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Human Capital and Methodic of Determination of Its Cost: A Case of Kazakhstan

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Abstract

This research is aimed the furthest development of the conception of Human capital formation. The study made on the base of methods of scientific classification and systematization; dialectical method and the method of scientific abstraction, systematic and comparative analysis; expert assessment and ratings. Formation of the competitive human capital is one of the most important goals of modern development of Kazakhstan in condition of the innovative economy construction. In this context the necessity of formation and development of the effective human capital considerably increases. Realization of this requires definition of a technique of measurement of its cost as well. The authors attempt to calculate the value of human capital for Kazakhstan during independency time. In order to determine the methods of its quantitative and qualitative assessment different methodological ways for human capital research are studied. On the basis of the study, it was revealed that formation of the competitive human capital can't be considered in a separation from development and modernization of system of quality education, improvement of the employment sphere, worthy payment for work.

Keywords: Human Capital, Methods, Assessment, Income, Employment.

JEL Classification Codes: E24, J24.

1. Introduction

Purpose of the study is the furthest development of the conception of Human capital. This research is made on the base of

methods of scientific classification and systematization; dialectical method and the method of scientific abstraction, systematic and comparative analysis; expert assessment and ratings. Competitive country development at the basis of new technologies requires the high quality specialists who will be able to use accumulating experience and knowledge. The hire quality characteristics of workers are of primordial importance for successful appliance of high technologies and technical equipment. Among a complex of economic and organizational factors of innovative economy creation the Human capital at the base of which are education, professionalism and intellect is the most significant. Under this condition the human capital becomes the strategic resource of the country by changing the nature of competition at the global markets. In the modern Global economy the new type of economic growth at the base of using knowledge's and innovations as main resources is formed. The national wealth of the developed countries only for 5% is consist of natural resources, for 18% – of the material (production) capital, and the main share – 77% –is for of knowledge and ability to use it.

2. The Essence of the Concept of Human Capital

The human development of a country is considered in direct interrelation with economic growth, increasing of competitiveness of a national economy and increasing of the level of population life. Experts' note that threshold level of accumulation of the human capital of countries having high grow this estimated at 40% by educational level of the population (Azaridis & Allen, 1990). To gain the level opening abilities for the increasing growth requires to open the national economy for new technologies. Case of the new quality of economic growth based on the use of knowledge and new technologies as result of effective usage of human resources. The human capital of a country determines its place in the Global economy. It is quite logical to tell that today, in fact, there is a competition of the human capital among different countries (Chulanova, 2005).

Formation and development of the human capital is determined by influence of external and internal factors which are tightly interconnected to each other and in whole positively affect its development. In particularly, the external factors determined by the situation in the global economy. The degree of

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influence on the human capital formation of some countries depends of its integration level into the Global economy. Some factors, for example illegal labor migration, can have negative impact on quality of the human capital of the host country. For successful development of the human capital it is necessary to carry out factors of negative impact of world economic crisis 2008 which revealed big need of economy restructurization at the new innovation-technological basis. It is important both for developing and developed countries. As for internal factors of the human capital formation, they are defined first of all by stability of national economy, prospects for industrial-innovative development of the country. It, in turn, assumes a qualitative modern education system, effective employment system, opportunity to qualification work by receiving specialization with the corresponding wage. These new standards of the life quality determine along with the other factors the new quality of human capital and its competitiveness. Such competitive advantage of developed countries, in particular USA, where were made the most attractive conditions for scientific employers and specialists-generators for new knowledge. It is caused by inflow of the high quality human capital all over the world that promotes development of science and the high technologies. According to actualization of formation competitive human capital as main directions of modern development of developing countries is obvious. In context of this is significant to speed up the process of formation and realization of human capital.

Relevance of research of the human capital formation and realization immeasurably increases in the light of the set of the urgent priority strategic tasks. It has to be aimed at theoretical and methodological justification of formation of the human capital, further development of its modern concept and modernization of the labor relations and employment in the course of the forced innovative industrialization of economy. Effective functioning of the human capital is defined by a choice of uniform strategy of long-term development of the country. Successful realization of national idea in many respects depends on activation of a human factor and the main valuable resource of economy – the competitive human capital. At the beginning of the new millennium when in the world there are: formation and transition to "economy of knowledge", accumulation by each country of the human capital is of particular importance.

