

Research on Human Resource Management and Training Optimization Strategies for Power Companies under the New Power System Transformation

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Abstract: The current electric power industry is facing a critical stage of transition with deep construction of smart grids, accelerated energy structure adjustment, and comprehensive implementation of the "dual carbon" strategy: The traditional power system will be comprehensively upgraded into a cleaner, smarter and more digital new power system^[1]. They are all major players from aspects such as energy supply, grid operation and maintenance, and energy transition, power companies have prominent problems such as lack of total personnel, unbalanced talent structure, lagging professional competencies and insufficient adaptation of human resource management system amid rapid expansion of business scale and continuous implementation of new businesses^[2]. The traditional human resource management model and extensive training system can no longer meet the core demands of high quality enterprise development and power grid transformation anymore. Based on the actual situation of the rapid development of power companies, this paper systematically analyzed the existing deficiencies of corporate human resource management and employee training, deeply explored the core causes of personnel shortage, and according to the demand characteristics of the new power system construction for interdisciplinary, skilled and innovative electric power talents, put forward targeted optimization strategies for human resource management, establishing a precise training system, improving talent echelon construction etc., which provides practical reference for power companies to solve the talent supply-demand contradiction, consolidate talent support, promote industry transformation and upgrade and long-term corporate development.

Keywords: new power system, power companies, human resource management, employee training, talent development

1. Introduction

With the "dual carbon" goals as well as the deepening energy revolution, the electric power industry is undergoing disruptive changes in new businesses such as smart grids, renewable energy integration, energy storage technologies, digital operation and maintenance, and smart power dispatching that are being rapidly implemented, bringing about profound changes to their production method, business model and operation and maintenance systems. At the national level, because of the constantly advancing power system reform, expanded grid construction scale, extended power supply service coverage, and continued expansion of supporting businesses for new energy, there are rapid development opportunities for power companies: The business volume of power company grows steadily, the speed of projects' construction speeds up, and the workload of front-line operation and maintenance and technical services increase significantly; They have entered a golden stage of rapid development^[3].

Despite rapid development by the power company, there are increasing contradictions between the supply and demand of human resources, like shortage of personnel, talent gap and lack of capabilities, which gradually becoming a key bottleneck restricting corporate development^[4]. Staffing of traditional power positions are generally rigid, expanding talent gaps for professionals working on new power businesses (intelligent operation and maintenance, new energy technologies, digital management, and safety risk control), and the iteration rate of existing workforce's skills is much slower than the pace of industry transformation: outdated skill system can not satisfy the work needs of new positions, thus it leads to inefficiency human resources maximization. Most power companies still use traditional human resource management models with no forward-looking talent planning, unscientific staffing, untargeted

training systems and inadequate incentive mechanisms, causing existence of both personnel shortages and talent waste^[5].

Most important strategic resource in power enterprises: The primary driving force ensuring the safe and stable operation of the power grid, driving the digital and intelligent transformation of enterprises, optimizing the energy structure; under the dual background of industry transformation and rapid enterprise development, solving the problems with human resource management, optimizing employee training system, alleviating personnel shortage and building a high quality professional workforce for the high-quality development of power companies have become an important issue^[6], therefore according to the development trend of the power industry and the actual business operations of enterprises, focused on the core pain point of personnel shortages, explore the optimization path of human resource management and training, provide support for power companies overcome the dilemma of talent development and consolidate its core competitiveness is the purpose of this paper.

2. Development Status and Core Human Resource Dilemmas of Power Companies

2.1 Significant Rapid Development Trends of Enterprises and Continuous Expansion of Business Demands

With the comprehensive advance of new power system construction in recent years, the business boundary of power companies keeps expanding and the overall volume of business is constantly increasing: traditional basic businesses (power transmission and distribution, power supply services, grid operation and maintenance), keep improving both in quality and scale; emerging businesses (renewable energy integration and consumption, energy storage power station operation and maintenance, smart grid dispatching, digital power services, integrated energy services) rises rapidly. Business structure of enterprises is continuously optimized, but at the same time its operational scales are consistently expanded. With social electricity demands increase year by year, major projects like grid transformation and upgrading, urban and rural grid construction, power security assurance was continuously carried out which greatly increases workloads for various positions such as frontline operations, technology research and development, operation and maintenance management, customer services within power companies. All enterprises develop rapidly and work hard generally speaking.

