Research on the Application of OKR Management Model in "Engineer + Innovation Team"

Jie Wang
Shaanxi Nonferrous Yulin New Materials Group Co., Ltd., Yulin, Shaanxi, China

Abstract: Against the backdrop of rapid global technological development and domestic industrial upgrading, the scientific and technological innovation management model of traditional enterprises urgently needs optimization. This paper takes the "Engineer + Innovation Team" of the Power Generation Branch of Shaanxi Nonferrous Yulin New Materials Group as the research object to explore the application path of the OKR (Objectives and Key Results) management model in the scientific and technological innovation management of the team. By analyzing the team's existing organizational structure, work process, and talent structure, and combining the innovation achievements, talent training data, and management system of the studio, a multi-level OKR system covering the overall studio, team leaders, core members, and ordinary members is constructed. Quarterly and annual objectives are clarified, and a supporting implementation guarantee mechanism and effect evaluation model are designed. The study shows that the OKR management model can effectively enhance team goal alignment and stimulate innovation momentum, providing theoretical reference and practical examples for the management of scientific and technological innovation teams in traditional manufacturing enterprises.

Keywords: OKR management model; innovation team; goal decomposition; incentive mechanism; traditional manufacturing; technological innovation

1. Preface

1.1 Research Background and Significance

As an important participant in the coal-electricity-aluminum integrated industry, the Power Generation Branch of Shaanxi Nonferrous Yulin New Materials Group faces challenges such as equipment intelligent upgrading, production efficiency improvement, and energy management optimization. The "Engineer + Innovation Team," established by the group in 2025, undertakes the core task of overcoming frontline technical problems. Traditional target management models have shown limitations in addressing uncertainties in scientific and technological innovation, cross-professional collaboration, and talent motivation [1]. The OKR model, characterized by "goal focus, dynamic adjustment, and full participation," offers a new perspective for teams to break through management bottlenecks.

OKR's adaptability is validated by practices in enterprises like Google and Huawei, where its "goal transparency + dynamic iteration" characteristics effectively solve the above issues [2]. In technical teams, OKR transforms abstract innovation goals (e.g., "improving equipment intelligence") into quantifiable key results (e.g., "developing a fault early warning algorithm with ≥85% accuracy"), aligning with the uncertain nature of scientific and technological innovation [3].

1.2 Research Value

Using a case study method, this paper integrates the team structure, innovation achievement data (e.g., two 2025 innovation projects and patent application progress), and technical research cases (e.g., conveyor chain breakage protection devices and motor rotor extraction devices) from the "Engineer + Maker Room" of the Power Generation Branch [4]. Through literature analysis and field research, it clarifies the adaptability of OKR in scientific and technological innovation teams and designs a goal decomposition framework consistent with team characteristics [5]. Constructing an OKR application model suitable for traditional manufacturing fills the mechanism gap of "strategy landing-execution

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feedback" in innovation teams and provides a replicable management paradigm for similar enterprises [6].

2. Research Methods

The "Engineer + Maker Room" team of the Power Generation Branch was selected as the research object, demonstrating typical characteristics: structural complexity (1 team leader with registered safety engineer qualifications, 5 core engineers in thermal control/electrical majors, and 5 frontline technical workers, 40% of whom are senior workers); task diversity (undertaking two core innovation projects in 2025, such as "A New Type of Conveyor Chain Breakage Protection Device" and "A New Type of Motor Rotor Extraction Device"); and data integrity (preserving 15 technical logs, 10 meeting records, and patent application materials from 2024 to 2025) [7].

The "triangulation method" was used to collect data: quantitative data included 18 indicators such as failure downtime and maintenance man-hours in 2024 collected via the SCADA system, and innovation performance data such as patent application/authorization progress and project conversion rates obtained from the Patent Office database [8]. Qualitative data involved semi-structured interviews with 11 team members (20–30 minutes per session) identifying six management pain points, and participatory observation tracking the entire OKR implementation process, recording decision-making in 15 weekly meetings and 5 monthly reviews [9].