The methodology of measurement of the human capital is very inconsistent and ambiguous, as definition of his concept and essence. Apparently, one of the main reasons of such contradiction consists in it. One of the general definitions of essence of the human capital consists in the set of knowledge as a result of costs of education and training of the person. It is purely investment approach to a human factor. Other approach considers the human capital as a part of the capital embodied in the cost of salary and its profitability. In this regard questions of capitalization of a salary and difficulty of its measurement in the conditions of the developed tariffing and impossibility of exact definition of compensation in market economy are considered. In this regard there are doubts about essence of the human capital as parts of the capital and inapplicability of category of the capital to the human person.

At the country level creation of its own human capital requires its estimations for make choice of criteria and indicators of measurement as initial, basic, and limit, final parameters of achievement of new quality of the human capital. Ambiguity and discrepancy of methodical approaches to the human capital measurement in many respects is explained by unequal treatment of definition of its essence. Intensive international integration of the countries in global economy is shown in need of an assessment of the human capital according to high-quality measurements and the international standards. It means detection of competitive advantages and opportunities of the human capital of the country at the international level. The solution of tasks of an economic recovery and post-crisis development is also inseparably linked with modernization on the basis of application of the latest technology.

The assessment of the human capital has to be carried out as measurement of the knowledge accumulated by the country and realization of the human capital according to the solution of objectives of industrial and innovative development and post-crisis stabilization of economy. The specification and addressing of realization of effective use of the human capital requires its measurement at three levels: at the level of macroeconomic for the country in general for calculation of the national human capital; at the micro level (companies or firms) and for the human person. Each of these levels will be characterized by the sum of expenses and sources of their replenishment.

3. Methodological Approaches to Defining the Essence of Human Capital

This research is aimed for furthest modernization of the conception of the Human capital formation and determination of methods of its quantitative and qualitative assessment. Different methodological ways for human capital research causes unequal definitions of concept of its essence. However, so far there is no accurate unambiguous definition of the concept "Human capital". Many researchers consider its in separate aspects. Thus the majority of definitions are based on consideration of the human capital as certain part of the monetary capital in the form of expenses, income and profit. In the dictionary of the Modern economic theory the following definition of the concept "human capital" is given: essences of the human capital are investments into human resources for the purpose of increase of their productivity. Thereafter expenses are made in expectation of future benefits. So the term «investments to human capital» was generated"(Pirs, 2009). At the same time some authors, recognizing that the main factor in economic development always is a Human, give large meaning for quality parameters of human resources development. They determine the category «human capital» from the quality aspect that is characterized by the level of education, ability to increasing incomes and by productivity workers to make a contribution to the general economic development (Sidorovich, 2001).

The assessment of quality of the human capital is possible

as a result of quantitative measurement of the reached new high-quality changes. The majority of factors of formation and development of the human capital can be measured by quantitative indicators. However, the degree of their impact at the human capital isn't identical. That causes difficulties to estimate a development level of the human capital at this stage. In the structure of human capital the main and initial component is the demographic potential which is characterized by population, its gender and age structure, health, territorial and professional mobility. Changes influence improvement or decline of qualitative characteristics of the population that is directly reflected on formation of the human capital. Thus, close interrelation of all compounds of components of the human capital among themselves should be noted. So, it is possible to allocate an educational compound, as a major factor to gain it. In the new millennium with transition to knowledge economy in aggregation with the educational capital the scientific and intellectual capital are allocated. With them it is closely interconnected the personal potential, characterizing internal, physical and cultural energy of a person, his active position directed on creative expression and self-realization. Personal potential can be shown in creative and scientific potentials, creative and leader abilities of a person, its ability to accept and realize decisions, its moral qualities. Must tell about the enterprise potential taking a special place in market economy. It should be considered as a key factor of economic growth of a national economy. Its involvement by using scientific management methods at the micro and macro-level give the good results (Samuelson, 1948).

Thus, research of the theory of the human capital is representing the richest set of saved-up values, presented by demographic characteristics, level and quality of education, employment, level of living, technologization of social space, psychology, degree of the solution of environmental problems, demands an integrated approach. As potential opportunities of compounds of the human capital are closely interconnected, the assessment of the human capital is available on the basis of three-level approach: education and knowledge accumulation of an individual person, the human capital of employees of corporation, and the human capital of the country as a whole, i.e. research must be conducted both at the level of microeconomics, and at the level of macroeconomic.