With the rapid development of business, there are new demands on quantity, quality and structure of human resources that not only require sufficient frontline practical operators to implement basic businesses, but also have many interdisciplinary talents who possess professional knowledge in intelligence, digitalization, and new energy to develop new businesses. Demand for talent reflected by their characteristics is as follow: "expansion in total volume, optimization in structure, and upgrading in capabilities".

2.2 Core Human Resource Dilemmas: Coexistence of Personnel Shortage and Inefficiency

With rapid enterprise development, there is an imbalance between human resource supply and demand with four core problems including total shortage, structural imbalance, capability lag and extensive management which greatly restricts the improvement of quality and efficiency for enterprise development.

Firstly, there is a complete lack of personnel; the gap between jobs keeps widening: Power industry is a technology intensive and high safety risk industry with strict requirement on professionalism and compliance. With expansion of business scale and implementation of new projects, personnel at the front line (operation and maintenance, overhaul, dispatching, and marketing) has been in overload working state for a long time, lacked sufficient staffing, difficulty in shift replacement, and normalized overtime exist widely. New emerging businesses like new energy, digitalization and smart grids develop rapidly while supply of corresponding professional talents is insufficient, and recruiting external talent is difficult and time consuming which aggravate the shortage of personnel, impact the efficiency of advancing projects and the quality of power supply services.

Secondly, There's an imbalance in talent structure with a talent gap being relatively prominent. Personnel composition: For Power companies, They face the dilemma of "There exist redundancy for traditional positions while shortages for new positions; surplus at grassroots level practical operator but shortage of high-end technical and management personnel". A large amount of employees are deep involved in traditional power operation, maintenance, and overhaul services without knowing new energy

technologies, intelligent equipment operation, and digital management. Reserve of young backbone talents is insufficient, the skill iteration speed of middle-aged employees is slow, the innovation capability of senior employees lacks, and there is no continuity of talent echelon construction so that it can't meet diversified and intelligent development demands of enterprises.

Thirdly, Lack of capability among employee with inadequate adaptability to transformation. New technologies, new equipment, new process (intelligent inspection, digital dispatching), are widely used in the new power system construction, comprehensive upgrading for work standard, technical requirements, safety regulation on position is made; Most of current employees rely on their traditional work experience without any new skill training. The outdated knowledge system and singular professional skills, low digital literacy make them cannot adapt to the work requirement of new positions which causes an awkward situation having people but lacking capabilities, indirectly aggravate the problem of human resource shortage.

Fourthly, There are abundant human resource management, but the efficiency of allocating resources is low. Some power companies don't have forward-looking human resource plan; They don't have medium- and long-term talent plans according to the rapid development pace of enterprises and industrial transformation trends. Recruitment, deployment and reserve lag behind the development of businesses. Allocation of personnel to jobs isn't scientific: Mismatch between personnel and positions exists, idle human resources exist, redundant and shortage in certain posts exist at the same time. Low utilization rate for human resources, it can't fully release the efficiency of human resources.

3. Current Problems in Human Resource Management and Training Systems of Power Companies

3.1 Lack of Forward-looking Human Resource Planning, Poor Connection between Talent Supply and Demand

Nowadays most power company's human resource management only focuses on general administration (attendance, payroll, recruitment), no strategic level talent planning during its rapid development: enterprises just fill up short term job vacancy but do not take into account their future talent needs according to the long-term development trend like smart grid construction, new energy business layout, and enterprise scale expansion which result that the recruitment, reserve, and training work are lagged behind the business development. Linkages among human resource departments and business departments are insufficient so they can't accurately know the personnel gaps and capability requirement for different positions and business lines. Recruitment is haphazard and reserve work fragmented, it is hard to effectively relieve the pressure from personnel shortage due to the rapid enterprise development, the contradiction between talent supply and demand intensifies.

3.2 Imperfect Employee Training System with Insufficient Relevance and Effectiveness

Improving employee skills, solving talent gaps and addressing personnel shortage are one of the key ways of training. Many shortcomings existing in the current training systems of power companies can't meet the requirements of enterprise transformation and development: Firstly there is no training needs assessment, disconnected with practice; most enterprise training has adopted a uniform and standard model, not doing differentiated training according to the capability weakness and job requirement of employees in different positions and at different levels. Excessively large proportion of traditional theory course, lacking practical and cutting edge training contents such as intelligent equipment operation, new energy technologies, digital operation and maintenance, leading to disconnectivity between training and actual job work. Second, rigid training mode and monotonous, low employee participation. Most training is carried out through centralized offline lectures and theoretical presentation, missing diverse training modes such as VR simulation training, online fragmented learning, on-site practical drill. The dull training causes employees unwillingly participating actively which reduces training effect. Third, no systematic plan in training, prominent fragmentary problems exist. Most enterprises adopt reactive and gap filling training, without setting up a full level and normalized training system for new employees, grassroots staff, technical backbones and management personnel. This leads to discontinuity of employee's skill iteration, it is difficult to quickly adapt to the capability demand of new positions.

