Ensuring a high level of human capital as a response to the challenges of scientific and technological progress

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Abstract. The article presents the results of a study of the influence of the level and quality of human capital as a prerequisite and factor in responding to the challenges associated with the formation and development of a new technological order in Russia and the entire world economy.

Keywords: human capital, scientific and technological progress, digital economy, knowledge economy, education, quality of human life, security.

At present, Russia, together with other countries of the world, is at the stage of transition and formation of a new technological order based on the widespread dissemination of scientific and technological progress in the form of digitalization. If at the previous stage information and digital technologies affected only production sectors, now they have been introduced and integrated into almost all spheres of activity and life of society and the individual. Building an information society is already becoming an insufficient goal and task for the current and future sustainable and safe social development, the need to build it up and make the transition to a more developed knowledge society has become actual. (In the scientific literature, there are discussions about the relationship between the information society and the knowledge society, we will base our research on the statement that the knowledge society is a more progressive form of socium development). According to the UNESCO report (Towards Knowledge Societies ..., P.19), the knowledge society is not limited to the components of the technosphere and certain market segments, but additionally extends to the system of diverse social, ethical, political, cultural and other spheres and areas of society functioning.

Transitional processes to a new technological order are accompanied by constantly growing in space and time streams of fundamental large-scale changes in activity, life, way of thinking, behavior and interests of man and society, complicating them, making them less stable and predictable. These changes impose on a person, on the quality of his personality, on his knowledge, practical skills, abilities, competence (general cultural, universal, general professional and professional), cognitive abilities, psychological state and health, new necessary and sufficient requirements, both for activating innovative processes, contributing to further progress, and the compliance of a person (otherwise, a person finds himself in the field of dangers associated with his ability to work, adaptation to new conditions, psychological stability, etc.) to the current and future period of socio-economic development. A person is promoted by scientific and technological progress to a leading position in socio-economic development. Human capital is becoming the main factor of production, the quality and level of human capital in the modern world economy determine competitive advantages in the markets of both countries, their integration associations, corporations, firms, etc., and an individual. Knowledge, abilities, skills and competencies become a commodity or a dominant component of the commodity value of goods.

At present, the world economy is under the conditions of the simultaneous influence of such factors as: a slowdown in the development of the global economy, an increase in trade wars, a decrease in the growth rate of labor productivity, a protracted pandemic with its influence on the economy, etc. Countries that actually have a high level of human and social capital, that is, they are able to develop a competitive innovative economy, have the prerequisites for a scientific and technological breakthrough and digital leadership (separation), which for a certain period of time will give socio-economic development greater stability, dynamism, security and, as a result, will allow achieving a higher level of quality of life of society and the individual.

A person in the economy is simultaneously a producer and consumer of goods, including the latest (innovative, creative), therefore, the level of human capital becomes a decisive factor in the development and security of a person, society and the state. A person needs to have sufficient potential to generate innovative ideas, then, on the basis of new technologies and technical processes, to implement them productively, and society (consisting of individuals), in turn, must be so competently prepared that, firstly, not reject (not be afraid of the advanced achievements of science and technology), but adequately perceive innovations. Secondly, to feel interest, a need, and therefore to present a massive demand for the latest goods. A person's unwillingness to correspond to any stage of this chain changes the person's motivation for action, and thereby creates a system of dangers (real, potential) for the development of society, the country and the

person. Human capital is such a resource that cannot be accumulated in sufficient volume in the short and even medium term. The level of human capital that a person and society actually has at the present time, to a large extent, was laid and formed in the past. The directions, rates and quality of development in the strategic period are being laid now, therefore it is so important for all subjects of management to pay constant attention to monitoring, improving the processes of modernization and the production of knowledge adequate to the goals and objectives of the progressive development of the economy and society.

Currently on the global, regional, individual countries, industry, corporate, etc. levels are already manifested and felt a shortage of human capital, as the main source of growth in labor productivity, and, consequently, growth in gross domestic product and gross national income. At the same time, the transition processes to a new technological order are traditionally accompanied by a decrease in the level of efficiency of the main socio-economic indicators and, as a result, by a decrease in the available resources of society for modernization and stabilization processes, and the achieved level of human capital is of particular importance for the continuity and safety of development. Human capital will be understood as knowledge, skills, abilities and other distinctive features of a person that contribute to the creation of personal, social or economic well-being (UNDP, 2004).