However, it is must be noted that despite big theoretical cultivation of problems of the human capital, questions of its measurement are worked insufficiently fully. Estimates by the size of this main wealth of the country are very inconsistent. There are various approaches to definition of separate components of the human capital. However, an accurate technique by its complex assessment today has not developed yet. Lack of concrete techniques affects, and the difficulty are caused by collecting, processing and assessment of reliability of necessary statistical information. Today it is possible to speak about two main methods of the cost assessment of the human capital – retrospective, which is based on the accounting of the expenses, and perspective - on the basis of accounting of incomes which source it should become.

4. Methods for Human Capital Assessing Based on Production Costs

The first method assumes that the cost of the human capital should be measured proceeding from the cumulative expenses connected with its formation, minus depreciation. For the first time such approach was applied in 1883 by Ernst Engel, who tried to estimate the cost of the birth and education of children for their parents. It was defined by it in the form of total maintenance costs of children from the moment of conception to achievement of adult age by them. It is obvious that this approach is refer not so much on an assessment of the human capital, not as for estimation of cost of the maintenance of the person as for estimation physical beings for men. Besides, in it the expenses connected with the birth and education of children which are incurred by society as a whole aren't considered. Also it ignores expenses of time of parents on care of children. And at the end, here isn't considered the fact that charges for children of different age are made during the different periods of time and, therefore, they aren't subject to simple summation, and have to be led to the real time point (Engel, 1883).

Other representative of this approach based on the accounting of expenses, was The Odor Vitstein who considered human beings as base funds (capital goods). So by to his assumption, earnings size during life of an individual is equal to costs of his contents plus expenses for education. These researches were conducted in the link with necessity of development of the help tables which used for calculations of sizes of claims on compensation for loss of life, for the life insurance sphere. When using this approach human life cost at the time of its birth is inevitably equal to zero.

To it is conformable method which was removed by the Ukrainian economists according to which the cost of the human capital is defined by average per capital expenses of the person on: a food, clothes, footwear, the maintenance of housing, transportation costs, cultural and spectacular and cultural needs of the person, and also expenses on health care, formation, education, since children's age. The World Bank for calculation of the human capital offered a formula defining it link with investments. According to this approach the human capital represents function multiplication index quality of labor in his wise definition index quality summarizing human capital investments to human capital and other variables. Undoubtedly, the listed approaches which are based on costs of production consider a set of the factors influencing formation of the human capital; however have also certain shortcomings.

In particular, this approach assumes that the value of the human capital is defined entirely on the offer side without any participation of factors of demand. Also it isn't considered that at measurement of the human capital, unlike physical, between the size of the invested means and the end results of their investment there is no unambiguous stable relation. For example, the cost of education and formation of less healthy or less capable children will be for its parents more expensive, than for one healthier and more capable child. But from here doesn't follow

that the first will have the big human capital, than the second. Usually the situation is opposite. In similar conditions the method which is based on the accounting of expenses, will overestimate stocks of the human capital of a people with the worst health or the worst abilities, and to underestimate its stocks at people with the best health or the best abilities.

Besides, when using this approach it isn't considered that wear and the depreciation of the human capital occur essentially differently, than physical. In the course of activities for a measure of a growing of workers and accumulation of professional experience by them the economic value of a stock of knowledge available for them, skills and abilities doesn't decrease, and increases, unlike from the physical capital. To number of shortcomings it is necessary to bring out the fact that here is not taken for addition of prolixity of investments for person in time. The period of investments into the human capital and time of its use is most often divided by a considerable temporary log. In modern societies the prevailing part of investments goes to school pupils and students who should remain still certain time in an education system and which human capital is still far from starting "being operated" soon (OECD, 2005).

According to the World Bank, the cost of the national human capital of the countries of the world on the basis of an expensive method joined the used means of the state, families and different funds. They allow to define the current annual costs of society of reproduction of the human capital. In the USA the cost of the human capital at the end of the XX century made 95 trillion dollars, or 77% of national wealth, 26% of a world result of cost of the human capital. By estimates of specialists of the World Bank, the cost of the world human capital made 365 trillion dollars, or 66% of world wealth, 384% to the level of the USA. For China these indicators make 25 trillion dollars, 77% of all national wealth, 7% of a world result of the human capital and 26% to the level of the USA. The ratio of these indicators for Russia reveals: 30 trillion dollars, 50%, 8% and 32% (World Bank, 2000). These indicators allow to give comparative estimation of cost of components of the human capital, however the high share of cost of natural resources for some countries considerably changes current situation. So, by the beginning of the XXI century the average ratio of the main components of national wealth in the countries with the prevailing raw orientation of economy and foreign trade was offered as a percentage with calculation of specific weight of "the human capital", "production and social structure" and "natural resources" (respectively 59%, 21% and 20%).

