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Lifelong education in the context of innovation development of Russia and Belarus

The article presents the results of indicators analysis characterizing lifelong education in the context of transition to innovation-based development in Russia and Belarus. Problems of developing lifelong education and main directions of integrated educational space formation in both countries are defined.

Lifelong education, formal education, innovative development.

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Innovation development of the society is directly connected with the educational system. Scientists proved that in the first two decades after World War II the USA and several European countries managed to achieve significant rate of economic growth due to the high level of investments in education [Aghion et al., 2005]. As an example, the following countries called "Asian tigers" can be mentioned: Hong Kong, Taiwan, Korea and Singapore, where investments into elementary and vocational secondary education allowed increasing economic growth, which is called "miracle effect" [13, p. 3].

The role of education especially increases during the time of social and economic reforms. Such situation was observed in a post-war, quite unstable period, at the stage of market reforms, during the demise of the Soviet Union. In the last case, the countries that became independent due to the opening of borders (organization of international cooperation, activities of international funds in the educational sphere) met with the necessity of modernizing the whole educational system including education of adults. Organization of such changes was accompanied by development of new training methods and practices, enhancement of opportunities for personal qualities development, introduction of practice-oriented approach to education, which makes it possible to respond to labour market changes flexibly.

However, despite the changes happened in the CIS countries and the obtained positive results, some problems, which are general for these countries (partly it is connected with unified historical roots and unified principles of educational systems formation) can be mentioned. In the first place the following problems can be marked: lack of system approach in implementing reforms, slow response of the "former motion path", and absence of modern technologies, which considerably hinder transition to new principles of education, appropriate to innovation challenges. In particular it concerns lifelong education, so called learning of life.

So, in Russia, for instance, system of lifelong education is not formed (only single elements of it are present), erratic accesses to education during the whole life, cost increase of educational services, reduction of economic returns from education with age (demotivating factor of investment in education) are observed.

The same situation is in Belarus – there is no unified educational system for adults. Besides, slow response of motion within the Soviet tradition (adaptation of the existing forms to new challenges, neglecting of world tendencies and needs of population), particular provisions of lifelong education are not codified. So, in the new Educational Code of Belarus, admitted in 2011, not only some notional aspects (the term "non-formal education of adults" is not codified), but also the legal and regulatory framework of activities of particular organizations, which along with public structures can provide educational services, are missing.

These and many other problems hinder participation of population in lifelong education that reduces opportunities for rise of professional level and in the long run for innovation reforms of territories.

All the problems mentioned above considerably actualize the necessity of studying indicators of lifelong education in the context of transition of post-Soviet countries (Belarus, Russia, etc.) to the innovation development.

One of the indicators characterizing innovation development of territories is the global innovation index. It comprises such blocks of indicators as institutes and politics, human capital, infrastructure, technological indicators, business environment, etc. The key sub-index of the global innovation index is the human capital, while calculating it the following indicators are taken into consideration: investments in education, quality of educational institutes, and innovation potential of population.

Analysis of integrated indicators and their components characterizes not only the opportunities of the country's economic growth, but the degree of educational system's development, opportunities for development of lifelong education and implementation of accumulated human capital.

Comparing the figures of global innovation index and sub-index "human capital", we revealed that the highest figures of the last one provide the highest positions of integrated indicator. All in all, it is noteworthy that in spite of the common historical past of the former CIS member-states, the level of their innovation development is different *(tab. 1)*. Higher figures among the countries under consideration are shown by Russia; however, even Russia is in the middle of the list of countries ranking in descending order of the global innovation index. Belarus is 27 positions down than Russia, Tajikistan – almost twofold.

Apart from integrated indicators, which allow estimating the general level of innovation development, particular indicators characterizing the level of innovation activity of organizations, the share of expenditure on research and development in the GDP structure, etc. are also used in investigations.

Their analysis completes "the general picture" and allows revealing obstacles for innovation development of territories more reasonably.

Activeness in the sphere of technological innovations is one of the key indicators of innovation activity determining potential of technological modernization. The level of innovation activity among the industrial and service sector organizations in Belarus exceed the figures in the RF (industrial enterprises – 23% in Belarus, 9% in the RF). But figures of both countries are considerably lower than utterly critical points – 40% [4] and the average level of the EU countries (52%), which gives evidence about limitation of development and competitiveness of their economic systems *(tab. 2)*. According to the level of innovation development, Russian economy considerably concedes not only leading industrial countries (Germany – 70%, Belgium – 60%), but also the majority of countries from the Central and Eastern Europe.