The main source of increasing the level of human capital is traditionally the educational process, which is currently not a point-like process, as it was before, but a continuous one, requiring a person to constantly renew his competence, knowledge, skills, and practical skills throughout the entire cycle of his life. (And it is not even limited to cycles of active life, digital universal competencies for a full-fledged existence in society are now necessary from childhood to the end of life, which was clearly demonstrated by the lockdown period in the COVID-19 pandemic.) It is now obvious that the modern education process, in principle, cannot be completely completed by a person in the process of active life, a person is doomed to constant learning, otherwise it will lag behind scientific and technological progress, which will cause a complex of individual and social negative really and potentially dangerous consequences (phenomena, events, processes).

Human activity in a society based on knowledge presupposes a steady increase in the proportion of the adult population who have received higher education. Higher education takes on special significance and value. A World Bank report argues (Building Society…, 2003) that higher education helps to unite the nation by promoting social cohesion and trust in social institutions. It can be added that the social unity or integration of society in the current conditions of the

development of the world economy and scientific and technological progress (for example, the decline in the number of EAN and its aging, the need to update the infrastructure, growing environmental problems, etc.) is the basic element of building a new superintelligent society ("Society 5.0"). This new society shifts the goal of its development from the optimization of resources by one person (as it is defined in the information society or "Society 4.0"), to the optimization of society as a whole through the integration of not only physical, but also cyberspace (U. Noritsuga, 2017, P.3 -12).

Currently, a universal measure of changes in the level of human capital has not yet been developed, which takes into account in full all aspects of the abilities, skills, and business and personal traits of a person. Therefore, the indicator "average number of years of study" is often used for international comparisons, although it must be admitted that it has limitations in its application (for example, it does not assess the quality of education, proceeds from the judgment that each additional year of study equally increases human capital, etc.). Previously, the indicator "population literacy" was actively used, but due to the fact that many countries of the world have already solved the problem of population literacy, the very fact of literacy has become insufficient for effective and safe life of a person and a country, this indicator is losing its relevance. Russia, according to the international rating compiled by UNDP experts, in 2018 took the 40th position in terms of duration of study, and the average number of years employed in the economy was 12 years (that is, these years of study correspond to secondary specialized education and primary higher education), for comparison, obtaining a higher education (without a master's degree) takes 15.5 years. Austria is among the leading countries - the education cycle is 22.9 years, the number of years of study is 12.9; Belgium - 19.8 and 11.8, respectively; Ireland - 19.6, 12.5. There is an obvious direct relationship between the level of economic development of the country and the duration of education, the lower the level of economic development of the country, the less time the population spends on getting education. For example, in Nigeria, education takes 5.4 years, and the average duration of study is 2 years (World Ranking….). For comparison, in the USA in 2002 the share of the population aged 25-64 with higher education diplomas was 38% of the total population, in Russia it was 23%. In 2017 (according to the 2015 microcensus), the share of the adult population with higher education in Russia at the age of 25-64 was 30.2%, and in the age group from 25-34 it was 40.3%. In Japan, 30.2% of the population has a higher education in the 25-64 age group, 60.4% in the 25-34 age group, 30.2% in the 25-64 age group, 30.2% in the 25-34 age group, 69.8%. We see that in Russia the share of the population with higher education is at the level of a number of developed countries or even exceeds such countries as: France (21% and 44.3%, respectively), Germany (28% and 31.3%),

Italy (18.7% and 26.8%), etc., but the lag behind the countries of innovation leaders is also noticeable, especially in the younger innovation-active group (20% from Japan, 29.5% from Korea) (Education in figures ...).