Analysts of the World Bank offered other, discount method of estimation of cost of the human capital. At the set standard of profitability of cumulative national wealth the cost from which the price of the earth, minerals, forest and marine resources, the production capital and other assets is subtracted is calculated it. Other part represents the cost of the human capital. The cost of the human capital calculated by this technique makes even in the poor countries about a half of national wealth, and in the developed countries – near $\frac{3}{4}$. Despite some convention of measurement of the human capital, these methods are generally applied at its assessment. Effective realization of the human

capital represents a polysyllabic problem which decision has to be carried out in a complex. Effective use of the human capital demands not only researches in all aspects of its manifestation the most important of which is the functioning assessment in the main sectors of economy, in the sphere of employment and in labor markets, but also in comparison with the reached parameters according to the international standards.

The American economist J. Kendrick offered an expensive method of calculation of cost of the human capital on the basis of extensive statistical data of the USA. It included investments into the human capital - costs for family and society of children education before achievement by them of working-age and receiving a certain specialty, on retraining, professional development, health care, labor migration, etc. As a result of its calculations the human capital in the 1970th years made more than a half in the saved-up national wealth of the USA (without the state investments). Thus in accumulation it also included investments in housing, household durable goods, stocks of goods in families, costs of scientific researches and development (Kendrick, 1976). Such approach to an assessment of the human capital caused ambiguous objections of researchers as found reflection of expense in it, connected with reproduction of human resources and activity of people. This method allowed to estimate accumulation of the human capital on its overall "recovery" cost, but did not give the chance to allocate "netvalue" of the human capital (minus its "wear"). At the same time inclusion of expenses on health care and labor protection, education and vocational training, and also the so-called missed benefits –the lost earnings of students which they could receive if preferred to give the time to work is important. So, by a uniform technique 50% of national expenses on health care and the program of labor protection that is conventional by many authors belong to investments into the human capital.

Research of two methodological approaches to an assessment of the human capital on the basis of capitalization of a salary, expenses for education and expenses of a family reveals certain positive achievements in this area, as well as omissions. They characterize first of all narrow treatment of the concept "human capital" that doesn't correspond to modern ideas of its essence as the richest social and economic category.

5. Method of Evaluation of Human Capital on the Basis of Income Assessment

For the first time attempts of a cost assessment of the human capital taking into account the income were made by U. Petti. Doing calculations for England and Wales, he defined annual fund wage, having calculated it as a difference between the national income and the income from property, and then counted a stock of the human capital, having divided the received size into a percent rate (Petti, 1672). Another English economist U. Farr estimated the human capital as the capitalized cost of future earnings of individuals minus their maintenance costs themselves. Farr formulated key idea that the

capital embodied in individuals, it is possible to estimate proceeding from the total income which they should receive in the market during the subsequent life (Farr, 1853).

On the basis of these researches by their followers it was revealed that there can't be a perfect analogy between the physical and human capital. Also, it was recognized that the size of the income has to calculate taking into account expected rates of economic growth according to which the salary of the person through a certain period of time will be higher than its salary now. At the same time the main obstacle for calculation by this method is absence of micro data on a salary of workers with various personal characteristics which would allow counting an indicator of lifelong earnings. As a whole, the method of calculation of the human capital, based not on the last expenses connected with formation of the human capital, and on the incomes which the individual receives now or will receive in the future, better be used for dynamic, developing economies. One more undoubted advantage of the approach based on cumulative income gained during all life is that: at its usage of the human capital stocks are estimated by market prices. The levels of a salary established at a labor market develop as result offers by the human capital from workers and demand for them from companies. They, thus, accumulate influence of a set of the most various factors as at micro level (abilities of workers, their professional qualification, motivation intensity of labor efforts, etc.), and at macro level (technological state of the economy, features of the institutional environment, etc.).

