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Workforce Capacity and Innovation Support of Agricultural Enterprises' Competitiveness

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Abstract

The findings of the article are that in the actual formation and development of competitiveness of agricultural enterprises, human potential, i.e. the quality of labor resources, plays an important role, and the level of innovation support of the economic system is insufficient. Human resources are diminishing in terms of availability but labor efficiency is increasing in terms of both natural and value indicators.

Keywords: enterprise competitiveness, innovation support, workforce capacity, competitive advantages.

Introduction

Employment potential of agricultural enterprises, i.e. labor as a resource involved in entrepreneurial activity, is a specific factor in the formation and development of competitiveness. The specificity lies in the fact that workforce as the carrier of intellectual capital is a crucial prerequisite for introducing innovation which mainly contributes to ensuring competitiveness of an enterprise. This indicates a reasonable need to disclose the characteristics of the workforce – labor potential of agricultural enterprises in order to evaluate the effectiveness of its use as directly influential factors of competitive functioning in the market.

Brief Literature Review

Profound research in the area of workforce potential and innovation support of competitiveness of agricultural enterprises was conducted by such well-known economic theorists as V. Andriychuk, K. Andryushchenko, L. Zaburna, Y. Nesterchuk, I. Okhrimenko, P. Sabluk, M. Malik, Y. Lupenko, V. Mesel-Veselyak, O Shpikulyak, among others. However, given the importance and versatility of this problem highlighted in the works of scientists, there is no single point of view and there is a contradiction which creates opportunities for further research.

Purpose. To investigate the role of workforce competitiveness and innovation support in the development of competitiveness of agricultural enterprises.

Results

The current state of agricultural economy and socio-demographic problems of rural development have adversely affected the level, quality, functionality of the workforce potential of agricultural enterprises. The agricultural sector, through a series of systemic destructive processes, has been facing a shortage of workforce – businesses are experiencing an acute shortage of skilled workers. This is a problem of national importance and it should be systematically recognized and assessed against the realities; decisions should be taken to allow to establish workforce capacity for innovation development of agricultural enterprises in the near future.

Workforce potential plays a decisive role in the formation of qualitative signs of competitiveness of an enterprise and products that are supplied to the market. Employee qualification forms the basis of innovative technology implementation capabilities, which ultimately ensures the development of competitiveness. The workforce of an enterprise is given a special importance during the introduction of an innovative model of economic development, in which the crucial role is played not by resources but by knowledge. Quality of human resources is the main prerequisite for the success of an enterprise in the modern economy, regardless of industry and type of activity. The world has reached such a level of economic development that the availability of resources no longer surely guarantees a high level of welfare. Instead, enterprises that employ highly skilled personnel and use advanced production technologies are the most competitive.

In our opinion, workforce is labor resources involved in the management and labor activity of an enterprise, and workforce potential includes qualitative characteristics, intellectual level, knowledge and skills of the workforce. The main and the necessary property of the personnel involved in the formation and development of competitiveness of agricultural enterprises is educational and qualification potential. In fact, we agree that workforce potential employed in the enterprise is identified with the concept of “enterprise labor resources”. With this respect, a reasonable conclusion was suggested by O. Ermakova and O. Velichko who believe that: “Every agrarian formation can function only with a certain number of workers – labor resources, which are distinguished by their practical skills, knowledge, managerial experience, timely and qualitative fulfillment of agricultural work foreseen by technology” [36]. Usage of technology is possible if at the same time, required human resources are available, which is a confirmation of the connection with the formation of competitiveness of the enterprise.

Workforce potential of agricultural enterprises is the basis for the formation and development of intellectual capital, which is an innovative component of competitiveness. In this regard, we aim to analyze the availability of enterprises with labor resources to assess their role in shaping and developing competitiveness.

A comprehensive analysis of competitiveness at the national and regional level of individual agricultural enterprises showed that it is formed mainly under the influence of resource factors. In a simplified form of assessment, it seems to be directly dependent on the area of land and the possibility of maximum increase in the pattern of the most liquid crops – those intended for export since animal breeding in these enterprises is minimal. The issue of human resources and intellectual capital remains in the background – human resources development is not discussed at all because the resource model has not yet exhausted its potential in shaping the competitiveness of agricultural enterprises. It should be noted that the development of competitiveness of agricultural enterprises is a reflection of qualitative factors, in particular, human resources, intelligence, and innovation. Unfortunately, most domestic enterprises, including the ones that were investigated in the article, have focused on the resource model of quick profit.

