Human resources development as the basis of Russian technological breakthrough

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Abstract. The article deals with one of the most significant problems faced by enterprises at the stage of modernization which is staff training in accordance with new organizational and technological requirements. The article discusses the international and Russian experience of enterprise staff retraining and advanced professional training. There is a gap between Russia's quality performance indicators and the highest international standards both in the field of production and vocational education. The authors point out that labour force development is a long-term, future-oriented policy based on investment in human capital. Russian enterprises are aimed at integrating into the world economy and using the most successful experience in the field of vocational training.

1. Introduction

In his presidential address to the Federal Assembly on March 1 2018, Vladimir Putin marked breakthrough development as one of the main strategic courses of Russia. All projects and investments in infrastructure, education, health care and ecology, science and research as well as economic subsidies will be directed to achieve this goal. Special focus was placed on the fact that knowledge, technologies and expertise are the most important competitive advantages [1].

Since the viability of societies, states and position of countries, especially countries as large as Russia, in the world depends on advanced technologies, their efficient development and rapid implementation, scientific and technological breakthrough is among the key national goals and priorities.

Thus the solution of main economic tasks outlined in the Strategy of Scientific and Technological Development and the Decree of the President of the Russian Federation "On National Goals and Strategic Objectives of the Russian Federation for the Period until 2024" is impossible without high-quality human resources of domestic enterprises.

A logical question arises: is it possible to solve the ambitious tasks set by the President with the help of human resources?

In 2010 Russian Public Opinion Research Center and National Research University "Higher School of Economics" conducted a large-scale study "Human resource management barriers in the development of the Russian economy" in order to obtain data on human capital management problems that could act as an obstacle to the intensive growth of Russian companies. The study showed the gap between structure and training of human resources and employers' requirements (employers noted insufficient staff qualification); prevalence of "manual" approach to staff management that is inefficient in the context of staff development and skills transfer. The following ways of bridging this gap were named: federal and local government participation (70% of respondents) - changes in the economy structure and improvements in the education system; 11% of company experts saw the need for employee training while 6.6% found specialized training necessary[2].

2. Discussion and results

One of the most significant problems faced by enterprises at the stage of modernization is staff training (second place after financial problems), namely the training of staff in accordance with new
organizational and technological requirements. The staff issue is even more urgent for the companies that approach modernization - professional skills of the employees are lower than required. According to a study conducted by the National Research University "Higher School of Economics", 64% of such companies face difficulties in retraining or finding the right staff [3].

By various estimates, the working class in Russia currently accounts for approximately 50% of economically active population with total employment rate of 65%. The largest group of employees is skilled workers of industrial enterprises, construction, transportation, communications, geology and exploration. In 2014 their number was 9.4 million people (the latest available data). The number of mid-level industrial workers that includes operators of machines and installations is 8.7 million. According to the Federal State Statistics Service, there are seven million unskilled labourers. Thus, approximately 25 million people belong to the working class - 35% of all employees in Russia [4].

Ten million employees work in trade, consumer services and housing and communal services and that increases the total number of urban working class to 35 million people. Another 2.35 million wage earners are employed in agriculture, forestry, fishing and fish farming [4].

Generally the working class accounts for 53% of total employed population or 50% of total economically active population (employed and unemployed). Therefore, the Russian working class has not ceased to exist, although it has changed. Economic reforms have significantly adjusted the lifestyle, social consciousness of this social group [4].

Most vacancies on the market are for operation staff - 17% (figure 1) and only 3% for management staff [5].

![Figure 1. Vacancies in Russia (2018)](image)

Considering foreign experience, it should be noted that at the beginning of the current decade, the structure of the European employment market was dominated by middle-level specialists. They accounted for 17%, the number of high-level specialists exceeded 15%, senior and middle executives accounted for 9% of the total number of employees. Office employees, as well as trade and service workers, accounted for almost 25% of the total. Blue-collar jobs represented 35% of European employment: skilled workers, predominantly manual, workers (13%), skilled machinery operators (8%) and unskilled workers (10%) [6].

According to the forecast, by 2020 the total labor market of European countries will increase by about 3.6%. The biggest growth (13%) is expected for medium-level specialists. The number of highly qualified specialists is projected to increase by 8% [6].

The analysis of the international experience of staff retraining and development shows that its successful implementation is carried out by special institutions that develop and coordinate activities in the area of vocational education. Thus, the International Labour Organization has established an international centre for modern technical and vocational training. EU member states have created the European Centre for the Development of Vocational Training. Major US-based firms have established
CEO-headed organizations that develop permanent programs of retraining and advanced professional training.