Today the method which is based on calculation of income, gained during all life, is widely used in economic and social sciences in spite of the fact that it is based on rather ambiguous assumptions. The main of them is that potentially labor human life falls on the period from 15 to 64 years. Respectively, provided that the human capital, after 65 years is equal to zero. The Chinese economist T. Le in his calculations is basing on data of the labor income for each group of population of a certain age and an education level (Le, 2002). These indicators are grouped and weighed taking into account the level of employment rate, probability of survival till 65 years, possibility of continuation of education and professional development, labor activity. The most modern, after others the issued approach – measurement of the human capital by means of indexes. To a certain extent it allows to combine advantages, to overcome restrictions and distortions of natural and cost estimates. The index methodology best of all is suitable for inter-country and inter-categorical comparisons, for example, for ranging of stocks of the human capital of various territories, countries, social groups (UNDP, 1991, 2014).

In the last decades in the developed countries the advancing growth of investments into the human capital in comparison with physical is observed that characterizes growth of expenses for education, health care and social security three times in comparison with production capital investments. It is promoted by transition to innovative economy, technological business where, the concentration of highly qualified specialists is higher, the return of each of them is higher. They are even more considerable in the field of scientific researches. High payment of the

qualified and intellectual work is one of the main incentives of knowledge acquisition in the developed countries and the main factor of their development. High image of intellectual work, its huge value for economy of knowledge allow to increase cumulative intelligence of the country, industries, corporations.

6. Estimation of Human Capital Cost of Kazakhstan in 2008-2013

We have attempted to calculate the cost of human capital for Kazakhstan. By using the methodic of the return recursion for the individual at a certain age it is possible to receive the cost of its human capital, putting its expected labor income in current and the subsequent periods taking into account the corresponding growth rate of the incomes, norm of discount and probability of survival (Gu & Wong, 2010). We used this method in the simplified look with such indicators as: the annual labor income of the worker, to an employment rate, probability of survival of the individual from one age period to another to the category "education earnings" on certain age groups of a certain category "education earnings". As result we made attempt to estimate the human capital generally as a whole about the country at present time.

The following formula had changed so:

$$H = \left[(n \times I) \times R + \left[\frac{(1+g)^n}{(1+e)} \right] \right]$$

where:

H - human capital of the individual of a certain category "education earnings";

I - annual labor income of the worker of the category "education-earnings";

R - employment rate of a certain category "education earnings";

g - average growth rate of the real income;

n - time period

e - education level.

We calculated the cost of the Human capital of Kazakhstan 2008-2013 years by using the data from Committee on statistics of Kazakhstan.

<Table 1> The Indicators Characterizing the Human Capital of Kazakhstan, 2008-2013

	2008	2009	2010	2011	2012	2013
Nominal monetary income, the average per capita per year, Tenge	395808	411384	465348	545220	621060	678240
Employment rate, %	93.4	93.4	94.2	94.6	94.7	94.8
The rate of real income growth, %	111.8	96.9	105.6	109.4	106.9	109.2
Education level, %	99.8	99.7	99.7	99.8	99.8	99.8

Solving the received equation, it is obviously possible to calculate the generalized cost of the human capital in Kazakhstan for 2008-2012.¹⁾

$$H_{2008} = \left[395808 \times (93,4)^1 \times (99,8) + \left[\frac{(1+1,12)^1}{(1+1)} \right] \right] = 3,706 \times 10^7$$

$$H_{2009} = \left[411384 \times (93,4)^1 \times (99,7) + \left[\frac{(1+0,97)^1}{(1+1)} \right] \right] = 3,826 \times 10^7$$

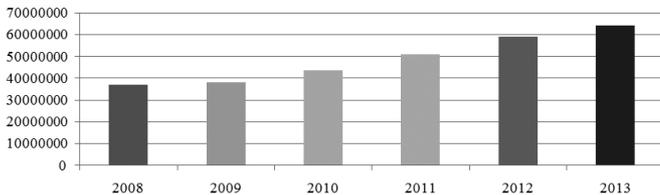
$$H_{2010} = \left[465348 \times (94,2)^1 \times (99,7) + \left[\frac{(1+1,06)^1}{(1+1)} \right] \right] = 4,374 \times 10^7$$

$$H_{2011} = \left[545220 \times (94,6)^1 \times (99,8) + \left[\frac{(1+1,09)^1}{(1+1)} \right] \right] = 5,1 \times 10^7$$

$$H_{2012} = \left[621060 \times (94,7)^1 \times (99,8) \times \left[\frac{(1+1,07)^1}{(1+1)} \right] \right] = 5,9 \times 10^7$$

$$H_{2013} = \left[621060^1 \times (94,8)^1 \times (99,8) \times \left[\frac{(1+1,09)^1}{(1+1)} \right] \right] = 6,4 \times 10^7$$

Thus, on the basis of the carried-out calculations it is possible to track dynamics of growth of the human capital from 2008 to 2013. The observed growth of its cost connects with increase in level of the income (salary) and increase of an employment rate of the population in the Republic of Kazakhstan at almost invariable level of education.