Traditionally, it is believed that labor is an important component of an enterprise's resource potential. This is peculiar for Ukraine because, as mentioned, a resource model is used in agriculture for ensuring competitiveness. Therefore, in the analysis of economic processes of the economy, the analysis of the use of labor resources, that is, the workforce potential of enterprises, is extremely important. Regardless of the limited possibility of collection of some analytical data,

we suggest to create a system of indicators for the economic analysis of the role of the workforce component in the mechanism of formation and development of the competitiveness of agricultural enterprises and include such indicators as:

- indicators of employee involvement in the labor process: employment and unemployment rates; employee turnover; labor utilization rate;
- indicators of efficiency: level of compensation; the ratio of compensation level and social standards of living established by the state (subsistence expenses, minimum wage); labor efficiency, etc. (Fig. 1).

According to the system of indicators shown in Fig. 1, we will assess the availability of workers and the effectiveness of their engagement in agricultural enterprises, after providing a general description of the economy of employment in agriculture in Ukraine and Cherkasy region.

Today, agriculture remains mostly employs villagers. Employment in this industry remains unattractive, especially for young people and people with a high level of professional knowledge and skills. Complex socio-economic conditions of life in the countryside and lack of life prospects have shaped a persistent de-motivating environment. It adversely affects the quality of workforce capacity of agricultural enterprises, as well as their competitiveness.

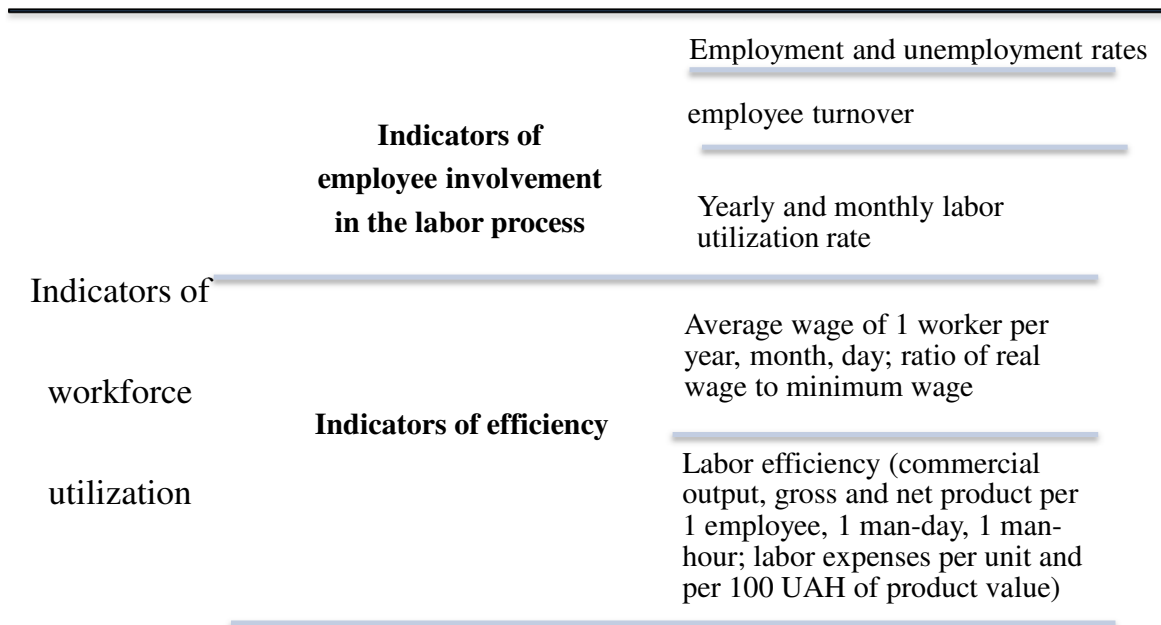


Fig. 1: System of indicators of an enterprise’s workforce utilization*

Source: created by the authors

Due to objective processes, the rural population of Ukraine and its regions, according to the State Service of Statistics of Ukraine [17], is decreasing. As of 2017, the rural population was 13244.7 thousand people, and in 2018 – 13171.4, out of which respectively 7855.4 thousand and 7792.1 thousand were aged 16-59 years. People move to cities, or even to other countries because practically the only form of employment in the countryside, agriculture, does not generate sufficient income, even for a minimum level of well-being. Similarly, the number of people employed in agriculture, forestry and fishery is decreasing, although in 2017 a minimal growth of agricultural enterprises was seen. There exists a direct link: once capital shifted to agriculture, the need for labor has increased.

