The development of the Russian economy, according to key performance indicators, has either reached or closely approached the 1990 level. That means that the possibilities of increasing the volume of production through the use of the old “Soviet” capacity are limited. In the primary industries, the limitations of growth, which are associated with the high level of capacity utilization and rising capital intensity, are obvious. Under these conditions, achieving high rates of economic growth, which provides an increased standard of living, and catching up with developed countries is only possible through rapid growth in non-oil sectors as a result of significant investments in fixed assets and an increase in the efficiency. Thus, the industries, which are oriented to the satisfaction of the domestic investment and consumer demand, have the greatest growth potential. In turn, the competitiveness of the Russian economy in the coming decades will be largely determined by the state of high-tech economic activities and their ability to generate and produce products with new features, which will allow to significantly reduce costs.

In this regard, it is important to understand what qualitative and quantitative requirements in the long term may be brought to the staffing of the Russian economy and its high-tech sector. Labor has always been regarded as one of the major limitations of development in the long run. In Russia, the potential labor shortages are estimated by the economic authorities and the expert community as one of the most acute problems of the medium and long-term development. It is recognized that this problem has a potential to have a negative impact on economic growth.

High-tech industries have certain requirements for the quality of manpower. Apparently, the compensation of the lack of workers through immigration is impossible for these industries. In addition, it should be noted that the substitution of positions in high-tech sectors places an increased demand for the education system. One of the necessary conditions for the development of high-tech industries is a substantial increase in the efficient use of labor resources, along with a set of measures aimed at the establishment of the necessary number of workers with the required level of skills and knowledge.

However, before we create a set of specific activities, we should determine the possible limits of labor efficiency growth in industry in the emerging economic and demographic conditions.

Forecast of the demographic situation. The severity of the problem of possible labor shortages is associated with the traditional demographic trends in the country, most of which are long-term.

Demographics sets “framework” conditions for the formation of labor force. Therefore, before analyzing the possible shortage of labor resources in the economy, industry, or specific activities, it is necessary to understand what human potential a country can have in the long run. To achieve this, with the use of the standard method of advancing age, a demographic forecast has been constructed, which reflects the possible changes in the gender composition of the population.

The age-specific death rates were set in order for their current values by 2030 to correspond to those typical for Eastern Europe—the Czech Republic, Slovakia, and Poland. Thus, first of all, a reduction in the infant and working-age population mortality rate was assumed. The net migration was taken at the level of the recent years, i.e., 200,000 people per year, and the distribution of migrants by gender and age was taken according to the data for 2009. Some results of the demographic forecast are shown in Table 1.

In the coming years, the ratio of certain age groups may change significantly. By 2020, the working-age
population will have decreased by 11 million people; by 2030, by 13 million people. At the same time, an increase in the population older than the working age will happen. The number of less aggregated gender and age groups that have a potential for increasing economic activity (persons aged 20–24 years and retirees of a younger age groups) will undergo wavelike changes.

Thus, we can note a significant reduction in the available workforce. In industries with low requirements for the quality of personnel, this process can be compensated due to migration, but in high-tech industries, which require employees with certain qualifications, it may create significant problems.

In the presence of such tough demographic limitations, we should explore the possibilities to use the available manpower.

The possibility of compensation for the reduction in the able-bodied population in 2011–2030. When analyzing the significance of the reduction in the able-bodied population for the labor market development and macroeconomy, several important factors are often ignored. First, the able-bodied population is limited by the retirement age from above, which is rather low in Russia (55 for women and 60 for men), and this defines the significant number of employed people at the retirement age. Second, the mortality rate in Russia, especially among working-age people, is extremely high (even in comparison with countries with similar levels of socioeconomic development). We can therefore expect that in the medium and long-term perspective the mortality rate will be reduced; thus, the able-bodied and economically active population over the working age will increase. This is indirectly confirmed by recent years’ trends. Third, a part of the able-bodied population is not included in the economically active population. Shortages in the labor market are likely to be accompanied by increases in wages and other incentives that can involve this potential.

In this regard, it is important to assess how in the long term period, taking into account all these factors, the working potential of the Russian economy can change. Such an assessment is made by comparing the predicted number of gender–age groups and hypothetical employment levels, which may be characteristic of these groups during the forecast period.

Employment rates for Russian men of working age (except for the age group above 24 years) are high and correspond to European indicators. The employment levels of Russian women are higher, so there are no significant reserves.

Reserves are in the increase in economic activity among women aged 55–59 years (what has been incidentally taking place in the last few years) and predictable increase in the number of employed people of 60–64 years. Due to these reserves, the number of employees over the working age will be 10.3 million people in 2020 and 10 million people in 2030 compared to 8.4 million people in 2010.

The source of compensation for the reduced able-bodied population could be an increase in the economic activity of younger working groups (those aged 16–24 years). If the employment rates of these younger age groups reach current European indices (which were recorded in Russia as early as the 1990s), it will provide additional employment growth by 2.1 million people by 2030.

Thus, changes in the structure and number of the economically active population will allow for a partial compensation for the decline in the working age population. With a general decline in the working-age population by 13 million people by 2030 compared to 2010, up to 3.5 million of these people can be compensated by an increase in the number of workers older than the working age and a decrease in the number of the economically inactive population of the younger working age.

However, such compensation will not allow for a radical improvement in the developing situation. Under these conditions, a key factor that allows for the overcoming of the limitations in the long-term development of labor is the efficiency of its use. Labor productivity is considered to be the main indicator that reflects the efficiency. Therefore, the key measures aimed at eliminating the shortage in labor resources should be associated with an increased output of applied labor and elimination of disparities in the distribution of labor across economic activities.

The contribution of productivity to the economic growth. First of all, it is necessary to define what is meant by the influence of changes in labor productivity on the production efficiency. In the traditional formulation of the problem, labor productivity is regarded as one of the key production indicators. Labor productivity growth reduces production costs and increases the output of the labor used. Under the conditions of demographic limitations, growth in labor efficiency can partially reduce the emerging labor shortages.

It is important to note that an increase in labor productivity is associated with investment and innovation activity and can be regarded as one of the results of such activity. However, growth in labor output is impossible without significant investments in the

2 In fact, it was already included in the constructed demographic forecast when gradually declining age–specific mortality indices were set. If they were set at the current level, the working-age population in 2030 would be equal to 73 million people, i.e., 2.2 million people less than in the reviewed scenario.

3 The level of employment is expressed by the ratio of the number of employees and the total number of people in a gender–age group.