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Ensuring the National Security of Agriculture in the Digital Era through the Formation of Human Capital

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Abstract:

Purpose: *Over the past few years in many literary sources and the media an issue of the digital economy is rapidly gaining popularity due to the qualitative technological changes in society. In current circumstances the qualitative component of labor resources called "human capital" is a priority value.*
Design/Methodology/Approach: *The following research methods have been used in the work: monographic, abstract-logical, sociological, economic-mathematical and calculation-constructive ones.*
Findings: *The solution of the problem of ensuring food security of the population of the region depends on the methods and strategies of applying technologies in domestic and global agriculture, as well as on the correct and effective use of scientific-technical implementations in the industry.*
Practical implications: *Identification of segments in tourism is mainly made based on their geographical, demographical, socio-economic, psychographic, behavior characteristics or their combinations. On the other hand, the authors stress on the fact that there is no universal segmentation approach and therefore, potential tourists can be classified based on other characteristics.*
Originality/Value: *The use of digital technologies in the agricultural industry will increase the efficiency of production activities.*

Keywords*: National Security, Agriculture, Innovation, Human capital, Professional competences.*

JEL codes*: Q18, O15, O31.*

Paper Type: *Research article in Special Issue dedicated to Russian Economy.*

Section 1: *Digital Era.*

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1. Introduction

The scientific-and-technological advance has a significant impact on the development of industrial and socio-economic relations in society, which favorably affects the development of the state. Technological changes in the production process also affected the workforce, which was expressed in an increase in employers' requirements for increasing labor productivity and efficiency of economic activity (Nagimov *et al.,* 2018). Today, in the period of advanced development of logistics, the theory of human capital plays a leading role in economic research.

Features of formation of human capital, as well as the problems of human resource development in the agricultural sector, are reflected in the works of Abalkin L.I., Adukov R.Kh., Altukhov A.I., Arutyunyan F.G., Bautin V.M., Belaya N.V., Bogdanovsky V.A., Bondarenko L.V., Veselovsky M.Ya., Demishkevich G.M., Dolgushkin N.K., Dorofeeva A.F., Kozlov A.V., Koritsky A.V., Kuznetsova T.M., Nuriyev R.M., Pankov B.P., Paptsov A.G., Pershukevich P.M., Petrikov A.V., Prok N.I., Rudy E.V., Sandu I.S., Semin A.N., Stadnik A.T., Stukach V.F., Ushachev I.G., Shelkovnikov S.A. and others.

2. Methodology

The object of this research is the relations arising in the process of the formation of human capital in the context of digitalization of the rural economy. The subject of research is a set of socio-economic conditions, principles and factors influencing the formation of human capital in the context of digitalization of agriculture (Dmitrieva, *et al.,* 2017; Dashko and Karpova, 2015).

The theoretical and methodological basis of the study includes the fundamental provisions of economic theory, the economics of agricultural organizations, scientific papers on the topic under study, legal and regulatory acts of the Russian Federation. The data from the Federal State Statistics Service of the Russian Federation and its territorial body, materials of the Ministry of Agriculture of the Russian Federation, as well as professional and reference literature were used in the study. The following research methods have been used in the work: monographic, abstract-logical, sociological, economic-mathematical and calculation-constructive ones.

3. Results

Many experts agree that the world is on the verge of an industrial revolution. It should be noted that information computer technologies play a significant role in all spheres of human activity. In the economic scientific environment this phenomenon is called the digital economy. Despite this, the content of this concept is still not

entirely clear. It is worth noting that even the term "digital economy" is often replaced by such definitions as "API economy", "application economy", "creative economy", "industry 4.0", etc., (Korableva *et al.,* 2018). However, the concept of "digital economy" is used in all regulatory documents (Buraeva, 2014; Kamolov, 2017; Plotnikov *et al.,* 2018a; 2018b; Goloshchapova *et al.,* 2018).

It is fair to say that there are several basic approaches to the term "digital economy". In the framework of the first approach – a classical one, the digital economy is an economy based on digital technologies and, at the same time, it can be characterized exclusively as the field of electronic goods and services (Kupavikh and Nutskova, 2016; Petrov *et al.,* 2018, 2019; Limba *et al.,* 2019; Ključnikov *et al.,* 2019; Zagrivnyi *et al.,* 2019).

