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Research on the Optimization Path of Employee Promotion Channel in Geological Exploration State-Owned Enterprises Based on Competency Model

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Abstract

This paper addresses the talent loss and structural contradictions of technical personnel caused by the single-channel promotion model of "excellent technicians becoming administrators" in the traditional promotion system of geological exploration state-owned enterprises (SOEs). It conducts an in-depth analysis of the predicaments under the current system: technical backbones are forced to transfer to management positions, resulting in a breakdown of core technical capabilities; and young talents face high turnover rates due to difficulties in promotion. Based on the competency model, this study proposes an optimization path for a three-channel promotion system (technical, management, and project channels) by establishing a "competence-performance-potential" triangular dynamic evaluation mechanism and integrating differentiated quantitative standards for core competencies of positions. Additionally, it supports the system with a stepped development support toolkit and incentive-compatible measures, aiming to provide talent guarantees for the strategic transformation of geological exploration SOEs.

Keywords

Competency Model, Geological Exploration State-Owned Enterprises, Three-Channel System, Triangular Dynamic Evaluation, Technical Talent Retention

1. Introduction

The geological exploration industry is undergoing a strategic transformation

from traditional mineral exploration to broader "macro-geological" services, such as new energy development, urban geology, and disaster prevention. However, it currently faces severe challenges in talent development. Technical personnel rely heavily on a single administrative promotion channel, while young technical backbones are leaving due to limited advancement opportunities. Their core demands clash sharply with the existing system: they seek to prove their value through practical achievements like breakthroughs in deep mineral exploration or emergency responses to geological disasters, yet promotion evaluations remain dominated by seniority and paper publications. Key competencies, such as blind-test accuracy of rock core identification or emergency drill repair efficiency during storms, lack quantitative standards. In light of new requirements for upgrading and high-quality development (Wang, 2025), traditional geological exploration SOEs—focusing on mineral exploration, engineering surveys, environmental monitoring, and similar activities—urgently need to reshape and optimize their employee promotion systems by constructing a scientific competency model (Kang, 2024). This will fully unleash employee potential, improve operational efficiency, and enhance output quality, which holds profound strategic significance for ensuring national energy and resource security, supporting ecological civilization construction, and achieving sustainable enterprise development.

The so-called competency model refers to a systematic framework that identifies and quantifies the combination of knowledge, skills, professional qualities, and underlying attributes that distinguish high performers from average performers for a specific position or career path. Its core value lies in transforming "abstract capabilities" into specific, assessable, and developable indicators. By optimizing the promotion system based on this model, geological exploration enterprises can address the long-standing evaluation pitfalls of prioritizing seniority over practical ability and emphasizing academic publications over real-world performance. This approach not only fully unleashes employees' potential and enhances operational efficiency and output quality but also holds profound strategic significance for safeguarding national energy and resource security, supporting ecological civilization construction, and achieving sustainable corporate development.

Based on the competency model, this paper attempts to reconstruct the promotion logic for geological exploration SOEs. By establishing a three-channel promotion system (technical, management, and project channels), designing a "competence-performance-potential" triangular dynamic evaluation mechanism, and incorporating differentiated quantitative standards for core competencies across positions, it proposes an optimized path for the three-channel promotion system. This is supplemented with a stepped development support toolkit and incentive-compatible measures to provide talent guarantees for the strategic transformation of geological exploration SOEs.

2. Current Situation and Causes of Promotion Dilemmas in Geological Exploration SOEs

2.1. Current Manifestations of Promotion Dilemmas

1) Single Promotion Channel. Under the existing system, the structural dominance of the administrative sequence squeezes the career development space for technical personnel, leading to a narrowing of career paths. Most technical personnel view "entering the management sequence" as their career goal, resulting in a constrained development trajectory. This structural imbalance is reflected in data from a survey design institute: the ratio of technical personnel to management personnel (including administrative support and logistics) is only 1:3, and the salary ceiling for senior engineers is only comparable to that of section-level management positions, indicating a significant inversion between the professional value and compensation of technical roles. Meanwhile, although some units nominally establish a "project manager sequence," project experience is not incorporated as an independent promotion path in professional title evaluations. For example, a project backbone in a geological exploration group was denied a professional title promotion due to "lack of management experience" despite completing three large-scale exploration projects, highlighting the disconnect between project contributions and promotion qualifications.