With regard to compensation, we believe that increase in demand for skilled labor as a major factor in the formation and development of competitiveness of enterprises, causes founders to raise wages. In 2018, compared to 2016, the average monthly nominal wage of agricultural workers has increased by approximately UAH 800 but continues to constitute 80.9% of the national average.

In Cherkasy region the share of population employed in agriculture, forestry and fishery increased in the period from 2016 to 2018. The reason is that the area is predominantly agrarian. For the rural population of this region, work in agriculture is an attractive type of employment because of the size of production in agricultural enterprises.

Analytical study of the influence of workforce potential of enterprises on the formation and development of their competitiveness led us to agree with the conclusion of Ukrainian scientists, in particular that: “workforce is crucial for the organization of production in every enterprise, regardless of ownership and industry” [18, p. 3]; “Workforce potential is the main component of the economic potential of an enterprise. Labor as a process of applying the professional and qualitative characteristics of personnel is aimed at combining all other factors of production” [18, p. 8].

Thus, there is a reason to believe that competitiveness of agricultural enterprises depends on the available human resources (workforce) potential, the conditions of labor utilization and the factors of its motivation.

Given that personification of analytical indicators of agricultural enterprise development is not available, we consider these economic structures as an aggregate set across the whole country and Cherkasy region individually. In terms of assessing the competitiveness of agricultural enterprises, it is necessary to characterize resource aspects of its formation and development – specifically, along with land, logistics and capital, the current priorities in motivating workers with payment and the dynamics of changes in their numbers.

In our opinion, these factors of vital importance, in particular with regards to developing competitiveness through the ability to innovate.

Today, workforce potential defines primarily the competitiveness of those enterprises that rely on innovative production in their activity because they cannot use the economy of scale advantages due to their small size. However, this factor of competitiveness and the formation of conditions for its motivationally favorable use nowadays still receive insufficient attention, as we can conclude from the available data (Table 1).

By localizing our research of the level of entrepreneurial formations, we will try to analytically substantiate the role of workforce potential in the formation and development of competitiveness of agricultural enterprises as a major resource.

We believe that due to systematic structural changes and the economic situation in the country, the conditions and efficiency of the use of agricultural personnel are often changing, which in general affects competitiveness.

Table 1: Selected indicators of availability and efficiency of labor at agricultural enterprises*

Indicators	Years					2017 до 2018, +/-
	2013	2014	2015	2016	2017	
<i>Ukraine</i>						
Number of enterprises involved in agricultural activities	56056	55630	46199	45379	47697	-8359
Number of employees, thousand persons	621,8	579,8	528,9	500,9	507,7	-114,1
Average number of employees per enterprise, persons	11,1	10,4	11,4	11,0	10,6	-0,5
Average monthly nominal wage, UAH	2023	2270	2476	3140	3916	1893
% to average in the economy	66,5	69,2	71,1	74,9	75,6	9,1
% of agricultural production expenses						
labor compensation expenses	9,4	7,6	7,2	5,5	5,5	-3,9
social benefit allowances	3,4	2,8	2,7	1,9	1,2	-2,2
Agricultural production in constant prices (as of 2010):						
per person, UAH	4897	5559	5847	5589	5967	1078
per 100 ha of agricultural land, '000 UAH	608,4	691,4	708,3	674,2	715,7	107,3
Labor efficiency at agricultural enterprises per employee, UAH:						
agriculture	159679	201217	227753	223310	275318	115639
plant breeding	155544	202221	228885	218768	270863	115319
animal breeding	171798	198186	224105	237990	292511	120713
<i>Cherkasy region</i>						
Number of enterprises involved in agricultural activities	1856	1883	1676	1689	2000	144
Number of employees, thousand persons	34,9	35,4	33,2	33,1	34	-0,9
Average number of employees per enterprise, persons	18,8	18,8	19,8	19,6	17,0	-1,8
Average monthly nominal wage, UAH	2392	2458	2661	3178	4128	1736
% to average in the economy	78,7	74,9	76,5	75,8	79,6	0,9
% of agricultural production expenses						
labor compensation expenses	19,2	7,6	7,4	5,1	6,1	-13,1
social benefit allowances	7,1	2,8	2,7	1,8	1,4	-5,7
Agricultural production in constant prices (as of 2010):						
per person, UAH	11019	11821	11713	11722	12112	1093
per 100 ha of agricultural land, '000 UAH	14028,8	1128,4	1114	1103	1126,7	-12902,1
Labor efficiency at agricultural enterprises per employee, UAH:						
agriculture	254969	275880	288798	277242	300917	45948
plant breeding	221031	247732	252892	234248	255147	34116
animal breeding	317854	330143	358231	370893	408813	90959