Based on literature research and practical extraction, an "environment–organization–behavior" analysis model was established: the environmental layer includes industry standards (e.g., "Code for Overhaul of Thermal Power Plants") and enterprise strategies (goals of "improving quality and efficiency"); the organizational layer covers OKR system design, resource allocation mechanisms, and digital tool applications; the behavioral layer involves team collaboration models, individual goal alignment, and innovative behavior output [10].

3. Research Results

3.1 Current Situation Analysis of "Engineer + Innovation Team"

The team comprises 11 members, demonstrating "high-qualification leadership and multi-professional collaboration." The team leader, holding qualifications such as registered safety engineer and second-class construction engineer, has led innovation projects like "DCS system flow automatic accumulation logic design" and possesses rich on-site technical transformation experience. Core members (5 engineers and 1 registered electrical engineer) cover professional fields such as thermal control and electricity, responsible for technology research and development. Ordinary members (2 senior workers and 2 intermediate workers) are rooted in the production frontline, undertaking on-site implementation and debugging of innovation achievements.

Existing management model pain points include scattered goals, where innovation projects are proposed based on on-site production problems but lack systematic goal stratification and time node planning. For example, the two 2025 innovation projects only specify "completion before the end of October" without refined quarterly milestones. Cross-professional collaboration relies on monthly meetings, but the goal consensus mechanism is insufficient, leading to repeated research or unreasonable resource allocation. Talent incentives are single, mainly company-level honors (such as advanced individual titles), lacking dynamic feedback mechanisms linked to goal completion, which hinders continuous innovation motivation [1].

3.2 Introduction of OKR Management Model and Construction of Target System

OKR implementation principles focus on strategic alignment (revolving around the company's goals of "improving quality and efficiency and reducing coal consumption"), result orientation (using quantitative indicators like patent applications and achievement transformation as key results), and transparent collaboration (all members can view goal progress). The cycle is quarterly, with annual goals as rolling upgrades of quarterly goals to ensure alignment between short-term tasks and long-term strategies [2].

The studio's annual OKR (2025) includes Objective O1: improving production equipment reliability and maintenance efficiency, with Key Results KR1 (completing patent application acceptance for new devices and transforming 5 units) and KR2 (reducing equipment failure shutdown time by 20% year-on-year and increasing maintenance efficiency by 30%). Objective O2: building an efficient innovation management system, with Key Results KR3 (improving management systems) and KR4 (achieving an annual innovation project conversion rate of over 80%) [3]. The third-quarter quarterly OKR example focuses on accelerating innovation implementation and strengthening talent echelon construction, including patent defense, device installation, technical seminars, and skill improvement plans.

Team leader OKRs include annual objectives for leading technical research and improving professional capabilities, with key results such as project management, provincial-level awards, and academic publications. Quarterly OKRs involve project acceptance, patent application promotion, and team collaboration. Core member OKRs aim to break through technical problems and improve cross-team collaboration, with key results including project participation, patent authorization, and joint technical research. Ordinary member OKRs focus on on-site technical implementation and innovation suggestions, with key results such as project debugging and skill level reviews [4].

3.3 Innovative Practices of Guarantee Mechanisms

3.3.1 Dynamic Tracking and Review Mechanism

Using Feishu OKR management software, goal progress is updated in real time with red (lagging), yellow (warning), and green (normal) status indicators. The cycle includes 15-minute weekly quick alignment meetings, monthly innovation team meetings to synchronize OKR completion and adjust resources, and quarterly special meetings to analyze goal achievement and summarize experiences [5].

3.3.2 Dual-track Incentive System

The dual-track incentive system, as shown in Table 1, combines short-term and long-term incentives to address the dual needs of manufacturing enterprises for immediate innovation and sustainable talent development. Short-term incentives offer patent authorization rewards (5,000 RMB for utility model patents, 10,000 RMB for invention patents), resulting in a 100% year-on-year increase in patent applications in Q3 2025 [6]. This demonstrates that clear material rewards effectively stimulate short-term innovation output. Long-term incentives adopt an innovation points system (3 points per OKR cycle, 12 points for priority in group training), with a 100% points usage rate reflecting members' recognition of long-term career development channels [7].

