

CDSSES 2020**IV International Scientific Conference "Competitiveness and the development of socio-economic systems" dedicated to the memory of Alexander Tatarkin****TECHNOLOGY DEVELOPMENT OF COAL INDUSTRY ENTERPRISES AND PROFESSIONAL STAFF DEVELOPMENT**

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Abstract

The technological development of coal industry enterprises means a qualitative change in the technological basis of coal production. One of the key markers of coal mining enterprises' technological development is an increase in the capital-labor ratio, while capital productivity is decreasing. This is the slower professional development of personnel compared to the technological development of enterprises. The study aims to identify the priority areas for the staff's professional development at coal mining enterprises, ensuring the effective development of technical and technological innovations. The primary research method is a questionnaire survey, together with analysis and generalization. The survey was carried out among employees of coal mining enterprises, selected by a random sample. According to the survey, the gap between the actual and the required level of professionalism among middle managers lies in economic competence; among deputy directors, it is in law and culture; among directors - in psychology and sociology. In order to increase the efficiency of investments into technical and technological innovations at coal mining enterprises, professional development of personnel should be aimed at eliminating the gaps, firstly, between the internal motives of the employee and the external incentives of the enterprise, and secondly, between the actual and necessary qualifications of middle managers in the sphere of economics.

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1. Introduction

Companies and conditions in which they operate are developing and changing rapidly due to permanent technical innovations, digitalization and IT development (Galkin et al., 2019; Plakitkin & Plakitkina, 2017; Rozhkov & Karpenko, 2019). These processes specify requirements that the staff should meet, i.e., professional development, ensuring higher technical and technological innovations. An organization's success depends on whether they raise and develop human capital allowing innovation and perfection of activities, goods and services (Barro & Davenport, 2019). Many companies find it challenging to adjust to the environment's technical and technological change as their staff is reluctant to transform their business models. The dynamics of technical progress are currently exponential, while there is practically no progress in organizational design, leading to an increasing gap between the potential of technical solutions and the staff's ability to use it (Pasmore, 2019). To bridge this gap, more accurate distribution of investments in the formation of knowledge, skills, and abilities of personnel is required regarding the specifics of the organization's production activities.

2. Problem Statement

Current development of Russian coal mining companies is determined by the technological development, namely innovation, modernization and increasing capacity of the equipment used, mastering new technological complexes. Technological development of coal industry enterprises is a qualitative change in the technological basis of coal production based on the use of innovative developments, modern equipment, digital and information technologies aimed at improving the quality of products, efficiency and safety of production. Obviously, technological development requires investment. According to the Federal State Statistics Service of Russia, over the past 10 years, the average annual investment of coal mining companies has amounted to about 70 billion rubles. As a result the capital-labor ratio in the field of mining in 2008-2018 almost doubled. At the same time, the capital productivity decreased by 40%, that is, the investment efficiency is not high enough, which can be explained by the lag in the rate of professional development of the staff from the rate of technological development of enterprises. The level of innovative activity of the personnel of coal mining enterprises is clearly not sufficient to provide high competitiveness in the international market - about a quarter of the staff believe that innovations are not needed at their enterprise, and another quarter does not have innovative ideas. And only 50% of employees describe their labor behavior as motivated improvement.

Taking into account ensuring efficiency and high dynamics of technological updating we see professional development of the staff as a qualitative change in their characteristics and abilities, which allows increase and more effective use of the intellectual and innovative potential of the enterprise employees. Motivation and qualifications are highlighted as the main characteristics and abilities. Better understanding of motivational factors is important for studying methods and outcomes. (Løvaas et al., 2020; Nielsen & Cleal, 2011).

Human resource procedures which exist within a company involve a wide variety of professional development programs; corporate studies projects for various employees' categories; creating a personnel reserve, certification; internship, etc. (Artemiev et al., 2019; Dobrovolskiy et al., 2018; Korkina et al.,

2017). But they are unable to reach the level of professional development necessary for investment attractiveness and competitiveness of a company.

3. Research Questions

Studying the ways to bridge the gap between technical and technological development of Russian coal mining companies and staff professional development means finding out incentives for personnel motivation and detecting weak points («bottlenecks») in personnel qualifications. All this is regarded as a way to develop a more effective program for treating various categories of employees.

