Thoughts on Improving and Perfecting the Assessment Indicator System for Non-Transport Subsidiaries of China State Railway Group Co., Ltd.

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Abstract: To implement the Action Plan for Further Deepening and Upgrading the Reform of State-owned Enterprises and China State Railway Group Co., Ltd.'s (China State Railway) deployment on the integrated operation of transportation and non-transportation businesses, this paper aims to address the prominent issues in the assessment of non-transportation enterprises, such as ambiguous positioning and homogenized indicators. Based on guiding principles requirements and practical research, a "three-dimensional integrated, classified and hierarchical" assessment indicator system is constructed. This paper combs through the construction background and existing exploration of the assessment system for railway non-transportation enterprises, supplements theoretical underpinnings including Management by Objectives and Stakeholder Theory, and analyzes current assessment drawbacks such as insufficient indicator accuracy and low data collection efficiency. It clarifies the system framework centered on "integration, marketization and refinement", refines enterprise classification criteria and the logical framework for indicator design, and proposes application and optimization paths. The research provides institutional support for non-transportation enterprises to strengthen core functions and enhance core competitiveness, and also offers practical reference for the classified assessment of state-owned enterprises.

Keywords: Railway; Non-Transportation Enterprises; Assessment Indicator System; Integrated Operation; Classified Assessment

1. Introduction

1.1 Research Background

The deepening and enhancement actions for state-owned enterprise (SOE) reform explicitly require improving the scientific nature and guiding principles of SOE performance evaluation. As a super-large SOE vital to the national economy, China State Railway Group Co., Ltd. urgently needs to implement an integrated operation strategy for its transportation and non-transportation businesses, aiming to resolve issues such as "vague positioning and a one-size-fits-all evaluation approach" for non-transportation enterprises. Currently, non-transportation enterprises encompass diverse businesses including commercial travel services, engineering construction, technology, and information. They not only undertake the supportive function of serving the core transportation business but also need to explore external markets to increase revenue and profitability. The existing performance evaluation system lacks the targeted approach of "tailoring policies to individual enterprises," making it increasingly difficult to meet the developmental needs of different types of enterprises. By the end of 2023, China Railway's non-transportation enterprises already covered over 1,000 enterprises across eight major categories, with operating revenue accounting for more than one-quarter of China State Railway Group's total revenue. However, the lagging evaluation system has led to significant disparities in the profitability capabilities of some enterprises, with notable gaps in per capita profit generation among different non-transportation enterprises, making it challenging to meet the differentiated development needs of railway non-transportation enterprises.

Based on research data from five railway bureau group companies in Xi'an, Zhengzhou, Wuhan, and other locations, and in conjunction with China State Railway Group's policy documents on the performance evaluation indicator system for non-transportation enterprises under railway bureau group companies, this study

systematically reviews the current status, existing problems, and optimization directions for evaluating non-transportation enterprises. It aims to systematically construct a hierarchical, categorized, precise, and efficient performance evaluation indicator system. Through differentiated assessment, it seeks to guide non-transportation enterprises in strengthening their core functions and enhancing their core competitiveness.

1.2 Research Status

Regarding performance evaluation research, scholars both domestically and internationally have produced a wealth of scientific research findings that can provide significant support for developing performance evaluation systems for China State Railway Group's non-transportation enterprises. In terms of foreign theoretical research, the focus is primarily on performance evaluation tools such as the Balanced Scorecard and stakeholder theory. Peter Drucker, in The Practice of Management, emphasizes goal decomposition and performance linkage [1]. However, his research context is mostly based on highly marketized and privatized corporate environments, which substantially differ from the systemic and public welfare characteristics of China's railway industry. There is a lack of practical evaluation approaches that balance the public welfare and market functions of state-owned enterprises, making direct borrowing of limited applicability.