3.3 Imperfect Talent Incentive and Assessment Mechanisms, Difficulties in Talent Retention

The primary cause that triggers the deterioration of the personnel shortage situation in the power

industry is the insufficient talent incentive mechanism: Compensation system and promotion mechanism of some power companies are too rigid without a close relationship among pay distribution with job value, work performance and skill level; there is an egalitarianism phenomenon where it is hard to see the pay advantage for front-line high-intensity positions and high-tech positions; narrow employee promotion channel and imbalance of technical talents and management talents promote path exist; professional skills improvement, job innovation and dedication to tackle difficulties values cannot be recognized which leads to lack of work enthusiasm and initiative by employees, and relatively high turnover rate of outstanding young talents and high-end technical talents. Loss of talent aggravates the personnel shortage, thus form a vicious circle of "difficulty in recruiting, difficulty in retaining, and slow cultivation of talent".

3.4 Lagging Talent Echelon Construction and Severe Shortage of Reserve Forces

For rapidly developing enterprises, power companies focus on business expansion without a sound talent echelon cultivation system: no systematic induction training or job experiences for new employees, which leads to the slow growth rate of young employees; no specialized empowerment and advanced training for backbone employees, which makes them lacking in reserves of high-end technical talents and interdisciplinary management talents; no skill iteration and transformation enhancement training for senior employees, which makes it impossible to renew skills and transform jobs for senior employees. Discontinuity and insufficiency of talent echelons cause enterprises to miss sufficient available talents when expanding businesses by relying on external temporary recruitment. This incurs high recruitment cost with long cycle, and has long adaptation period for new hires, which makes it hard to quickly fill the gap of jobs, severely constrains the pace of enterprise development.

4. Optimization Strategies for Human Resource Management and Training Adapted to Rapid Enterprise Development

4.1 Building a Forward-looking Human Resource Planning System Based on Strategic Development

To resolve the fundamental contradiction between rapid enterprise development and personnel shortage, power companies need to develop a scientific and forward-looking human resource planning that matches the new power system transformation and the medium- and long-term development strategies of enterprises, achieve the accurate match between talent supply and business development: First, set up a regular mechanism for talent demand research; Human resource department along with all business departments shall accurately determine the personnel gap and capability weakness at each position according to grid construction, new energy business layout, annual key projects and other works, make an annual and quarterly recruitment and reserve plan so as not to have any unfilled positions or stalled business operations due to lack of manpower; Secondly, optimize the allocation of internal personnel through full inventorying of the workforce, identifying idle human resources and redundant staff, revitalizing internal human resources via internal transfer, job rotation and position reuse etc., relieve the pressure of personnel shortages in front-line positions and solve the problem of mismatched personnel and waste of human resources; Finally, establish a dynamic talent early warning mechanism. Set up red lines for talent reserves for core technical positions and key frontline positions, reserve backup talents in advance to avoid operational risks from talent loss and vacant positions.

4.2 Optimizing the Training System and Establishing a Precision-Empowerment Training Model

In order to fill up capability gaps, adapt to job requirements, speedily cultivate talents, alleviate personnel shortages with the core goals, power companies have to reform their tiered, categorized, and precise employee training system to make it effective and quickly upgrade the professional capabilities of all employees. Firstly, we need to accurately identify training needs and carry out differentiated training. Classify them by job types such as frontline operation and maintenance, new energy technology, digital management, marketing services, and comprehensive management. Customized training programs are needed for employees at different levels: For new employees, train them on basic skills, job regulations, and safety standards to help them quickly adapt to jobs; for grassroots employees, train them on practical skills like new equipment operation, intelligent operation and maintenance, and emergency response, which helps compensate for capability weaknesses; for backbone employees, train them on advanced training in new energy technologies, digital operation and maintenance, project management, etc., to cultivate interdisciplinary talents; for management personnel, train them on

strategic thinking, digital management, and team management capabilities to enhance management efficiency.