Resources provision of innovation development is characterized by expenditure volume on carrying out different kinds of innovation activity. Volume of expenses on R&D in Russia after 20 times downfall in the beginning of 1990s somehow rose and hardened at the level a little bit more than 1% of GDP. Such situation does not provide reproduction of scientific and technological potential of the country [4]. Besides, the Republic of Belarus concedes this indicator to Russia twofold. The share of expenditure on research and development activities in GDP of both countries considerably falls behind the utterly critical level (3% in GDP; *tab. 3*).

Russia and Belarus considerably fall behind not only leading European countries accor-ding to the amount of financing, but in the structure of their expenditure on technological innovations significant disproportions are observed *(tab. 4)*. In both countries half of assets allocated to technological innovations is spent on acquisition of machines and equipment, while

Table 1. Global innovation index*

Country	Global innovation index			Human capital**		
	2008	2010	2012 ***	2008	2010	2012
Russia	2.60 (54)	3.03 (64)	37.9 (51)	–	3.86 (46)	43.8 (43)
Ukraine	2.24 (75)	3.06 (61)	36.1 (63)	–	4.04 (36)	42.2 (48)
Armenia	2.07 (86)	2.84 (82)	34.5 (69)	–	2.98 (107)	32.5 (76)
Belarus	–	–	32.9 (78)	–	–	42.7 (45)
Kazakhstan	2.45 (61)	3.05 (63)	31.9 (83)	–	3.48 (66)	31.2 (85)
Tajikistan	1.95 (94)	2.59 (115)	26.4 (108)	–	2.90 (112)	29.1 (96)

* CIS countries, which have higher figure of integrated indicator as well as countries with a lower one, are presented.
** Human capital as the structural component of the global innovation index.
Source: Global innovation index(2007, 2008, 2010, 2012)
[Electronic source]. – Available at: http://www.globalinnovationindex.org/
*** Ranking by the global innovation index data in 2012. When calculating the scale from 0 to 100 points was used, not unit fractions as before.

Table 2. Level of innovation activity of organizations in 2011, %

Country	Ratio of organizations realizing technological innovations in the total number of industrial organizations	Ratio of organizations realizing technological innovations in the total number of service sector organizations
Russia	9.4	11.2
Belarus	22.7	12.1

Source: Science and innovation activity in the Republic of Belarus: statistical digest. Minsk: National statistical committee of the Republic of Belarus, 2012. P. 148.

Table 3. Internal expenditure on R&D, % in GDP

Country	2005	2011
Russia	1.07	1.16
Belarus	0.68	0.76
Source: Science and innovation activity in the Republic of Belarus: statistical digest. Minsk: National statistical committee of the Republic of Belarus, 2012. P. 139.		

Table 4. The structure of expenditure on technological innovations of industrial organizations in 2011, %

Country	Total	Types of expenditure				
		Investigations and researches made by themselves	Investigations and researches made by external organizations	Acquisition of machines, equipment and software tools	Acquisition of new technologies	Sundry expenditures on technological innovations
Russia	100.0	16.3	10.9	52.5	1.5	18.7
Belarus	100.0	25.4	10.9	65.6	0.1	2.0
Source: Science and innovation activity in the Republic of Belarus: statistical digest. Minsk: National statistical committee of the Republic of Belarus, 2012. P. 139.						

considerably less funding goes to the investment of investigations and researches directly.

However, it is noteworthy that significant changes in the structure of investing probably will not occur in the near future. The situation in Russia can be an example of this case, where this type of expenses was predominant during the last decade *(tab. 5)*. The same can give evidence to the fact that the leading strategy is "technological borrowing", not the "creation of innovations" by activation of investigations in the native country and by organization of cooperation with other countries in the innovation sphere[1].

In spite of all existing problems, modern economy of post-Soviet countries is characterized by the development of new types of activity and modernization of technologies. Due to this fact, the demands of employers to the quality of human capital are increasing (in particular to professional skills and innovation abilities of population), what considerably actualizes the necessity of organizing lifelong educational process. One of the main characteristics of human capital is the educational level of population, which can be evaluated only by the average number of cumulative years of study.