The regional level of analytical assessment of this problem is special in that it significantly differs from the national one. We consider the importance of agriculture in the life of a region (oblast') to automatically affect workforce treatment by the employers in the process of engaging and using workforce (see Table 2).

Table 2: Correlation of selected indicators of availability and efficiency of workforce at agricultural enterprises of Cherkasy region and Ukraine, +/-*

Indicators	Years				
	2014	2015	2016	2017	2018
1	2	3	4	5	6
Average number of employees per enterprise, persons	8	8	8	9	6
1	2	3	4	5	6
Average monthly nominal wage, UAH	369	188	185	38	212
% to average in the economy	12,1	5,7	5,3	0,9	4,1
% of agricultural production expenses					
labor compensation expenses	9,86	0,01	0,24	-0,45	0,62
social benefit allowances	3,65	0,02	0,04	-0,12	0,16
Agricultural production in constant prices (as of 2010):					
per person, UAH	6122	6262	5866	6133	6145
per 100 ha of agricultural land, '000 UAH	13420,4	437	405,7	428,8	411
Labor efficiency at agricultural enterprises per employee, UAH:					
agriculture	95290	74663	61045	53933	25599
plant breeding	65487	45512	24007	15480	-15716
animal breeding	146056	131958	134126	132903	116302

*Source: created and calculated based on the data of the State Service of Statistics of Ukraine: Statistics digest "Agriculture of Ukraine"

With respect to the set of agricultural enterprises of Cherkasy region, we assess that entrepreneurs have a more systematic approach to workforce capacity (see Table 2). The main indicators of availability and efficiency of workforce in agriculture of Cherkasy region exceed the national average level within the analyzed period, except for 2016. Employee compensation and gross product efficiency are also higher.

Personification of assessment of the role of workforce capacity in enterprises' competitiveness development is important for every research (Tables 3 and 4).

Table 3: Indicators of workforce efficiency at selected private agricultural enterprises in Cherkasy region*

Indicators	Years				
	2013	2014	2015	2016	2017
<i>Private enterprise "Papuzhentsi"</i>					
Average number of registered employees in agriculture – total, persons	67	68	68	64	56
incl.: plant breeding	36	45	41	39	34
animal breeding	27	23	27	25	22
Ratio to average number per enterprise in Ukraine, total, %	126,4	132,9	136,9	135,7	118,2
incl.: plant breeding	97,7	126,1	116,8	116,7	98,3
animal breeding	167,3	148,3	185,3	181,8	172,1
Ratio to average number per enterprise in Cherkasy region, total, %	89,2	92,0	98,8	93,6	81,5
incl.: plant breeding	80,0	100,9	97,8	92,4	81,2
animal breeding	89,7	78,5	100,3	95,5	82,0
<i>Private agricultural enterprise "Zelenkivs'ke"</i>					

Average number of registered employees in agriculture – total, persons	34	43	44	39	40
incl.: plant breeding	17	25	26	21	22
animal breeding	17	18	18	18	18
Ratio to average number per enterprise in Ukraine, total, %	64,2	84,0	88,6	82,7	84,4
incl.: plant breeding	46,1	70,1	74,1	62,8	63,6
animal breeding	105,3	116,1	123,5	130,9	140,8
Ratio to average number per enterprise in Cherkasy region, total, %	45,3	58,2	63,9	57,0	58,2
incl.: plant breeding	37,8	56,0	62,0	49,7	52,5
animal breeding	56,5	61,4	66,9	68,7	67,1

*Source: calculated based on the data of the State Service of Statistics of Ukraine

Regardless of some positive dynamics in workforce changes of agricultural enterprises, mostly these changes are quantitative and cyclic and do not profoundly change the situation.