In domestic theoretical research, Li emphasizes that when formulating performance evaluation indicators for subsidiaries, group companies should fully consider the subsidiaries' industry characteristics, strategic positioning, and development stages, avoiding a "one-size-fits-all" evaluation method. Through differentiated indicator design and dynamic adjustment mechanisms, the actual performance of subsidiaries can be more accurately reflected, promoting the achievement of the group's overall strategic goals [2]. Cai et al. argue that when formulating differentiated control strategies for subsidiaries, group enterprises should select the most appropriate model based on their actual circumstances, avoiding blindly following trends or rigidly applying a predetermined control model [3]. Wang points out that when developing specific indicator systems, it is necessary to select indicators reflecting financial status, core competitiveness, organizational structure, and external stakeholders. However, during implementation, these choices must be scientifically made by fully integrating them with the group's strategic development objectives [4]. Mao classifies subsidiaries into three types: financial investment, strategic control, and operational control. He suggests that different performance management systems should be established for companies with different businesses and life cycles [5].

2. Theoretical Foundation

By studying relevant theories of performance evaluation management, this research provides support for the design of a performance evaluation indicator system for non-transportation enterprises under China State Railway Group. This ensures that the system design not only aligns with the principles of enterprise operation and management but also accurately translates strategic objectives into actionable measures.

2.1 Management by Objectives (MBO) Theory

Proposed by Peter Drucker, *Management by Objectives theory* emphasizes a clear goal-oriented approach, breaking down corporate strategy into quantifiable and achievable evaluation indicators. Through goal decomposition, execution monitoring, and outcome assessment, it aims to motivate both the organization and individuals. The evaluation system for China Railway's non-transportation enterprises centers on the core objective of "optimal overall benefit" translating strategy into indicators across dimensions such as integrated operations and market-oriented value creation. This aligns with the core logic of MBO theory.

2.2 Stakeholder Theory

Freeman posits that the relationships between an organization and its stakeholders should be adjusted based on their interests and characteristics. Stakeholders of non-transportation enterprises include China State Railway Group, the core transportation business, employees, and the public. The evaluation system must balance the demands of these diverse parties: it must meet the requirement of enhancing the overall benefit of China State Railway Group, support the core transportation business in reducing costs and

increasing efficiency, safeguard employees' sense of professional belonging, and contribute to social value creation, thereby achieving a win-win situation for all stakeholders [6].

2.3 Integrated Theory of OKR and KPI

OKR (Objectives and Key Results) focuses on strategic objectives and key outcomes, emphasizing challenge and alignment. KPI (Key Performance Indicators) emphasizes the quantitative evaluation of key performance metrics, focusing on operability and guidance. Integrating the two can achieve the dual goals of "strategic direction and performance execution" providing methodological support for designing both common indicators (OKR-oriented) and differentiated indicators (KPI-oriented) for non-transportation enterprises [7].

3. Current Status and Existing Issues in the Performance Evaluation of Non-Transportation Enterprises under China State Railway Group

Implementing differentiated evaluations based on enterprise functional positioning and business characteristics is an effective pathway to address the issue of a "one-size-fits-all evaluation approach" [8]. Non-transportation enterprises within China State Railway Group are categorized by market orientation into market-oriented, service-support, and comprehensive types, and are further subdivided into six major business sectors. This classification provides a theoretical basis for implementing category-specific evaluations.

Currently, various Railway Bureau Group Companies have undertaken fragmented explorations in evaluating their non-transportation enterprises. Some have attempted to design evaluation indicators based on business types, preliminarily establishing a prototype framework combining "profitability-type" and "support-type" indicators. Others have introduced quantitative metrics such as total profit and profit per capita to enhance the tangibility of evaluations. A limited number of units have explored "one enterprise, one policy" evaluation models to better align with the individualized development needs of enterprises. However, overall, the evaluation work lacks unified classification standards, indicator frameworks, and application mechanisms, and a systematic, standardized evaluation system has yet to be fully established. The main issues encompass the following four aspects:

Firstly, evaluation indicators lack precision and sufficient differentiation. Some indicators demonstrate poor adaptability across different enterprise types. For example, service-support enterprises and market-oriented enterprises are still assessed using partially homogenized profitability indicators, failing to adequately reflect the core distinction between their "support function" and "profit-generation function" orientations. Differentiated indicators are absent for certain business sectors (e.g., new energy), hindering the guidance of enterprises towards forward-looking business development. Furthermore, the weighting assigned to indicators lacks a dynamic optimization mechanism, preventing timely adaptation to business structure adjustments.