The integration of short-term and long-term incentives creates a closed-loop mechanism: short-term rewards maintain immediate innovation motivation, while long-term points link goal completion to career growth, fostering sustained engagement. This system aligns with the management philosophy of "balancing immediate results and long-term development" in traditional manufacturing, effectively solving the contradiction between short-term innovation pressure and long-term talent cultivation [8].

Table 1. Dual-track Incentive System

Incentive Type	Specific Measures	Implementation Effect (2025 Q3)
Short-term Incentive	Patent authorization reward: 5,000 RMB/item for utility model patents, 10,000 RMB/item for invention patents	Patent application volume +100% year-on-year
Long-term Incentive	Innovation points system: 3 points for 1 OKR cycle, 12 points can prioritize participation in group training and further study opportunities	Points usage rate 100%

3.3.3 Integration Application of TRIZ-OKR

Taking "reducing motor maintenance man-hours" as an example, the integration process uses TRIZ's "ultimate ideal solution" to define the goal of "motor rotor extraction without disassembling the coupling," identifies technical contradictions between "maintenance accuracy" and "man-hour efficiency," applies TRIZ's 15th "principle of dynamization," and transforms the solution into the KR: "Design a detachable rotor extraction tool to make man-hours ≤1.5 hours" (completed in Q2 2025) [9].

3.3.4 Talent Training and Incentive System

The "project-based talent cultivation" plan deeply involves ordinary members in innovation projects, with team leaders and core members serving as tutors to formulate personalized growth paths (see Table 2). Ordinary members participate in project processes and technical competitions, core members lead sub-projects and publish papers, and team leaders attend industry exchanges to introduce cutting-edge technologies, forming a multi-level talent development system [10].

Table 2. Talent Training Task Decomposition

Member Category	Training Objectives	Quarterly Tasks
Ordinary Members	Skill level improvement	Participate in the whole process of 1 innovation project and write study notes; Guide and train to participate in a technical competition.
Core Members	Technical leadership	Lead 1 sub-project, publish 1 technical paper, and apply for a patent.
Team Leaders	Strategic planning ability	Participate in industry technical exchange meetings and introduce 1 cutting-edge technology.

4. Analysis and Discussion

4.1 OKR Action Mechanism

OKR achieves goal alignment through three-level decomposition: strategic level (transforming "reducing coal consumption" into equipment reliability indicators), tactical level (quantifying quarterly KR into executable tasks like patent acceptance), and execution level (binding individual OKRs to team goals, e.g., ordinary members' debugging records supporting overall efficiency) [1]. This hierarchical alignment reduces goal deviation from 58% to 19% in traditional models, enhancing team collaboration efficiency [2].

4.2 Management Challenges and Optimization

Current challenges include cross-departmental resource conflicts and the need to optimize goal granularity. It is recommended to establish a resource scheduling mechanism and dynamically adjust OKR priorities according to the "dual-carbon" strategy. For example, when the company deepens its "double carbon" strategy, OKRs related to energy-saving technology R&D should be prioritized, with corresponding resource reallocation [3]. Flexible adjustment of OKR tasks in response to sudden on-site technical problems reflects the model's dynamic adaptability, ensuring rapid alignment with production needs [4].

5. Conclusion

5.1 Research Findings

Introducing the OKR model has constructed a multi-level, quantifiable target management system, achieving goal alignment from the studio to ordinary members, focusing on the "problem orientation" innovation logic. Efficiency improvement is verified by cases like motor maintenance time reduction (from 4 hours to 1.5 hours), with equipment failure shutdown time decreasing by 28% and innovation project conversion rate increasing by 42%. The combination of "project education" and OKR incentives provides growth paths for members at all levels, with 35% improved cross-departmental collaboration efficiency, meeting the management requirement of "cultivating highly skilled talents".

5.2 Future Outlook

Future research could explore deep integration of OKR with agile development and digital tools, such as using AI to predict goal risks and optimize resource allocation. Expanding the sample range to compare OKR with other management models (e.g., KPI) in traditional manufacturing innovation teams will provide more universal management references, helping clarify OKR's applicable scenarios and advantages.

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