4. Purpose of the Study

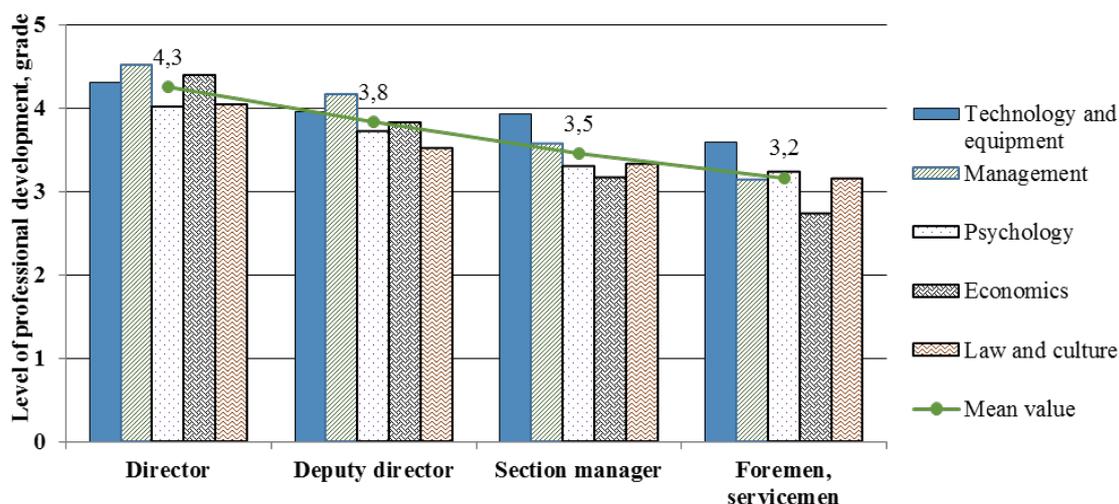
The purpose of the study is to identify priority areas for professional development of the coal mining enterprises staff which will ensure effective mastering of technical and technological innovations.

5. Research Methods

The study engaged the following methods: comparative method, observation, synthesis, GAP-analysis, and questionnaire survey. The primary object of the study was key managerial level of Russian coal mining enterprises such as directors, deputy directors, section manager, foremen and servicemen. Questionnaire survey involved experts and managers of different levels at coal mining enterprises. They were singled out by random sampling.

6. Findings

According to the survey, the most significant gap in qualification constituent of professional development is seen in foremen and servicemen (Figure 1). The less-developed competence for them is an economical one. It is important to note that this is the category of employees that has received the lowest grades in awareness and understanding modern equipment and technology. Considering that this category is directly responsible for the operation and maintenance of the equipment, the reason for its low effectiveness becomes strikingly obvious. According to the interviewees' opinion section managers have the highest need for professional development in economics. Company directors received the lowest grades in the field of psychology and sociology. Developing of competence in this sphere may ensure better and more effective ways to overcome employees' reluctance to the technological development. The survey shows that deputy directors feel the need for knowledge of law as well as principles and methods of culture formation.



5-grade scale was used to measure the compliance of professionalism to the requirements. 5 – fully complies; 4 – chiefly complies; 3 – partly complies; 2 – chiefly fails; 1 – fails.

Figure 1. Assessment of staff professional level at coal mining enterprises (survey results)

To identify factors that decrease staff interest in professional development in the sphere of innovations, primarily technical and technological ones, the staff of coal mining enterprises have been surveyed. The survey was based on specifying moral and material encouragement (Amabile et al., 1994; Fischer et al., 2019), as well as motives and incentives for innovative activity (Byron & Khazanchi, 2012; Cerasoli et al., 2014; Deci et al., 2017; Volkov et al., 2019). The material encouragement that is mostly often used is «bonus», which was mentioned by 40% of interviewees. But this factor is a weak motivation tool. Second in terms of frequency is «valuable gift» (8%), while the third is «a prestigious business trip» (5%). The strongest positive impact and push for innovation has a valuable gift, second in terms of impact is pay rise.

Moral encouragement that is mostly widely used is certificate of appreciation (22% of interviewees), acknowledgment of achievement by principals (11%); participation in training programs (7%). Judging by the survey, strong positive impact to the motivation level is achieved by «participation in important decision-making», «participation in training programs», «honorable distinctions». Less important impact is «acknowledgment of achievement by principals», «respect of subordinates». The least important is honorable mention and honorable photo. Thus, internal motives of an employee and external incentives of an enterprise do not match. Therefore innovative energy of the staff is not aimed properly and necessary reliability in achieving target results in the field of technological development of an enterprise is not provided.

7. Conclusion

In order to increase the efficiency of investments in technical and technological innovations at coal mining enterprises, staff professional development should be focused on the formation and implementation of their intellectual and innovative potential, first of all, based on eliminating the identified gaps: 1) between the employee's internal motives and external incentives of the enterprise,

namely, an increase in the forms and methods of remuneration of personnel, which have a strong positive effect on their involvement in the implementation of innovations (participation in making important decisions, participation in training programs; distinction, valuable gift, salary increase); 2) between the actual and required qualifications of middle managers in the field economics.

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