Secondly, significant challenges exist in data collection and quantification for evaluation indicators. Certain indicators lack unified quantification standards and data collection channels. For instance, data for indicators in the technology and information sector, such as "Information System R&D Fulfillment Rate" and "Maintenance Equipment Failure Rate," are dispersed across different management systems, resulting in inefficient aggregation and calculation. Clear calculation formulas and assessment criteria have not been established for a few indicators (e.g., "Low-Carbon Trading Contribution"), leaving quantitative evaluations without a solid foundation. Additionally, collecting data for some indicators necessitates the development of new system modules, and a mature data support system has not yet been implemented.

Thirdly, the application and linkage of evaluation results are weak. The mechanism linking evaluation indicators to the promotion of enterprise leaders or employee compensation incentives is inadequately developed. The magnitude of rewards and penalties does not sufficiently reflect performance disparities. A complete closed-loop process for feedback and corrective action based on evaluation results has not been fully established, leading to a lack of subsequent tracking and optimization measures for issues identified during evaluations. The application scenarios for indicators remain relatively limited and are not sufficiently integrated into core management processes such as strategic adjustment and resource allocation.

Fourthly, the dynamic adjustment mechanism for evaluation indicators is underdeveloped. Evaluation indicators fail to adapt promptly to changes in the market environment and updates in China State Railway Group's strategy, providing insufficient support for emerging businesses. Simultaneously, there is a lack of a cross-industry benchmarking system. Target values for some indicators are set merely by referencing historical internal data within the railway system, without fully leveraging advanced industry standards. Furthermore, the indicator adjustment process lacks regularized research and justification procedures, making it difficult to respond swiftly to evolving operational and managerial needs.

4. Construction Approach and Framework for the Performance Evaluation Indicator System of Non-Transportation Enterprises under China State Railway Group

4.1 Guiding Philosophy

Centered on the requirements for enhancing the core functions and market competitiveness of enterprises, the focus is on constructing a hierarchical, classified, scientific, and precise performance evaluation indicator system. This aims to strengthen the effectiveness of incentives and constraints, improve the guidance and standardization of evaluations, and provide a solid institutional guarantee for the sustainable, healthy, and specialized development of non-transportation enterprises.

4.2 Fundamental Principles

First, Adhere to Strategic Guidance for Optimal Overall Outcomes. Focus on the integrated operation strategy of China State Railway Group's transportation and non-transportation businesses. Guide non-transportation enterprises to extend the transportation service chain, expand the railway supply chain, and develop resource value chains. Achieve synergistic development between transportation and non-transportation businesses, with the core objective of optimizing the overall benefit of China State Railway Group.

Second, Uphold Classification and Tiering for Objectivity and Fairness. Classify enterprises scientifically based on market positioning and business sectors. Set differentiated indicators and weights to objectively reflect the operational results and actual contributions of different enterprise types, enhancing the fairness and relevance of evaluations. Persist with "one enterprise, one policy" to align with the individualized development needs of enterprises [9].

Third, insist on Scientific Precision and Balanced Rewards and Penalties. Adhere to the principle of "Three Precisions and Three Feasibilities," ensuring that indicator design precisely aligns with strategy, accurately targets business operations, and enables meticulous management processes. Indicators must possess the attributes of being quantifiable, comparable, and actionable. Integrate evaluation into daily management, encourage innovation and value creation, strictly penalize violations and disciplinary breaches, and use precise evaluation to promote refined management.