According to the second approach, the digital economy is an economic production using digital technologies. Turning to the definition of the digital economy, according to the World Bank's definition, it is a system of economic, social and cultural relations based on the use of digital information and communication technologies. Urmantseva (2017) understands the digital economy as *"the basis setting the new paradigm of development of the state, the economy and the whole society".*

The definition given by Kuntsman (2018) is rather interesting: *"The digital economy is a modern type of economy, characterized by the predominant role of information and knowledge as determining resources in the production of tangible products and services, as well as by the active use of digital technologies for storing, processing and transmitting information".*

According to the Digital Economy Development Program in Russia until 2035, the digital (electronic) economy is a combination of social relations emerging through the use of electronic technologies, electronic infrastructure and services, technologies of analyzing large amounts of data and forecasting in order to optimize production, distribution, exchange consumption and to increase the level of socio-economic development of states.

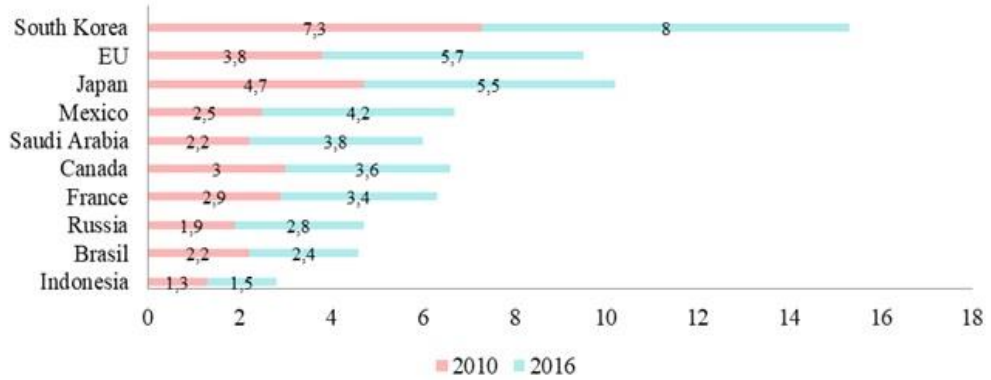
Thus, having analyzed various interpretations of the definition of "digital economy", it can be concluded that the overwhelming majority of researchers agree that in current circumstances there comes an "era of knowledge", in which information and human capital are a priority value (Atari *et al*., 2019; Dmitrieva *et al.,* 2017; Sharafutdinov *et al.,* 2017; Yamova *et al.,* 2018; Mullakhmetov *et al.,* 2018; Ma'Arif *et al.,* 2018; Polyakova *et al.,* 2019; Kozhokin *et al.,* 2017; Brager *et al.,* 2018; Ilyina *et al.,* 2019a; 2019b; Ruslan Agarunovich, 2015; Hanif *et al.,* 2018; Glebova *et al.,* 2016; Abramov and Sokolov, 2017; Karpov *et al.,* 2017; Kirillova *et al.,* 2018; Kolesnikov *et al.,* 2018; Anilan *et al.,* 2018; Abramov et al., 2018a; 2018b; Sycheva *et al.,* 2018a; Gurieva *et al.,* 2016). In June 2016, the Minister of Agriculture Alexander Tkachev, making a keynote speech at the session on

innovations in agriculture at the XXI St. Petersburg International Forum, noted as follows: *"We are faced with the tasks of increasing labor productivity and improving yields. To solve all these problems, it is necessary to use innovative technologies, carry out robotization".*