2) Unclear Evaluation Standards. The current talent evaluation system in the geological exploration industry exhibits structural imbalances, with easily quantifiable indicators such as seniority and paper publications accounting for over 60% of the weight. In contrast, core competencies critical to practical work effectiveness—such as field operational skills and emergency response capabilities—lack scientific assessment models and quantitative pathways, remaining marginalized in the evaluation system. This imbalance directly leads to the phenomenon of "seniority overriding ability, papers prioritized over drilling skills" becoming widespread in the industry. A typical case involves a technical competition champion in a Jiangxi geological survey unit who, despite outstanding professional performance, was excluded from eligibility as a project technical leader due to "less than five years since undergraduate graduation." A deeper contradiction lies in the homogenized "single metric" problem in assessments. For instance, positions with significant differences, such as mineral exploration and laboratory testing, share a assessment standard centered on "scientific research outputs," inherently placing hands-on talents who require long-term field experience at a disadvantage in promotions, with their success rate being less than one-third of that of laboratory personnel.

3) Information Asymmetry in Development Support. The development support system in the geological exploration industry suffers from a dual disconnect: First, training resources are significantly mismatched. Only 29% of institutions have established a layered and classified training system, leading to advanced technical training resources (e.g., AI geological modeling) being disproportionately allocated to administrative departments, while field personnel (e.g., a drilling

crew) still use two-decade-old drawing templates, creating a "digital divide" in technological iteration. Second, there is a systematic lack of post-promotion management support. Survey data from a Shandong geological survey institute show that 65% of newly promoted managers have not received systematic leadership training. As a result, technically proficient professionals often struggle after transitioning to management roles due to a lack of core management skills such as team coordination and budget control, frequently leading to "team management failures" and falling into a "promotion without support" dilemma.

2.2. Causes of Promotion Dilemmas

1) Structural Hindrance of Professional Value by Administrative-Sequence-Dominated Single Promotion System. The long-standing official-rank-oriented culture in geological exploration units has evolved into an institutional issue that systematically undermines the value of professional expertise. This impact manifests through three dimensions: promotion channels, resource allocation, and professional title evaluations, imposing structural limitations on technical talents. As a typical technology-intensive field, geological exploration should treat technical talents such as geological engineers and geophysical experts as core pillars. However, the rigid administrative-dominated structure in practice has led to the systematic devaluation of technical expertise.

2) Institutional Defects: Evaluation System Design Inertia and Disconnect from Core Job Competencies. The current talent evaluation system in geological exploration units exhibits a reliance on "seniority and papers," reflecting a misalignment between institutional design and the core competency requirements of positions. This deviation not only gives excessive weight to visible evaluation indicators but also weakens the professional attributes of the industry, resulting in a quantification tendency that diverges from actual job needs. As a highly practical applied science, the value of geological exploration should be demonstrated through practical outcomes such as exploration breakthroughs, disaster prevention, and technological innovation. However, the evaluation dimensions remain overly focused on external indicators like paper counts and years of experience.

3) Systemic Lag of Talent Development Support System Behind Strategic Transformation Needs. Amid technological innovations such as artificial intelligence and satellite remote sensing impacting the geological exploration industry, its talent training system shows significant gaps, reflecting a systemic lag between support mechanisms and the industry's strategic transformation needs. This lag is evident not only in insufficient intergenerational skill iteration but also in the poor adaptability of incentive mechanisms to emerging technological fields, making talent structure imbalance a critical factor hindering industry transformation (Zhang & Cao, 2022). Geological exploration is currently transitioning deeply from the traditional "hammer and magnifying glass" model to a "smart geological cloud" model. However, the existing talent development system still follows traditional frameworks, struggling to meet the practical demands of digital and green

transformation.

3. Optimization Path for Employee Promotion Channels in Geological Exploration SOEs

3.1. Three-Channel System Design

To address the promotion challenges in the geological exploration industry, three differentiated development pathways have been established.

First, the technical pathway introduces a "Chief Geologist-Senior Engineer-Technical Expert" sequence, where the highest remuneration is directly aligned with the VP level, and technical experts are granted participation in strategic decision-making-for instance, a Chief Geologist at a coal survey institute once directly vetoed an overseas acquisition deal that violated metallogenic based on this authority.