Fourth, Maintain Dynamic Optimization for Adaptive Development. Regularly conduct research on the effectiveness of indicator application in conjunction with market environment changes, strategic adjustments, and business development. Optimize indicator settings and weight allocations. Establish a cross-industry benchmarking mechanism and continuously enhance the scientific nature and forward-looking perspective of the evaluation system by referencing advanced standards.

4.3 System Framework Design

The design of performance evaluation indicators must ensure precise alignment with the functional requirements of railway enterprises, achieving accurate positioning and refined management [10]. Simultaneously, the evaluation indicator system should possess the characteristics of being quantifiable, comparable, and operable. This ensures that indicators not only meet strategic requirements but also have the conditions for practical implementation, thereby balancing scientific rigor and practicality.

Building on this foundation, a "three-dimensional integration, classification and tiering" evaluation system framework is constructed for non-transportation enterprises under China State Railway Group. The "three dimensions" refer to the three core indicator dimensions: Integrated Operations, Market-Oriented Value Creation, and Lean Management. "Classification" refers to dual categorization based on market positioning (market-oriented, service-support,

comprehensive) and business sectors (six major categories including commercial travel services, engineering construction management). "Tiering" refers to combining common indicators at the group level with specific indicators at the enterprise level, forming a clear, hierarchical, and highly adaptable evaluation system.

5. Design and Application of Evaluation Indicators

5.1 Indicator Classification Standards

5.1.1 Classification by market positioning

The evaluation indicators for non-transportation enterprises under China State Railway Group can be categorized into three types: market-oriented, service-support, and comprehensive.

Market-oriented indicators primarily target external markets beyond the railway sector. They aim at maximizing benefits and efficiency, focusing on cultivating businesses with high development potential, favorable market prospects, and substantial returns. Examples include enterprises like Anhui Railway Group Company and Shanghai Railway Construction Engineering Group. Their core evaluation revolves around market-oriented value creation indicators.

Service-support indicators mainly serve the internal railway market. Their goals are to enhance core functions and reduce costs for the primary transportation business, fostering businesses that can break market monopolies. Examples include enterprises like Shanghai Railway Materials Company and Shen-Tie Information Company. Their core evaluation focuses on integrated operation indicators.

Comprehensive indicators combine characteristics of both aforementioned types. Enterprises like Hua-Tie Travel Service Company belong here. Their evaluation involves a balanced set of indicators across all three core dimensions, accommodating both market value creation and service-support functions.

5.1.2 Classification by business sector

The evaluation indicators for non-transportation enterprises under China State Railway Group can be further subdivided into eight major categories: Commercial Travel Services, Engineering Construction Management, Comprehensive Land Development, Industrial Manufacturing and Maintenance, Technology and Information, Finance and Insurance, among others. Differentiated indicators are designed based on the characteristics of each sector. For emerging businesses like new energy, separate forward-looking indicator modules are added.

5.1.3 Classification by indicator function

The performance evaluation indicators for non-transportation enterprises under China State Railway Group mainly include:

Market-oriented indicators that encourage enterprises to increase revenue, create value, and expand into external markets.

Integrated operation indicators that reflect the function of serving the primary transportation business and support its cost reduction and efficiency improvement.

Lean management indicators that guide improvements in quality and efficiency.

5.2 Specific Indicator Design

5.2.1 Common indicators

Starting from the overall operational objectives (O) for China Railway's non-transportation enterprises—ensuring safety, benefit, and quality—and integrating the assessment requirements for SOEs focusing on profit and key ratios ("One Profit, Five Ratios"), corresponding Key Results (KR) are derived to serve as common performance evaluation indicators for these enterprises. The specific rationale is illustrated in Figure 1, with the detailed indicators as follows:

① Integrated Operation Category: Includes indicators such as Operating Revenue, Revenue per Capita, Asset and Resource Occupancy Fee, Integrated Operation Revenue Ratio, and R&D Investment Intensity. These guides non-transportation enterprises to support the primary business in reducing costs and increasing efficiency, achieving mutual promotion and common progress between transportation and non-transportation businesses.