German experience in this field deserves attention. Germany is the country with the highest paid workforce and having a greater number of less qualified employees in the enterprise is unprofitable. Therefore, the professional development of production staff is a direct task of production managers.

The most renowne[d] organization, both in and outside Germany that develops methods and carries out employee training is the federal union REFA. One of the main principles of the REFA union is "from practice and for practice", for example, a production manager who has successfully completed training in one of the REFA programs, then not only applies the acquired knowledge in his daily work but also is also able to transfer it to production staff.

Fundamental and comprehensive methods of REFA include training in the workplace [7].

It should be noted that the usual understanding of the German system of training is traditionally associated with "dual training". Each educational program in the German dual system is a network. Its implementation involves an enterprise (one or more), a professional school and a competence centre. Professions regulations (guidelines) in Germany are the official documents for the development and implementation of educational programs. Such documents serve as a basis of professional training programs in enterprises and vocational schools. The enterprise is obliged to form an individual training plan of each student, which includes practical (in the enterprise and/or in the competence centre) and theoretical (in vocational school) training.

Vocational training is most common in industries with active development and introduction of new products and technologies (production of computing equipment, chemical, aerospace industry etc.). However, it is common for even large organizations to join forces. A special fund "10 Cents per Hour" created by three automotive giants ("Chrysler", "General Motors" and "Ford") in cooperation with United Automobile Workers Union is an illustrative example of the integration of corporate resources in the organization of professional training. Financial resources of the fund were invested in the modernization of the training system of automotive industry staff. Japan is one of the recognized leaders in the development and implementation of effective professional training systems. Japanese technical schools, an analogue of vocational education institutions in Russia, are the basis of workers training system. Workers in Japan can receive secondary-level education at part-time and correspondence high schools- an analogue of Russian evening schools. Further training of highly qualified workers is conducted in Junior colleges- an analogue of vocational-technical schools in Russia. It should be noted that the Japanese system of vocational training is not aimed at flexible and continuous educational trajectory. Technical schools and vocational institutions educate workers for specialized corporate tasks.

Usually, blue-collar qualification blocks access to other education levels such as universities. In Finland, vocational training programs are improved in cooperation with labour sector representatives and other interested parties in order to facilitate workers’ access to the labour market. Finland is a member of «World Skills International» since 1988. Since 1993, the country has been developing a national competition of professional skills among young people (up to 21 years); it is called "Tajtaja" (artisan) and is supported by the national fund "Skills Finland". Every year up to 1.5 thousand young professionals partake in this competition [8].

The analysis of training systems in the leading countries showed that the main types of vocational education are alternating and continuous training. The first type includes "school-enterprise" approach with varying training duration depending on the student's choice: 2-4 years for persons aged 15-25. Normally training is conducted in vocational centres, where students learn a theoretical course combining it with practical tasks in an enterprise (Denmark, Portugal, Germany, Finland, Switzerland and the Netherlands). Continuous training implies that employees do not stop their work. In some countries, e.g. Portugal, Spain, Finland, Belgium and Norway, vocational training is part of the social policy of the state that allocates funds for its implementation. In other countries, e.g. France, Italy, Luxembourg, Switzerland and the Netherlands, it is conducted with the use of equity capital or payroll tax, i.e. independently from the state institutions. Industrial-technical training in most countries is a
form of alternating training and involves theoretical and practical courses. In this case, the student spends 80% of the time in the enterprise, which, after the completion of training, must confer a new qualification to the employee and pay a scholarship (approximately 30-60% of the minimum wage) during the entire period of training. Therefore, labour force development is a long-term, future-oriented policy based on investment in human capital. It is largely due to the consistent and systematic work on the formation of the vocational training system in Germany, Japan, and Finland that a significant increase in productivity in high-tech sectors of the economy was achieved [8].

The priority for the Russian economy and education is not only training of skilled workers, but also the formation of intellectually active employees with broad-based knowledge who are able to see the prospects of technology, product, equipment, production, processes. Consequently, such employees should be able to determine tactical productivity-oriented decisions both individually and collectively [8].

