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ЭКОНОМИКА ТРУДА И ЧЕЛОВЕЧЕСКИЙ КАПИТАЛ

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METHODOLOGICAL ASPECT OF HUMAN CAPITAL ASSESMENT

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Abstract. The development trend of the world economy shows that one of the important factors of development is the knowledge, skills, abilities, ability and need to continue their education. In developed economies, the share of human capital in national wealth is up to 80%. In this regard, special attention is paid to the development of human capital in the developed countries of the world. In the process of building a New Uzbekistan, special attention is paid to issues such as economic growth, employment and quality of life, development of human capital. Economic growth is directly related to employment and health, quality of life, the level and quality of development and competitiveness of the education system. In particular, the human capital currently formed in Uzbekistan does not fully meet the needs of the economy for highly qualified personnel. Therefore, in the context of the development of innovative economies and digital technologies, it is expedient to improve the methodology of calculating human capital and the mechanisms that encourage its growth. Taking into account the world experience, this article proposes a methodology for identifying and evaluating key indicators of human capital at different levels as an important factor in the development of the national economy.

Keywords: human capital, human capital index, expected years of school.

INSON KAPTIALINI BAHOLASHNING USLUBIY JIHATLARI

Azimov Tolmas Nematullayevich
Toshkent davlat iqtisodiyot universiteti

Annotatsiya. Jahon iqtisodiyoti rivojlanish tendentsiyasining ko‘rsatishicha, taraqqiyotning muhim omillaridan biri sifatida bilim, mahorat, malaka, o‘qishini davom ettirishga bo‘lgan qobiliyat va ehtiyoj alohida ahamiyat kasb etmoqda. Iqtisodiyoti rivojlangan mamlakatlarda milliy boylikdagi inson kapitali ulushi 80 foizgachani tashkil etadi. Shu jihatdan, jahonning taraqqiy etgan mamlakatlarida inson kapitalini rivojlantirishga alohida e'tibor qaratilmoqda. Yangi O‘zbekistonni barpo etish jarayonida iqtisodiy o‘sish sur'atlarini ta'minlash, aholi bandligi va turmush sifatini oshirish, inson kapitalini rivojlantirish kabi masalalarga alohida ahamiyat berilmoqda. Iqtisodiy o‘sish aholi bandligi va salomatligi, turmush sifati, ta'lim tizimining rivojlanish darajasi va sifati hamda raqobatbardoshligiga to‘g‘ridan-to‘g‘ri bog‘liq. Ayniqsa, O‘zbekistonda hozirgi vaqtda shakllantirilgan inson kapitali iqtisodiyotning yuqori malakali kadrlarga bo‘lgan ehtiyojni to‘laqonli qondirmaydi. Shundan kelib chiqib, innovatsion iqtisodiyot va raqamli texnologiyalarni rivojlantirish sharoitida inson kapitalini hisoblash metodikasi hamda uni oshirishni rag‘batlantiruvchi mexanizmlarni takomillashtirish maqsadga muvofiq. Jahon tajribasini inobatga olgan holda, ushbu maqolada milliy iqtisodiyotni rivojlantirishning muhim omili sifatida, inson kapitalining asosiy indikatorlarini turli darajalarda aniqlash va

baholash metodikasi taklif etilgan.

Kalit so‘zlar: inson kapitali, inson kapitali indeksi, ta'limning kutiladigan yili.

Introduction

The Action Strategy for the five priority areas of development of the Republic of Uzbekistan for 2017-2021 was developed in 2017. This Strategy involves the five directions and its 3rd direction about "The development and liberalization of the economy".

Doubtless, implementation of the 3rd direction relates also with human capital except other factors. According to [1] economists have long recognized that people are an important component of the wealth of nations. Recently the focus has been switched to using human capital as a tool to explain economic growth across countries. Human capital is believed to play a critical role in the growth process, as well as producing positive external effects such as enhanced self-fulfillment, enjoyment and development of individual capabilities, reduction in poverty and delinquency, and increased participation in community and social and political affairs [2]. The World Bank published the Human Capital Index of the world's countries for 2020 in September this year. For the first time, the index includes data on health and education of Uzbekistan. Uzbekistan, which participated in this study, showed 62% results.

The human capital currently formed in Uzbekistan cannot fully meet the needs of the country's economy for highly qualified human resources. Therefore, to increase of human capital in Uzbekistan is significantly relevant in the context of the development of an innovative economy and digital technologies.

The research purpose is:

-To study the international experience of human capital calculation.

The research objectives are:

-Describing of international experience of human capital calculation;

-Interpreting its meanings and understanding concepts.

“With perceiving about the importance of human capital, many nations have tried to effectively and efficiently measure their human capital to understand their current status” [3].

“Thereafter, human capital measurement is an important source in terms of suggesting and implementing policies regarding human resources” [3].

Human capital is emerging as a key determinant of international competitiveness and its very long development period makes it necessary to understand the stock of the capital, the influences on it, and the way in which that capital and those influences alter [4]. Human capital as the source of economic efficiency [5]. Human capital may be developed through formal training and education aimed at updating and renewing one’s capabilities in order 6 to do well in society. Prior researchers have made a distinction between different types of human capital [6]. Human capital emanates from

the fundamental assumption that humans possess skills and abilities that can be improved, and as such can change the way people act [7].

The human capital model is the basis of neoclassical analysis of labor markets, education and economic growth. It has also had an important influence on other social sciences such as sociology and demography [8]. The human capital model is derived from the standard economic logic of optimization and is supported by a large body of empirical evidence. It is not surprising, therefore, that the model is dominant in economic analysis of education throughout the world, and that it is taken as a background assumption in many other areas of economics, such as the theory of economic growth [9].