② Market-oriented Value Creation Category: Includes indicators such as Total Profit, Profit per Capita, and Market Share Outside the Railway System. These encourage enterprises to explore external markets, increasing profits for the railway sector and creating value for society.

③ Lean Management Category: Includes indicators such as Return on Net Assets, Operating Cash Flow Ratio, and Clearance of Existing Risky Receivables. These ensure the standardized and healthy development of enterprises.

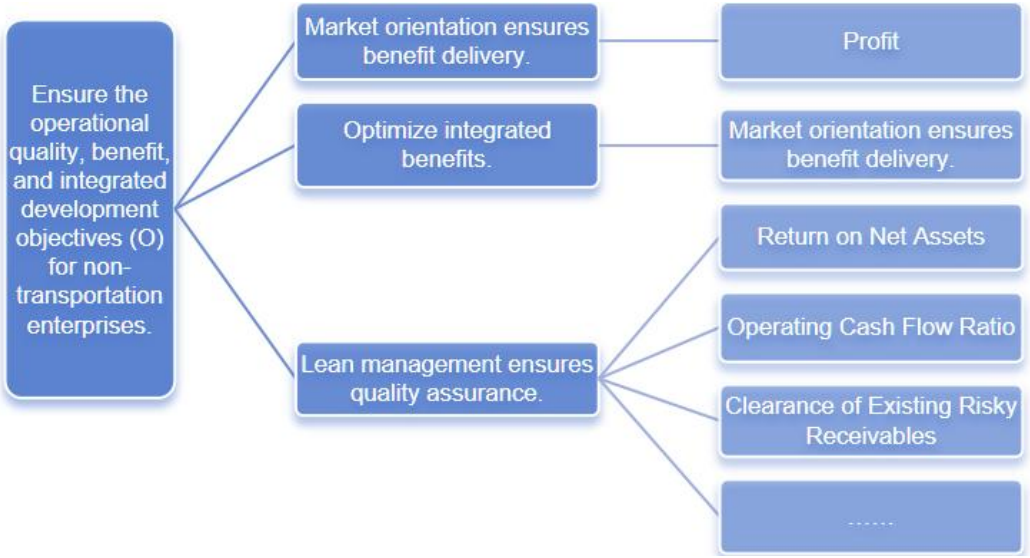

Figure 1. Common Indicator Design Framework

5.2.2 Differentiated indicators

Building upon the key indicators of concern for each business sector as identified by China State Railway Group, and incorporating the operational performance feedback reported by various Railway Bureau Group Companies during the research phase, a limited number of forward-looking and highly guiding KPI indicators are selected for each business sector according to the "Pareto Principle." This aims to guide different categories of enterprises in accurately defining their operational positioning and conducting their business activities more effectively. In subsequent evaluation indicator systems implemented by Railway Bureau Group Companies for their subordinate units, these indicators can be further refined and optimized based on their specific operational realities. The specific rationale is illustrated in Figure 2, with the detailed indicators as follows:

①Commercial Travel Services Sector: Includes indicators such as Sales Proportion of Budget Meals on EMUs, Commercial Revenue per Square Meter at Stations and on Trains, Number of Tourist Trains Operated, and Passenger Consumption Conversion Rate. The focus is on passenger service quality and operational profitability.

②Engineering Construction Management Sector: Includes indicators such as Extended Revenue from Both Ends of Railway-Related Projects, Total Annual Value of Contracts Undertaken for Engineering Projects, Technical Service Fees for Construction Coordination, and Grade of Railway Construction Qualifications. The orientation is towards market expansion and brand building.

③ Comprehensive Land Development Sector: Includes indicators such as Rent per Square Meter of Building Assets, Vacancy Rate, Absorption Rate, and Targets for Affordable Housing Construction. The goal is to improve asset utilization efficiency and income levels.