According to A.N. Tkachev, the state of agriculture is currently experiencing transformations. First, this happens because the population of the planet is increasing annually and the production of agricultural products should grow by 60-70% over the next few years (The program "Digital Economy of the Russian Federation", 2017). It is worth noting that the level of intensification of the agricultural sector lags far behind the world average. For the past 5 years, the countries with a more developed agricultural sector have been developing an average of about 55% of the innovation potential, while in the Russian Federation no more than 5% is used. Over the past 20 years, more than 1,000 varieties and hybrids of agricultural crops have been created. According to scientists, their development would provide an opportunity to increase the efficiency of the agricultural industry by more than 3 times (Sycheva *et al.*, 2018b; Voronkova *et al.*, 2018a; 2018b; Polyakova *et al.*, 2018; Melekhin *et al.*, 2016; Kuznetsov *et al.*, 2017; Shklyarskiy *et al.*, 2018; Plaskova *et al.*, 2017; Prodanova *et al.*, 2017,2019; Tahir and Salleh, 2018)

The rapid development of the digital economy indicates that in the most developed countries the share of the digital economy in the GDP has grown in developed countries up to 5.5%, in developing countries – up to 4%. The UK is the absolute leader, the share of the digital economy has increased up to 12.4%. In the Russian Federation, the share of the digital economy is 2.8%. At the same time, there are positive changes associated with an increase in gross domestic product (Figure 1).

Figure 1. *The share of the digital economy in the GDP of developed countries, %*

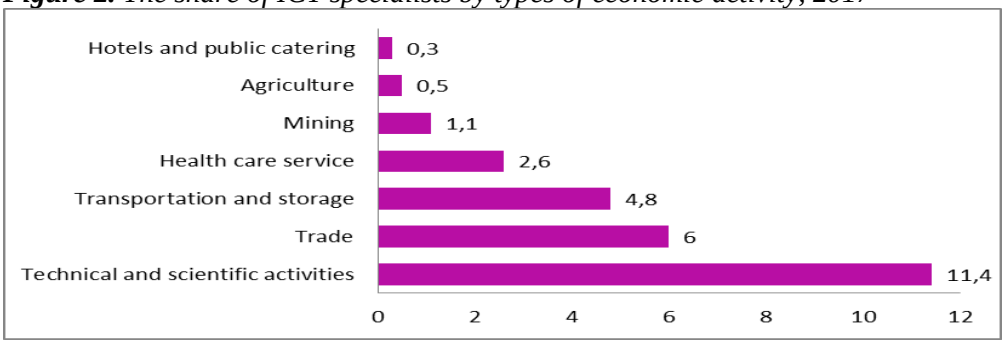


It is fair to say that the practical implementation of the digital economy in the agricultural sector of the Russian Federation is hampered because it is explained by the following factors:

- ✓ the lack of legal regulation that would allow organizations and individuals to fully use digital economy technologies;
- ✓ the lack of specific knowledge and skills of using digital technologies among the population (Shelkovnikov, 2016).

It is worth noting that a significant number of agricultural organizations are not yet ready to use the advantages of Internet platforms, since their maintenance requires professional and highly qualified service (Shatunova *et al.,* 2019). The study shows that in current circumstances the level of availability of specialists in the field of information and communication technologies in the agricultural sector lags significantly behind other sectors of the economy and is 0.5%. While in other sectors of economic activity this figure varies from 2 to 10% (Figure 2).

Figure 2. *The share of ICT specialists by types of economic activity, 2017*



As already mentioned, the digital development of the industry requires the use of information and communication technologies in production. They may establish the effective interaction in a constant online mode. For the agricultural industry, the main digital platforms can be "Technologies of Food and Processing Industry of Agribusiness – Healthy Foods" and "Eurasian Agricultural Technology Platform". In addition, "Space and GIS Technologies – Products of Global Competitiveness" and "Eurasian Supercomputer Technology Platform" can also be used.

It should be noted that for the smooth transition to new conditions, it is necessary to develop the digital economy step by step, considering the historical and socio-cultural characteristics of the population living in the territory of the state. We can state with full confidence that the basis for increasing the welfare of the state, including an increase in human capital, depends on investment (Takhumova *et al.*, 2018; Abramovich *et al*., 2019; Shklyarskiy *et al.,* 2017; Caplinska and Ohotina, 2019; Faridi and Sulphey, 2019; Koptev *et al.,* 2019; Movchan and Yakovleva, 2019a, 2019b; Kuznetsov and Suprun, 2017; Gulkov *et al.,* 2019). In other words, lack of investment leads to a slowdown in economic growth.