<Figure 1> Dynamics of Development of the Kazakhstan Human Capital in 2008-2013

7. Recommendations

Formation of the competitive human capital cannot be considered in separation from formation of system of quality education, improvement of the sphere of employment, worthy payment for work. In the conditions of increasing of the international integration of the countries and the competition of effective realization of new quality of the human capital is available with creation of certain conditions. For this purpose it is necessary the next priority directions to realization:

- To accelerate reforming of education systems, professional training and retraining;
- To improve labor market situation corresponding to expected labor relations
- To achieve the highest labor productivity and the corresponding wage in all sectors of national economy, providing production of competitive goods and services of high quality
- To increase the role of the state in a choice of the priority

1) It was calculated by authors by of the engineering and mathematical program -Mathcad-2012.

directions of industrial policy, creation of work places in the knowledge-intensive branches, in regulation of effective functioning of the human capital in crisis conditions;

- To improve and to upgrade the labor relations between the state, employers and workers represented by labor unions on the basis of tripartite partnership;
- To increase the social responsibility of business in professional training of workers.

8. Conclusion

Formation of the competitive human capital is one of the most important goals of modern development of Kazakhstan in condition of the innovative economy construction. As a whole, based on the analysis of major factors of growth of the human capital, it is possible to tell that increase of cost of the human capital in the conditions of innovative development of national economy represents a polysyllabic problem which demands a comprehensive integrated approach to its consideration. However, results of the carried-out calculations indicate evidence of that the main competitive advantage of the modern advanced country is connected with the human person and those factors which directly provide activity of the person.

References

- Azriadis, C., & Drazen, A. (1990). Threshold Externalities in Economic Development. *Quarterly Journal of Economics*, 105(2), 501-526.
- Chulanova, Z. (2005). Human Capital in the Global Economy. *Kazakhstan in Global Processes*, 4(6), 81-97.
- Committee on Statistics of the Republic of Kazakhstan (2014). Economic Activity of Population (1991-2014). www.stat.gov.kz.
- Course of the Economic Theory (2001). The General Bases of the Economic Theory. Microeconomics. Macroeconomic, Bases of National Economy, 2nd ed. Reprinted under the Editorship of Sidorovich, A.V. Moscow: Moscow State University.
- Dictionary of the Modern Economic Theory (2009). Under Reduction of Pirs, D.U.: Moscow.
- Engel, E. (1883). *Der Werth des Menschen*. Berlin: Germany. Verlag von Leonhard Simion.
- Farr, W. (1853). Equitable Taxation of Property. *Journal of Royal Statistics*, 16(March), 1-45.
- Gu W., & Wong A. (2010). Estimates of Human Capital: The Lifetime Income Approach. Economic Analysis Research Paper. Series No. 062.
- Kendrick, J. (1976). *The Formation and Stocks of Total Capital*. New York: Columbia University Press for NBER.
- Le, T., Gibson, J., & Oxley, L.A. (2002). Forward Looking Measure of the Stock of Human Capital in New Zealand. Paper presented at the NZAE conference.

- Wellington.
Organization for Economic Co-operation and Development (2005). Statistics Directorate. Monetary Measures of the Stock of Human Capital for Comparative Analysis: Country Data.
- Petti, U. (1672). *Economic and Statistical Works*. Reprinted at Moscow: Social Publishing House, 1940. T. 1–2.
- Samuelson, P. (1948). *Economics*. New York: McGraw-Hill.
- United Nations Development Programme (2014). *Human Development Reports (1991-2014)*. <http://hdr.undp.org/>
- World Bank (2000). *Measurement of the Human Capital and National Wealth, Methods of Estimation of Cost of Human Resources as a Component of National Wealth*. Washington: World Bank.