④ Industrial Manufacturing and Maintenance Sector: Includes indicators such as Cost Reduction Amount for Primary Business Achieved through Product Support, Proportion of Sales to Markets Outside the Railway System, and Failure Rate of Key Proprietary Products. The aim is to balance cost reduction and efficiency improvement with market competitiveness.

⑤Technology and Information Sector: Includes indicators such as Information System R&D Fulfillment Rate, Revenue from Transport Facility Maintenance Services, Profit Margin for Passenger Station Maintenance, and Maintenance Equipment Failure Rate. The emphasis is on strengthening service support and cost control.

⑥ Finance and Insurance Sector: Includes indicators like Proportion of Employee Insurance Handled via Self-Insurance. The focus is on the internal insurance protection function within the railway system.

⑦Other Sectors: For example, indicators for the New Energy sector could include Photovoltaic Power Consumption Ratio and Photovoltaic Project Commissioning Rate for Newly Built Station Buildings. These guide enterprises to develop low-carbon businesses and reduce electricity costs for the primary business.

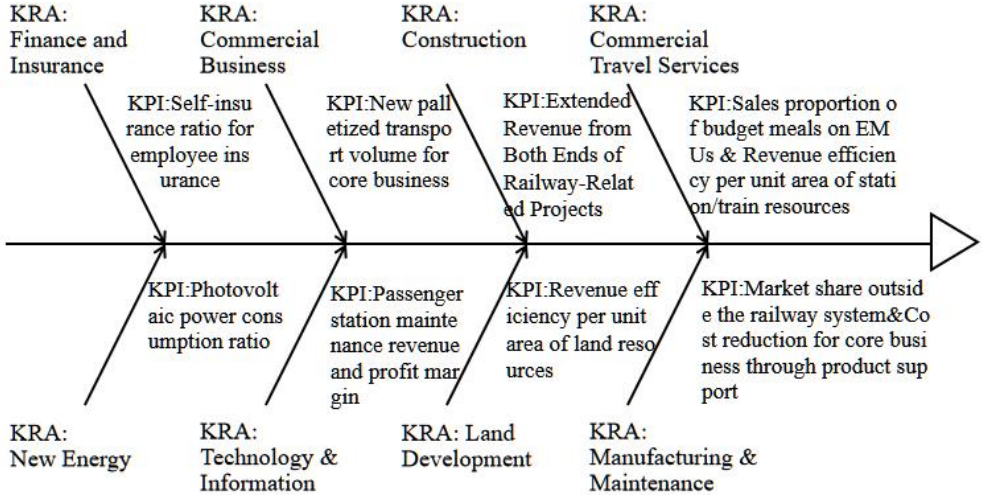

Figure 2. Design Framework for Differentiated Indicators

By integrating the considerations of both common and differentiated indicators, and taking into account the market characteristics of each business sector, the proposed indicator system for evaluating non-transportation enterprises under China State Railway Group is formed as presented in Table 1:

Table 1. Proposed Performance Evaluation Indicator System for Non-Transportation Enterprises under China State Railway Group

Category / Business Sector		Market-Oriented Operations	Integrated Support	Lean Management
Common Indicators	Total Profit	Asset and Resource Occupancy Fee		
Operating Revenue Indicators	Commercial Travel Services	Station Commercial & Advertising	Sales Proportion of Budget Meals on EMUs	Safety Metrics
	Industrial Manufacturing & Maintenance	Proportion of Sales to Markets Outside the Railway System	Cost Reduction for Core Business through Product Support	Asset-Liability Ratio
	Industrial Manufacturing & Maintenance	Extended Revenue from Both Ends of Railway-Related Projects	-	Operating Cash Flow Ratio
	Industrial Manufacturing & Maintenance	Rent per Square Meter of Building Assets	-	Return on Equity (ROE)
	Logistics & Commerce	-	New Palletized Transport Volume for Core Business	Profit to Investment Ratio
	Finance & Insurance	-	Self-Insurance Ratio for Employee Insurance	Risk-Adjusted Return on Risky Receivables
	Technology & Information	-	Passenger Station Maintenance Revenue and Profit Margin	Upstream Import Risk Gap Issues
	New Energy	Photovoltaic Power Consumption Ratio	Photovoltaic Project Commissioning Rate for Newly Built Station Buildings	-