We consider the problem of motivation to be the most important problem in improving qualitative characteristics of workforce potential of agricultural enterprises, which is required for activating its effect on the competitiveness.

Table 4: Indicators of workforce efficiency at selected private limited agricultural companies in Cherkasy region*

Indicators	Years				
	2013	2014	2015	2016	2017
<i>Limited company "Nadiia"</i>					
Average number of registered employees in agriculture – total, persons	109	107	104	104	88
incl.: plant breeding	53	50	41	50	40
animal breeding	56	57	63	54	48
Ratio to average number per enterprise in Ukraine, total, %	205,7	209,0	209,3	220,5	185,7
incl.: plant breeding	143,8	140,1	116,8	149,6	115,6
animal breeding	347,0	367,6	432,4	392,8	375,4
Ratio to average number per enterprise in Cherkasy region, total, %	145,1	144,8	151,1	152,0	128,1
incl.: plant breeding	117,8	112,1	97,8	118,4	95,5
animal breeding	186,0	194,5	234,0	206,2	179,0
<i>Agricultural limited company "Onopriivske"</i>					
Average number of registered employees in agriculture – total, persons	32	30	32	32	30
incl.: plant breeding	32	30	32	32	30
animal breeding	-	-	-		
Ratio to average number per enterprise in Ukraine, total, %	60,4	58,6	64,4	67,9	63,3
incl.: plant breeding	86,8	84,1	91,1	95,8	86,7
animal breeding					
Ratio to average number per enterprise in Cherkasy region, total, %	42,6	40,6	46,5	46,8	43,7
incl.: plant breeding	71,1	67,3	76,4	75,8	71,6
animal breeding					

<i>Agricultural limited company “Kolos”</i>					
Average number of registered employees in agriculture – total, persons	40	48	42	38	27
incl.: plant breeding	27	35	32	29	24
animal breeding	13	13	10	9	3
Ratio to average number per enterprise in Ukraine, total, %	75,5	93,8	84,5	80,6	57,0
incl.: plant breeding	73,3	98,1	91,1	86,8	69,4
animal breeding	80,5	83,8	68,6	65,5	23,5
Ratio to average number per enterprise in Cherkasy region, total, %	53,3	64,9	61,0	55,5	39,3
incl.: plant breeding	60,0	78,5	76,4	68,7	57,3
animal breeding	43,2	44,4	37,1	34,4	11,2

**Source: calculated based on the data of the State Service of Statistics of Ukraine*

Summarizing the analytical assessment of the role of human resources in the formation and development of competitiveness of agricultural enterprises, we note that:

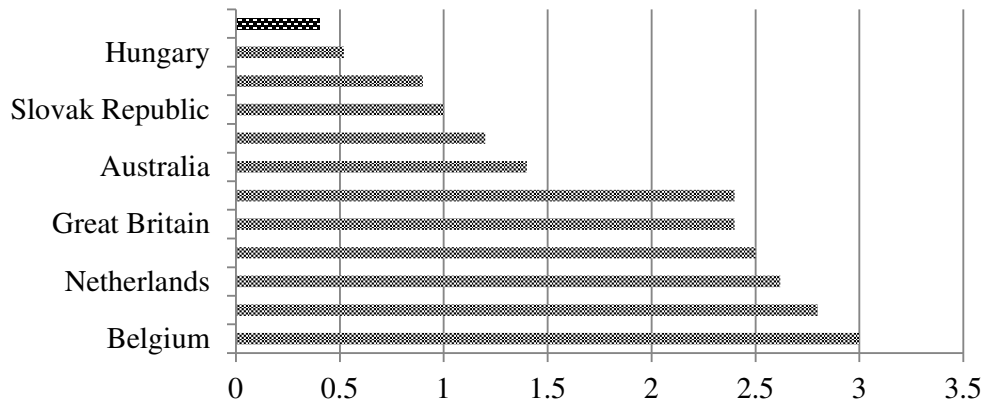
1) under the significantly changed market conditions for most agricultural enterprises, workforce planning has become a problem, which means that workforce potential has deteriorated; the socio-economic crisis in the countryside has led to profound depopulation processes, which has proved critical for the formation of high-quality, market-oriented human resources for ensuring the competitiveness of agricultural enterprises;

2) management of agricultural enterprises has finally become clear to the highly skilled workforce in the formation of competitiveness. Dependence on this factor is especially complex today, in the era of innovative technologies of high intensity, because their application together with modern technology requires high qualification. There are many problems with this today, as a large number of prospective workers migrate to other industries, concentrating at best in sustainable strong economies.