Second, the management pathway strengthens progressive cultivation from "Project Leader to General Manager," mandating cross-departmental rotation as a rigid requirement to systematically develop versatile leadership.

Third, the project pathway innovatively creates an independent promotion ladder, explicitly stating that those leading national key projects with achieved performance targets (e.g., the deep mineral exploration practice in Shandong) can bypass quota restrictions for exceptional promotion to senior professional titles, making significant engineering contributions the hard currency for career advancement.

3.2. Dynamic Evaluation Based on Competency Model

The promotion evaluation mechanism innovatively adopts a "Capability-Performance-Potential" triangular assessment method with a weight ratio of 4:3:3. Forty percent of the weight is allocated to competency, as it forms the core foundation for realizing position value. For technology-intensive roles such as mineral exploration and geological disaster prevention, the proficiency in core skills-such as core identification and emergency drill execution-determines work quality and safety. These "hard support" skills help avoid biases in evaluating performance or potential that lack a competency basis. Thirty percent of the weight is assigned to performance, which directly reflects the translation of capability into outcomes. A dynamic difficulty adjustment coefficient can accurately quantify contributions in high-risk projects, ensuring short-term goal achievement and evaluation fairness. The remaining thirty percent is devoted to potential, a key variable in adapting to the industry's digital transformation. VR scenario testing, for example, assesses adaptability, aligns with long-term organizational strategy, and prevents lagging talent development.

This weighting logic follows a progressive "Foundation-Outcomes-Future" structure, covering the full lifecycle of talent value. It is tailored to the characteristics of technical positions, balancing uniformity and specificity in evaluation. Moreover, it aligns with the high-quality development trends of the mineral industry, ensuring the evaluation system resonates with industry needs and achieves

a multidimensional measurement of talent value.

3.3. Continuous Development Support System Post-Promotion

A full-cycle support mechanism for talent development is established, employing a stepped escort approach (Cheng, 2025):

Pre-Promotion: Implementing a "dual-mentor system," where technical experts and senior managers form joint training groups. For instance, a technician in a geological survey team, under the guidance of both a field mapping expert and a project manager, became a versatile project leader with both technical depth and management breadth within two years.

Post-Promotion: A six-month capability transition period is provided, accompanied by a "management toolkit" containing practical tools such as "10-Minute Team Conflict Resolution" and "Budget Negotiation Handbook," enabling a smooth transition from technical experts specializing in stratigraphic structures to practical commanders adept at managing team dynamics.

Building a full-cycle talent development pathway, a phased support mechanism is implemented.

Pre-promotion, a "dual-mentor system" pairs technical experts with senior managers for joint development-for example, a field survey technician under the guidance of both a mapping expert and a project manager became a multi-dimensional project lead with both technical depth and management breadth in just two years.

Post-promotion, a 6-month transition period is established, supplemented by a practical "management toolkit", enabling a smooth shift from a technical specialist focused on stratigraphic structures to a hands-on leader adept at managing team dynamics.

3.4. Expected Outcomes

Based on the competency model, the triple-path promotion system (technical, managerial, and project-based) is designed to resolve traditional promotion dilemmas through differentiated mechanisms (Wu, 2025), ultimately achieving comprehensive improvement in talent retention, development, and collaborative efficiency. By substantially enhancing the remuneration and status of top technical roles, it breaks the suppression of professional value by the "official rank-oriented culture," significantly boosting the sense of belonging among senior technical talents. Through the exceptional promotion mechanism in the project channel, it creates a results-driven growth ladder for young key employees, effectively shortening their career development cycles. Moreover, by mandating collaborative competence in the quality evaluation system, it transforms cross-department cooperation from passive coordination to proactive synergy.

According to research feedback, the expert forecasting method was employed, convening a panel including senior experts from the geological exploration industry, HR directors from state-owned enterprises, and university professors, covering practical, managerial, and academic dimensions. Using the Delphi method,

three rounds of prediction were conducted: the first round involved independent expert input on indicator ranges; the second round refined and narrowed these ranges based on three industry reform cases; the third round achieved consensus through discussion, finalizing the data. The data in Table 1 clearly demonstrates the anticipated effectiveness of the above optimization path.

Table 1. Expected outcome data.