5.3 Evaluation Application Mechanism

5.3.1 Target value setting

For market-oriented enterprises, the target value for benefit indicators is set based on the actual performance of the previous year, excluding significant one-off adjustments.

For service-support enterprises, the target value for benefit indicators is set at a break-even point, while the target for operating revenue is based on the previous year's actual performance.

For comprehensive enterprises, target values are

set using a weighted average based on the proportion of different business types.

Regional economic disparities are balanced through adjustment coefficients.

5.3.2 Scoring rules

The performance evaluation for non-transportation enterprises under China State Railway Group uses a base score totaling 100 points, covering core indicators such as safety, operations, and quality. Indicators for key tasks and comprehensive work assessments do not have a base score but are subject to a bonus/penalty point system.

For market-oriented enterprises, the bonus/penalty points for Total Profit, and for service-support enterprises, the bonus/penalty points for Operating Revenue, are capped at twice the base score of the respective indicator.

For all other indicators, bonus/penalty points are capped at the base score of the indicator.

5.3.3 Application of results

The evaluation results are incorporated into the performance assessment of enterprise leaders and the mechanism for determining total wage packages, serving as a critical basis for commendations, excellence recognition, and cadre selection. A feedback and rectification mechanism is established to develop optimization measures addressing identified issues. Evaluation results are linked to enterprise resource allocation and strategic adjustments, forming a closed-loop management cycle of "evaluation – feedback – optimization – improvement."

5.4 Data Collection and Assurance

Data is collected through the Non-Transportation Enterprise Asset Information Management System. Indicators already covered by existing systems are extracted directly; dedicated modules are created for uncovered indicators. A unified data reporting standard is established, requiring enterprises to provide supporting materials such as contracts and financial accounts, which must be stamped and uploaded to the system as evidence for evaluation and audit purposes. For data falsification discovered during audits, any previously awarded bonus points for the related indicator will be deducted at double the amount.

6. Research Conclusions

Based on China State Railway Group's policy documents and research practices, this paper constructs a performance evaluation indicator system for non-transportation enterprises centered on "integration, market orientation, and lean management," incorporating both common and differentiated elements. By scientifically classifying enterprise types, precisely designing indicator dimensions, and improving the application mechanism, it addresses the problems of "vague positioning, homogeneous indicators, and implementation difficulties" inherent in traditional evaluation systems. This approach remains faithful to original policy requirements and practical explorations while supplementing them with theoretical support and problem analysis. It provides an institutional guarantee for non-transportation enterprises to clarify their development direction and strengthen their core functions, and also offers replicable practical experience for the categorized evaluation of state-owned enterprises.

Considering the policy trends of market-oriented reform in the railway industry, the performance evaluation indicators for non-transportation enterprises under China State Railway Group can be optimized in four areas in the future:

(I)Build a big data collection and analysis platform to integrate data resources scattered across different systems, improving the accuracy of indicator quantification and the efficiency of data collection.

(II)Refine evaluation indicators for emerging businesses, dynamically update the indicator database, and adapt it to the needs of industrial upgrading and strategic adjustments.

(III)Strengthen the deep integration of evaluation results with talent development and resource allocation, improve the reward and penalty mechanism, and fully stimulate the initiative of both enterprises and employees.

(IV)Conduct cross-industry benchmarking research, learn from advanced experiences in the categorized evaluation of other state-owned enterprises, and continuously enhance the scientific nature and effectiveness of the evaluation system.

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