The personnel potential of agricultural enterprises is closely linked to the level of innovative provision of production activity, which dramatically affects the processes of formation and development of competitiveness. Mainly, it should be noted that innovative activity at the state level forms the basis for innovative provision of agricultural production.

We believe that development of innovation in the agricultural sector is a key to improving productivity and attracting investment to agricultural production. Collaboration between national and international research institutions will lead to greater productivity. It is necessary to promote partnerships between national and international research institutions, as well as to improve mechanism of intellectual protection in the process of developing innovative systems [19].

There is no mechanism in Ukraine that would involve the private sector in identifying research priorities, as a result of the mismatch of projects and developments to agribusiness needs [20]. The following institutions are engaged in development and research in Ukraine: National Academy of Agrarian Sciences, 15 research institutes, institutions of higher agricultural education, units of research and development of large agricultural companies [21].



% of governmental expenses on research and development agricultural GDP

Fig. 2: Intensity of research and development in agriculture, 2017*

*Source: calculated based on the data of Organization of Economic Cooperation and Development (OECD)

Intensity level of research and development is at a rather low level (Fig. 5). Yearly reduction of governmental expenses has only resulted in devastation but in 2017, tight cooperation with private sector was arranged for. Strategy involves financial assistance to farmers in research, development, and consultation [22].

Investment and innovation are strongly connected since investment numbers lead to a conclusion on the dynamics of innovation and the effectiveness of innovation market. At the figure, increase in foreign investment in agriculture from USD 206 million in 2010 to USD 838,3 million in 2017 can be seen (Fig. 3).

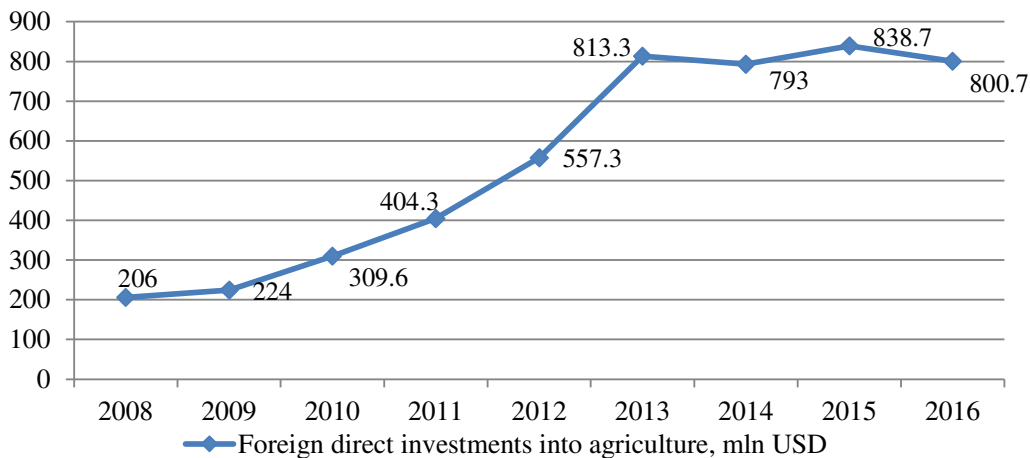


Fig. 3: Foreign direct investment* in agriculture, USD million*

*Source: created based on the statistical data and analyzed literature [23]

Organization of the innovation process in the agricultural sector is influenced by many factors, including peculiarities of the organization. For the development of innovation, it is necessary to provide them with informational, financial, technical and material bases, access to which should be open for scientific units. Factors hindering innovation activity are a lack of own funds, high costs of innovation, insufficient financial support of the state, high economic risk, long payback period of innovations, imperfections and insufficiency of informational support of innovative activity of agricultural enterprises (Table 5) [23].