A significant role is played by direct investment in the main production facilities, ensuring intensive growth of the economy and adapting the socio-economic structure

to modern technological innovations (Tarman, 2016). An increase in labor productivity is the most important indicator characterizing the efficiency of using human capital (Table 1).

Table 1. *Labor productivity by types of activity, %*

Indicators	Years					
	2012	2013	2014	2015	2016	2017
In the economy as a whole	103,5	101,8	100,7	97,8	97,2	96,9
Agriculture, hunting and forestry	100,4	99,1	97,3	96,9	94,3	93,5
Fisheries and fish farming	108,5	103,8	96,1	99,5	99,8	101,0
Mining	100,4	97,1	102,8	98,4	97,5	96,8
Manufacturing	105,7	106,0	102,5	96,9	94,5	92,1
Production and distribution of electricity, gas and water	101,3	99,5	100,2	99,9	97,6	95,3
Construction	101,6	99,8	98,4	101,0	101,2	99,3
Wholesale and retail trade	102,1	100,0	98,7	91,5	89,6	86,2
Hotels and restaurants	101,5	101,0	99,8	94,1	91,8	88,6
Transport and communication	102,2	102,7	100,4	99,4	98,2	97,1
Real estate operations	103,2	100,2	98,6	97,2	96,3	94,2

The statistical data provided by the state statistical bodies allow estimating the dynamics of changes in the labor productivity index by types of economic activity. Significantly high rates of labor productivity are observed in construction, manufacturing and mining. It should be noted that the maximum decrease in this index is observed in the types of economic activity related to the provision of services to the public, such as wholesale and retail trade, repair of motor vehicles, etc. First, this can be caused by a decrease in actual monetary income of the population, which greatly affects the amount of consumer demand. Considering a digital divide in various countries, it is necessary to study one of its most important components – a divide in the sphere of education and development of digital competences. It is worth noting that in order to solve this problem the state has planned a gradual increase in the state order for IT specialists (Peshkova *et al.,* 2017; Nutskova and Kupavyh, 2016; Malarev *et al.,* 2018; Laužikas and Miliūtė, 2019; Girdzijauskaite *et al.,* 2019).

According to the data provided by the Ministry of Agriculture of Russia, the need for IT specialists is 210 thousand people, while only 113 thousand people work today. In general, this creates a situation where the shortage of IT specialists in agriculture is more than 60%. Currently, there is 1 (one) IT specialist for every 1,000 specialists working in agricultural production (Stadnik, 2015). Thus, we can conclude that the most important condition for the implementation of measures to introduce technological innovations relating to increasing labor productivity of the agricultural sector is to saturate the labor market with professionals with a set of professional and digital competences.

4. Discussion

In the opinion of many researchers it is obvious that during the transition to the digitalization of the agricultural industry the workforce must be characterized by considerable mobility, flexibility and digital competence. Most of the tasks cannot be solved in the new conditions without the use of knowledge in the field of innovative developments, which determines the need for agricultural production in training specialists with innovative thinking (Korauš *et al.,* 2019). Since the latest technologies are quickly introduced into the production process, the speed of decision-making by heads of organizations becomes essential. Nowadays, information has a significant impact on the process of distribution, exchange and consumption of goods, as well as on the emergence of partnership and economic relations between all participants in economic relations, determining the formation and development of market mechanisms and principles, which makes information a special production factor (Rudoy, 2016; Lavrinenko *et al.,* 2019).

5. Conclusion

Summarizing the above, there is little doubt about the relevance of introduction and the use of modern technologies in agriculture. Since, according to experts, already in 15 years the population of the country will increase significantly. The solution of the problem of ensuring food security of the population of the region depends on the methods and strategies of applying technologies in domestic and global agriculture, as well as on the correct and effective use of scientific-technical implementations in the industry. The use of digital technologies in the agricultural industry will increase the efficiency of production activities. The period of change creates the need for rapid knowledge management due to the importance and necessity of striving not only for the generation of new knowledge, but also for its subsequent use (Shelkovnikov, 2018).

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