Secondly, power companies need to innovate their training modes and enrich their training carriers. Making full use of the digital resources from the power industry, build a combined online and offline training system: Online, use the enterprise learning platform to offer fragmented, lightweight cutting edge courses so that employees can learn anytime and anywhere; Offline, create training scenarios such as VR simulation training, on-site practical drills, mentoring and apprenticeship, positioning based drills to improve practical skills training in smart grid equipment operation, new energy operation and maintenance, and power safety emergency response, solve the disconnect between theory and practice in traditional training. At the same time, taking into account the current personnel shortage, adopt the mode of "on-the-job training, learning by doing, and training through practice" to quickly achieve skill iteration for employees without affecting business progress.

Thirdly, establish a standard training mechanism, strengthen closed-loop management of training. Power companies should formulate an overall training plan every year; combine short-term emergency training with long-term systematic training, constantly upgrading employee's skills. Improve the training assessment and evaluation mechanism by including training attendance, test scores, practical abilities and job application effects into the employee performance appraisal, forcing employees to take part in training, effectively implement training, achieve the purpose of "one training session, one group improvement, and empowering the frontline".

4.3 Improving Incentive Mechanisms, Strengthening Talent Retention and Proactive Empowerment

We must build a good incentive mechanism to solve the talent loss problem, alleviate personnel shortage problem and stimulate employee vitality. We should optimize the power company compensation, promotion and incentive system to fully unleash employee's enthusiasm, retain the core talents and activate the existing workforce: 1) Optimize the compensation distribution system, break egalitarianism, adopt a compensation mode of "position-salary alignment and performance-pay linkage", tilt towards front-line high-intensity positions, high-tech positions and core business positions, enhance the salary competitiveness of key positions and embody the principle of "more work, more pay" and "better performance, better remuneration"; 2) Broaden the channel of employee promotion, set up a three-dimensional promotion pathway (management, technology and skills), allowing technical and skilled employees to get rank promotion and salary increases without switching to management positions which solves the issue of only one career development path; 3) Improve the systems of honorary incentives and growth incentives, carry out regular skill competition, position model selection and outstanding employee evaluation, recognizing and rewarding those who perform well, have good skills and are dedicated to tackling difficulties, giving them a platform for growth and realizing their values, increasing their sense of belonging and identity and reducing the talent turnover rate.

4.4 Building Talent Echelons and Consolidating the Foundation of Enterprise Talent Reserves

To solve this lack of talent reservoirs and talent echelon discontinuity caused by rapid development of enterprises, we should build a comprehensive and multi-level talent echelon cultivation system by power companies with sustainable talent supply: Firstly, Implement a "Young Seedling Cultivation Plan", adopt the training method of mentoring and apprenticeship, dedicated guidance, fixed-position training, regular assessment, help new employees learn their job skills fast, shorten the growth cycle, filling the gap at grassroots level; Secondly, implement an "Outstanding Youth Backbone Cultivation Plan"- Selecting outstanding young employees into the core talent reserve pool, adopt special training, project experience, job rotation, key project tackling, etc., cultivate a batch of young backbones who are technically proficient, practically capable and responsible, forming the core strength of the enterprise; Thirdly, implement a "Transformation and Upgrading Plan for Senior Employees". Special training for senior employees on intelligence, digitalization, new energy technologies, promote the skill iteration and job transformation among senior employees, revive the existing talent resources. Strengthen external talent recruitment, focusing on shortages in new energy, digitalization, smart grids, etc., precisely introducing high-end technical talents and interdisciplinary professionals to quickly fill the talent gaps, building up a complete talent echelon where newcomers can grow, backbones can take responsibility, and veterans can transform.

Conclusion

With the rapid development of power companies for the new power system transformation, higher standards and requirements on talent team building exist. Personnel shortage, unbalanced structure of talents, lagging capability of employees, extensive human resource management are the core bottleneck restricting high quality enterprise development. Human resource management and employee training as the core means of talent team building directly relates to the efficiency of enterprise grid operation and maintenance, safety production, business expansion and transformation and upgrading.

Power companies need to follow the trend of industrial development and actual business operations; solve the human resource pain points brought about by rapid development; continuously optimize human resources allocation, enhance employees' professional skills and consolidate the foundation of talent reserves through setting up a forward-looking human resource planning system, establish an accurate tiered training system, improve diversified incentive mechanisms and build a comprehensive talent echelon in order to effectively solve problems like personnel shortage, talent loss and lack of capability so that they can form a high-quality professional power talent team adapted to smart grids and new energy development. Powering enterprise development with talent allows power companies to steadily promote their digital and intelligent transformation and upgrading, ensure the safe and stable operation of the power grid, support the high quality development of the power industry and implement the "dual carbon" goals.

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