Table 5: Factors hindering innovation activity in agriculture*

Factors	Characteristics
Informational factors	Lack of qualified personnel
	Lack of information about technology and markets
	Difficulties in finding partners for innovative activity
Pricing factors	Lack of external financing
	Low expenses on innovative activities
	Lack of enterprise's funds
Market factors	Some enterprises dominate on the market
	Demand on innovative products and services is hard to define

**Source: created by the author based on the results of scientific research*

Every institutional system has different innovative capabilities. Less developed regions are losing the innovative potential they have because, compared to industrialized countries, domestic entrepreneurs do not create the necessary business environment. Therefore, institutional competition encompasses relationships between all types of economic entities in all types of governance. Competition is considered to be the impetus for development of innovation and its implementation, which, in turn, improves the quality of products and reduces the cost of manufacturing (Fig. 4).

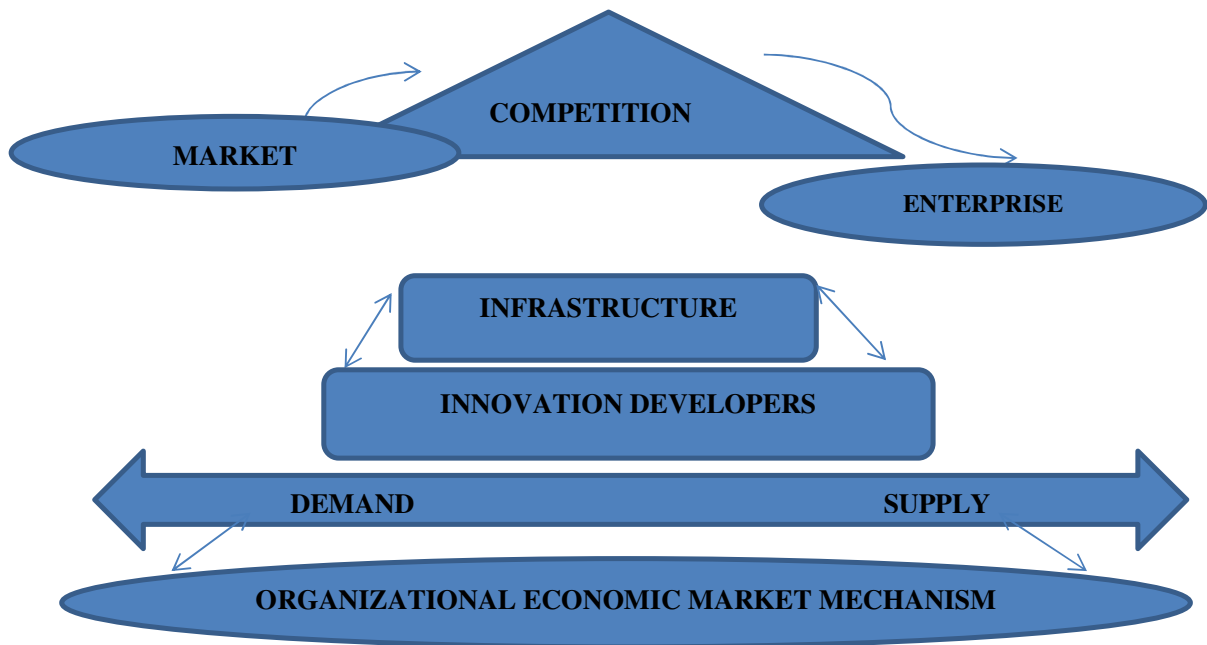


Fig. 4: Organizational and economic parameters of market and competition in innovative activities in agriculture*

**Source: created by the authors*

Introducing innovation in agricultural production activities will help:

- fill the market of innovative products with organizations, groups, individual specialists potentially capable to perform innovative activities;
- increase the solvency of agricultural producers;
- increase the share of internal investment;
- stimulate innovative recovery through state subsidies and preferences.

Unfortunately, not all businesses can afford the innovative type of development because they lack working capital. This problem has been particularly acute since 2014, when inflation had increased. Improvement also requires a regulatory framework that currently creates obstacles to the formation of Ukraine's innovation system. In most countries of the world, state provides support for science and technology as well as innovation. In Ukraine, the provisions of the Edict of the President of Ukraine "On financial support of innovative activity of enterprises of strategic importance for the economy and security of the state" are not fulfilled, particularly in what relates to investment of at least 10% of the funds received from the privatization of state property. Other potential investors are not interested in investing in developing the innovative potential of agricultural enterprises.

In our opinion, the main reasons for the low level of development and implementation of innovation are the inefficiency of the state mechanism, almost entire absence of governmental demand for the latest technologies, existing scientific and technological achievements are used inefficiently.

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