Indicator	Pre-Optimization	Expected Post-Optimization	Driving Factor
Senior Technical Talent Retention Rate	58%	85%↑	Top-level compensation in technical channel
Young Backbone Promotion Cycle	8 - 10 years	5 - 6 years↓	Exceptional mechanism in project channel
Cross-Department Collaboration Efficiency	Low (35 points)	High (80 points)↑	Competency evaluation forcing collaboration

However, it should be noted that the optimization of promotion channels in state-owned geological exploration enterprises (SOGEEs) may face multiple challenges during implementation.

Firstly, the entrenched administrative culture can easily trigger organizational resistance. Long-standing "official rank-oriented" mindsets have led some administrative staff to resent the increased weighting of technical and project pathways, fearing a dilution of their own authority. This may result in covert obstruction during review processes and resource allocation, undermining the fair implementation of the triple-path system.

Secondly, there are practical difficulties in applying quantitative standards. Core competencies such as field operational capability and emergency response proficiency require specialized tools and personnel for quantitative assessment. However, many veteran employees exhibit low receptivity to new methods like VR testing and competency point apps. Moreover, grassroots units often struggle to fully equip assessment systems due to budget constraints, leading to compromised execution of the evaluation mechanism.

Thirdly, the distribution of incentive resources may spark new conflicts. Preferential incentives such as project bonuses and "Geological Artisan Studios" tilted toward technical and project sequences could provoke perceived inequity among administrative staff if communication and balance are inadequately handled, potentially harming team collaboration and morale.

4. Safeguard Measures for Employee Promotion Channels in Geological Exploration SOEs

1) Organizational Safeguards. Restructure the promotion review committee,

mandating that technical sequence members constitute no less than 50% of the committee. Increase the weight of expert reviews from 20% to 60%, fundamentally ending the chronic issue of "administrative leaders judging professionals as outsiders" and ensuring that professional ability assessments return to technical rationality. Innovate tools for quantifying implicit competencies. Develop a dedicated mobile application (Competency Points APP) that allows field personnel to upload work videos of critical scenarios such as emergency rescue and complex fault handling, systematically accumulating and displaying practical ability points that are difficult to reflect in traditional assessments.

2) Incentive Compatibility. Implement a profit-sharing mechanism at the project level, explicitly stating that shale gas exploration teams can extract 15% of net project profits as a special reward fund, directly linking the value return of high-risk exploration work to team output. Open new paths for spiritual incentives. Establish named "Geological Craftsman Studios" for chief technical experts and innovatively allow their personal technical achievements to be named as industry-standard methods (e.g., "Zhang's Fault Rapid Determination Method"), enabling top experts to gain both material rewards and historical recognition for their professional contributions.

5. Conclusion

This study addresses the structural contradictions within the traditional promotion system of state-owned geological exploration enterprises (SOGEEs) by constructing a triple-path promotion framework-technical, managerial, and project-based-grounded in the competency model. Supported by a dynamic "Capability-Performance-Potential" triangular evaluation mechanism and phased developmental tools, it offers a theoretical pathway to resolve the talent drain and technical discontinuity caused by the practice of promoting technical experts solely into managerial positions. It also provides a reference framework for aligning with the "macro-geology" strategic transition and addressing corresponding talent demands.

It should be objectively noted that this study has three limitations. First, the conclusions are derived from analysis of the industry's current state and theoretical deduction rather than empirical implementation in a specific SOGEE. As such, there is a lack of quantitative data on promotion efficiency, talent retention rates, or evaluation fairness from real-world application, meaning the feasibility of the proposal still requires validation through practice. Second, while quantitative competency standards were designed for three core positions, the study does not fully cover the specificities of specialized sub-positions such as geophysical and geochemical exploration within the industry, potentially leading to standard adaptation biases. Third, it does not sufficiently account for variations among SOGEEs in different regions or with different business priorities, so the universal optimization path may increase implementation adjustment costs for some enterprises.

Future research could be deepened in three directions: First, conducting longitudinal case studies over 1 - 3 years across diverse types of SOGEEs to validate the actual impact of the triple-path system on talent retention and promotion cycles. Second, refining competency indicators for specialized sub-positions to develop a "general + specific" evaluation standard system and improve evaluation precision. Third, leveraging digital technology to develop competency assessment platforms and talent development profiles, thereby optimizing promotion management efficiency.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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