The results of analysis reveal that duration of training within the decade increased almost in all the countries under consideration. The largest duration of training was in Russia, the smallest one was in Tajikistan. Speaking about Belarus, in comparison with other European countries and former CIS states, there is no data about the number of cumulative years of study in the database "Educational Attainment for Total Population, 1950–2010".

Taking into account the fact that the key element of lifelong education is the formal education, let us dwell on the analysis of some of its indicators. One of the tendencies, characteristic both for Russia and Belarus is the rise in number of students in higher education institutions per 10 000 people during 2000 – 2011 (in Russia – 1.3 times, in Belarus – 1.7 times). However, according to the number of students of secondary education institutions of these countries, multidirectional trends are revealed: while in Belarus the rise was observed, in Russia there was a reduction of the figure *(tab. 7)*.

[1] According to the data of the National Research University Higher School of Economics, 34.3% of innovation companies in the country hold the strategy of "technological borrowings", 29.2% – "imitators on the national (local) level", 20.5% – "imitators on the international level", 8.6% – "innovators on the national (local) level", 7.4% – "innovators on the international level".

Table 5. Ratio of expenditure on certain kinds of innovation activity in the whole volume of expenditures on technological innovations in Russia, %

Figures	2000	2005	2010	2011
Investigations and researches	14.3	15.7	20.6	14.9
Acquisition of machines and equipment	57.4	60.3	54.5	60.9
Acquisition of new technologies	7.7	1.4	1.3	0.7
Acquisition of patent rights and patent licenses	1.8	0.8	0.5	0.2
Acquisition of software tools	2.1	2.1	1.2	0.9
Training and preparation of personnel	1.3	0.4	0.2	0.4
Marketing investigations	1.6	0.6	0.6	0.3

Source: Indicators of innovation activity: 2013: statistical digest. Moscow: NRU HSE, 2013. P. 43.

Table 6. Number of cumulative years of study*

Country	Population 15 years and older			Population 25 years and older		
	2000	2005	2010**	2000	2005	2010
Russia	11.1	11.3	11.5	11.3	11.6	11.7
Ukraine	10.4	10.9	11.1	10.7	11.1	11.3
Armenia	10.4	10.4	10.4	10.8	10.8	10.8
Kazakhstan	9.9	10.1	10.4	9.9	10.2	10.4
Tajikistan	9.5	9.3	9.3	9.9	10.0	9.8

* Data on the Republic of Belarus is missing in the database "Educational Attainment for Total Population, 1950–2010".
** Ranking of the data, 2010
Sources: Barro R., Lee J.W. Educational Attainment for Total Population, 1950–2010. Available at: http://www.barrolee.com/; Barro R., Lee J.W. A new data set of educational attainment in the world, 1950–2010: working paper No. 15902. Cambridge, 2010. P. 32.

Table 7. Number of students of secondary and higher educational institutions in Russia and Belarus per 10 000 people at the beginning of school year

Territory	2000/01	2005/06	2009/10	2010/11	2011/12
Number of students of secondary educational institutions in Russia and Belarus per 10 000 people at the beginning of school year					
Russia	158	173	144	142	139
Belarus	145	144	153	154	153
Number of students of higher educational institutions in Russia and Belarus per 10 000 people at the beginning of school year					
Russia	292	416	430	409	381
Belarus	246	337	392	404	409

Source: Belarus and Russia. 2012.: statistical digest. Rosstat; Belstat; Permanent Committee of the Union State. Moscow: Rosstat, 2012. P. 61.

Although, there is a significant demand in higher education among people, some researchers [5] forecast changing of the tendency in future. One of the reasons for such situation, reduction of benefit from higher education due to transition of holders of higher education institution's diplomas to semi-skilled work places and increase of unemployment among this group of people according to inconsistence of demand on labour force and its supply can be named [5]. That is why it can be supposed that secondary education would be more requested in comparison with higher education.