Today most experts share the opinion that the new economy needs a new workforce. Professor Eskindarov, president of the Financial University, reasonably remarked, "...The market is changing, the economy transforming and the process of digitalization is creating new professions. Today the University should not follow the labour market but anticipate the trends of its development..." [9]. Valeriy Fedorov, director of VCIOM, reported on the results of the sociological poll "Professions of the Future". According to respondents, manufacturing occupations will be in great demand in the next 7-10 years and lawyer will become the least attractive profession. Herewith the majority of respondents claimed that they would wish their children or grandchildren to be doctors, members of military or lawyers and not entrepreneurs, pilots or service sector employees. The opinion concerning robotic automation was almost unanimous: most believe that robots will not be able to perform their work duties in the future.

Since 2014, Agency for Strategic Initiatives (ASI) is implementing the program "Human Resources for Industrial Growth" which is a set of measures to train new generation workers and engineers for the Russian industry in the period until 2020. These measures are implemented on the international level (Russia's integration into the WorldSkills movement, Global Education Futures, dialogue at international platforms including Skills Development Working Group under the BRICS Business Council) and on the federal and regional level (WorldSkills Russia, dual education and leadership projects). Various competitions and contests facilitating the development of training systems have been organized in Russia. For instance, the Ministry of Education and Science is responsible for the all-Russian Olympiad of vocational education students. The Ministry of Labour and Social Protection organizes the all-Russian professional expertise contest "Best Professional". The Ministry of Industry and Trade and ASI coordinate sectoral WorldSkills contests, specifically corporate WorldSkills professional championships, WorldSkills Hi-Tech, Junior Skills and Future Skills. Individual state and private enterprises, development and educational institutions are also working to optimize and develop the system of vocational training [10].

Since 2014, ASI has been implementing the "Dual Education" project in 13 pilot regions of Russia. Taking into account the requirements of employers, training of students in new educational programs began. These programs were developed within the framework of the dual model. Dual education is a type of practice-oriented professional education, in which the theoretical part is received in the respective education institution and the practical part is taken in the workplace. Subsequent employment at the enterprise allows reducing time costs for adaptation of the young specialist as he or she is already familiar with the equipment of the concrete enterprise and its staff. Herewith the employer's role is becoming more important: companies request a specified number of specialists, creating on-site jobs for students, and provide mentors from among current employees, as well as participate in the curriculum.

Dual education can be considered as one of the effective formats of interaction between a vocational educational institution and the employer's enterprise, while at the national level this format can become an infrastructure model that provides the ability to predict the needs of production in human resources. Consequently, this process facilitates the implementation of a system of
qualification assessment and, ultimately, leads to practical changes in the vocational education system in the country.

These organizations present examples of active and efficient work in this field:

- PJSC "United Aircraft Corporation". PJSC "UAC" is developing and testing a certification system of university graduates and professional audit of aircraft-related education programs in the framework of a joint project with the Ministry of Industry and Trade and RUSNANO;
- JSC "United Engine Corporation". JSC "UEC" implements programs of dual education at corporation enterprises;
- JSC "Russian Railways". The company conducts training in corporate training institutions; in 2013-14 34 professional standards specific to railway transport were developed;
- JSC "Ruselectronics". JSC "Ruselectronics" project staffing requirements and conducts training within the production modernization framework;
- PJSC "RusHydro". PJSC "RusHydro" implements an advanced staff development program and develops professional standards for hydropower industry;
- JSC "ChelPipe". JSC "ChelPipe" conducts on-site training for 11 education plans [10].

In the XXI century, nation's successful development is determined not by the geographical location and the availability of fossil fuels, but by the intellectual potential. Human capital sets key trends in the development of national economies of the world today. In early 2018, an international team of scientists prepared a forecast of scientific and technological development of the world and determined the most relevant professional competencies: creative thinking, planning and implementation of research activities.

3. Conclusion

Thus, every year the development of vocational training and retraining system is becoming more large-scale. Numerous accumulated problems can be solved through close cooperation between employers, education institutions and regulatory authorities. Russia is aimed at integrating into the world community and using the world's most successful experience in the field of vocational training.

Russian is open for dialogue on the strategic production goals of the next 10-20 years and determining the competencies of the economy of the future.

However, there is a lack of connection between the system of vocational education and production needs both current and future. Currently, there is no proven mechanism that allows monitoring and forecasting the real needs of the economy, therefore educational institutions fail to train specialists in accordance with such needs. Industrial work placement of students is often of formal character and they do not master the necessary skills.

There is a gap between Russia's quality performance indicators and the highest international standards both in the field of production and vocational education. If a site of industrial work placement does not comply with the world standards, then it is not possible for students to acquire necessary skills. Most vocational institutions in Russia do not meet the needs of the economy and do not provide the opportunity for rapid modernization of facilities and equipment.

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