In the process of research, we see emerging trends in the Russian education system, which may have negative and dangerous consequences in the medium and long term. There is a change in the attitude of the young part of Russian society to the need for higher education. According to Rosstat, for the period from 2010 to 2017, the number of students enrolled in higher education per thousand people decreased by 1.6%, and an increase is noted in the innovation-leading countries. For example, in 2010 in Russia there were 65 students per 1,000 people, then in 2016 - 46, in 2018 - 40; in Norway in 2010 there were 46 people, in 2016 - 53 (Russia and countries ..., P. 134-135). In March 2021, "Rossiyskaya Gazeta"Russian newspaper published sociological research data from the SuperJob company, from which it follows that 43% of Russian applicants plan to enter universities in 2021, 48% planned to enter universities last year, moreover, in 2010 there were 80% of them (in 2011 year - 65%. in 2012 -58, etc.) (Without a "top" ...). Thus, over the past ten years, there has been a tendency towards a decrease in interest and demand among young people to get higher education by half. At the stage of the formation of a new technological order and the massive introduction and application of the achievements of science and technology in life, insufficient competence of the population (general cultural, general professional, universal and professional competence) can become a factor in restraining the socio-economic development of the country and reducing the level of security of the system "man-society nature".

Our studies of the current and projected demand in changing labor markets and employers' expectations from applicants for modern types of work have shown that the most significant changes are undergone by a person's thinking, on which not only cognitive, innovative, adaptive abilities of a person depend, but also mentality, interests, lifestyle. and (social, economic, household) behavior. Labor on a mass scale (not individual, as now and in the past) will be of an obligatory creative nature. To meet the new requirements, a person's thinking must be: abstract, critical, environmentally friendly, systemic, algorithmic, network and computational, fast, error-free under constant stress, multicultural, multilingual, etc. (Khristolyubova, 2020, 2021) The combination of such mental abilities in a person will allow him to acquire universal personal and professional qualities and, if necessary, freely and safely change areas of employment; reduce the risks of erroneous and dangerous decisions (the danger field will decrease); will reduce the ecological footprint (which is already relevant); a person, despite the constant variability,

uncertainty, multitasking and the complexity of the tasks being solved, to maintain health, spirituality, abilities and desire for constant self-development and self-improvement.

Note that the process of transition from obsolete to a new technological order is traditionally accompanied by the process of "creative destruction", which is based on overcoming the inertia of established production and social ties that restrain the arrival of new ones. This very ability to make and perceive changes is associated with the thinking of a person. The rate of transition processes and the establishment of a new one depends on the level of potential, both of an individual and of society as a whole.

The nature of a person's thinking is laid down and determined from childhood in the process of education and upbringing, therefore, systematic and high-quality preschool, school and additional children's education is of particular importance. It is known that now the share of paid education is growing, that is, there is an orientation not towards full-fledged educational and expedient educational activities, but towards obtaining a commercial result. The commercialization of the education sector is mainly explained, firstly, by the established economic market relations in Russia, and secondly, by the increase in the cost of modern "digital" education. The sphere of education became an element of the sphere of services, which, as a result of its reform, entailed a change in the traditional relationship between teacher (teacher) and student. The influence of students and their parents on the composition and content of the educational and upbringing process begins to increase, changing towards the undeniable rightness and power of the student as a customer of educational services. This trend can lead to the fact that at all stages of the educational process, the educational process will adapt to the desires and interests of students and their parents, which is real and potentially dangerous to unpredictable consequences (social, economic, political, environmental, etc.) in the future.In March 2021, the Institute of Progressive Education published the results of special studies based on an online survey of Russian schoolchildren in grades 8-11 in 74 regions of the country, on subjects that schoolchildren consider unnecessary and would like to be excluded from the curriculum altogether. According to schoolchildren, such superfluous subjects are: life safety (70%); technology (60%); astronomy (40%), argue that a complex science is not useful in life; music and painting (15% each); drawing, physics, chemistry, mathematics (10% each, as they interfere with preparing for the USE), etc. (Schoolchildren told ...).

The education system should already now, in order to meet the needs of the modern and future labor market, offer training programs for the development of new qualities of human thinking. It is known that thinking is directly related to human speech, therefore, humanitarian education at

all stages of education (starting from early childhood) should grow, despite the processes of optimizing resources for education and modern trends in the leadership of natural sciences in formative thinking.

The emerging negative trend serves as a signal for the adoption of operational regulatory measures by government bodies in the education system.

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