Postgraduate study is also requested among people except for higher education. Acceptance of education can not only contribute to professional level growth, but create opportunities for accumulation of innovation potential of population. However, in spite of population's readiness to study in postgraduate school, it should be marked that the ratio of those who graduated from it including those who defended their dissertations remains rather low. In Russia only one third of those who graduated from postgraduate school defend their dissertations, in Belarus their number is even less *(tab. 8)*.

Among Russian and Belorussian postgraduate students (more than 60% of population in both countries) the most requested branches of science are technical fields. However, in Russia the ratio of postgraduate students in this direction decreases, while in Belarus, in contrast, increases *(tab. 9)*.

Comparing structures of researchers according to branches of science, considerable differences in Russia and Belarus are not revealed. However, in Belarus due to the fact that in the technical branch the number of employed researchers is almost 10% less than in Russia, more requested branches are social sciences and humanities.

The key indicator, characterizing involvement in educational process of population, is the share of participants in programmes of formal and non-formal education. According to the data of the Organization for Economic Cooperation and Development, in 2011 40% of adults on average in its member-states took part in such programmes, 27% looked for information about different educational programmes [12].

Cross-country analysis of involvement of population into the system of lifelong education revealed the leading countries (Austria, Slovenia, Luxemburg, Denmark, Finland, Sweden), where 70 – 80% of population get education during whole life; countries taking intermediate place (France, Ireland, Italy, Latvia, Portugal, Belgium, Germany), where the level of population's involvement into lifelong education is comparable to the average one among the OECD member-states; countries with low level of population's participation in lifelong education.

The last group comprises Estonia, Lithuania and some CIS-countries including Russia, where almost one third of population takes part in lifelong education. In Belarus the level of

Table 8. Main figures of postgraduate school activities

Figures	2000		2005		2011	
	Russia	Belarus	Russia	Belarus	Russia	Belarus
The share of postgraduate students graduated from postgraduate school, in the total number of postgraduate students, %	21.1	19.4	23.5	25.7	21.2	19.0
The share of postgraduate students graduated from postgraduate school and defended their dissertations, in the total number of postgraduate students, %	6.4	1.4	7.5	1.5	6.2	0.9

Source: Belarus and Russia. 2012: statistical digest. Rosstat; Belstat; Permanent Committee of the Union State. Moscow: Rosstat, 2012. P. 61.

Table 9. Structure of researchers according to the branches of science in Russia and Belarus

Country	Year	Branches of Science					
		Natural sciences	Technical sciences	Medical sciences	Agricultural sciences	Social sciences	Humanities
Russia	2000	23.4	64.6	3.6	3.4	3.1	1.9
	2011	24.0	60.4	4.5	3.5	4.5	3.1
Belarus	2000	23.8	54.4	6.3	5.7	7.0	2.8
	2011	18.3	61.3	5.3	6.0	6.8	2.3

Source: Belarus and Russia. 2012: statistical digest. Rosstat; Belstat; Permanent Committee of the Union State. Moscow: Rosstat, 2012. P. 137.

population's participation in lifelong education is comparable to the level in Romania and Hungary, moreover, during 2000 – 2010 a certain reduction of the figure was observed (from 13% to 10%). Low level of population's participation in lifelong education and in professional improvement can be considered as one of the indicators impeding innovation transformations.

According to the experts from the Institute of Contemporary Development, the transition to innovation economy will be connected not only with modernization of national economies of countries under consideration, but partly with integration processes. The reason for this lies in common history and problems in the sphere of education. Therefore, using deeper forms of cooperation is more efficient, which will suppose agreement of national priorities in the sphere of science and technology, creation of institutional and financial mechanisms in the form of international funds for researches and innovation projects support on a multilateral basis [3, p. 35-37].

Strategy of the CIS economic growth for the period until 2020 supposes the formation of intergovernmental innovation space on the basis of national innovation system, which contributes to the promotion of research, development and innovation. Considerable part of this process will be allocated to education. Among the main directions of cooperation in the educational sphere of allied states the following directions can be mentioned: improvement of content, forms and methods of education on all the stages of education process, development of agreed parameters for monitoring the quality of education, "harmonization of educational programmes (it will make it possible to simplify the procedure of mutual recognition of documents on education)", joint preparation, organization of on-the-job training and professional development of personnel, implementation of joint research activities, implementation of mutual examination of research, scientific-methodological and teaching works and regulatory documents in the sphere of education [9].

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