Human capital in regions

Table 1

Human Capital index, USA [11]

Probability of survival to age 5	Expected years of school	Harmonized test scores	Learning-adjusted years of school	Fraction of children under 5 not stunted	Adult survival rate	Human capital index 2020 (lower bound)	Human capital index 2020	Human capital index 2020 (upper bound)
0,99	12,9	512	10,6	-	0,89	0,69	0,70	0,71

According to the World Bank’s HCI rate, the results of USA in the following order: Probability of survival to age 5 is 99%, Expected years of school is 12,9 years, harmonized test scores is 512, Learning-adjusted years of school is 10,6 years, adult survival rate is 89%, Human capital index is 70%.

M. S. Christian [12] investigated Human Capital Accounting in the United States in 1998-2009 years and identified that the human capital account as a whole was robust to using regressions to impute employment, school enrollment rates, and wages by age, sex, and education. Levels of human capital stock and investment tend to be lower, but real growth rates in the components of net investment were virtually the same. This bodes well for measuring human capital from small data sets from which reliable sample means cannot be measured by age, sex, and individual year of education. [13] measured of the human capital stock and of investment in human capital for the United States between 1994 and 2006. The researcher found that the size of the human capital stock in the United States is gigantic. When both market and non-market components of human output are combined, the stock of human capital was about three-quarters of a quadrillion dollars in 2006. About 70 percent of this stock is the non-market component. Net investment in human capital, which is primarily the effects of births, aging, and education, was about $6 trillion in 2006; the non-market share of investment is normally between about 70 and 80 percent.

Table 2

Human Capital index, Singapore [11]

Probability of survival to age 5	Expected years of school	Harmonized test scores	Learning-adjusted years of	Fraction of children under 5 not	Adult survival rate	Human capital index 2020 (lower	Human capital index 2020	Human capital index 2020 (upper
1,00	13,9	575	12,8	-	0,95	0,87	0,88	0,89

According to the World Bank’s HCI rate, the results of Singapore in the following order: Probability of survival to age 5 is 1,00%, Expected years of school is 13,9 years, harmonized test scores is 575, Learning-adjusted years of school is 12,8 years, fraction of children under 5 not stunted is 0%, Adult survival rate is 95%, Human capital index is 88%.

One of the unique features of Singapore’s national HRD strategies is its investment in human capital. Singapore had the highest per capita national expenditure on education in Asia for 1991-1995 [14]. But human capital poses challenges for Singapore because there is a lack of it. Not only have birth rates continued to dip, despite the government’s generous incentives in the form of a baby bonus to encourage couples to procreate, the mobility of talent out of Singapore has raised a certain level of consternation. Although no statistics can be found in the public domain to ascertain the trend of the out-flow of students, this paper analyses three media articles that reflect the subliminal anxieties about brain drain and shortage of talented human capital in its national imaginary [15]. For Singapore, the human capital management is propped up by two types of policies – the worker policies which discriminate between different types of labor and those which bring in international students with the hope of keeping them after graduation [16].

Table 3

Human Capital index, Japan [11]

Probability of survival to age 5	Expected years of school	Harmonized test scores	Learning-adjusted years of school	Fraction of children under 5 not stunted	Adult survival rate	Human capital index 2020 (lower bound)	Human capital index 2020	Human capital index 2020 (upper bound)
1,00	13,6	538	11,7	-	0,95	0,80	0,80	0,81

According to the World Bank’s HCI rate, the results of Japan in the following order: Probability of survival to age 5 is 1,00%, Expected years of school is 13,6 years, harmonized test scores is 538, Learning-adjusted years of school is 11,7 years, fraction of children under 5 not stunted is 0%, Adult survival rate is 95%, Human capital index is 80%.

The contribution of human capital in the non-agricultural sector was also

important. The results seem to quantitatively suggest one of the important mechanisms by which labor migration between sectors influences economic development. In Japan, high economic growth occurred after the war when secondary education became popular, rather than before the war when primary education had already been common. This fact is consistent with the results of many Barr regressions that (particularly male) secondary education contributes to economic growth rather than primary education or whole education [17]. [18] Conducted research and found that workers' average years of schooling increased dramatically during the 1950s and 1960s. Although this increase in human capital could explain much of Japan's economic growth during the 1950s and 1960s, the expansion of higher education in Japan does not promise to greatly contribute to future economic growth. [19] studied that a bidirectional causality between human capital and economic growth in Japan. In other words, human capital and economic growth are related by a feedback mechanism. This implies that if a country plans to stimulate growth, investment in human capital is an effective way to achieve its goal. Conversely, a country that achieves rapid economic growth can better afford more spending on education. Thus, human capital investments and economic growth promote and reinforce each other.

Table 4

Human Capital index, Uzbekistan [11]

Probability of survival to age 5	Expected years of school	Harmonized test scores	Learning-adjusted years of school	Fraction of children under 5 not stunted	Adult survival rate	Human capital index 2020 (lower bound)	Human capital index 2020	Human capital index 2020 (upper bound)
0,98	12,0	474	9,1	0,89	0,87	0,60	0,62	0,64

Human Capital Index. A child born in Uzbekistan today will be 62 percent as productive when she grows up as she could be if she enjoyed complete education and full health. This is lower than the average for Europe & Central Asia region but higher than the average for Lower middle income countries.

Probability of Survival to Age 5. 98 out of 100 children born in Uzbekistan survive to age 5.

Expected Years of School. In Uzbekistan, a child who starts school at age 4 can expect to complete 12 years of school by her 18th birthday.

Harmonized Test Scores. Students in Uzbekistan score 474 on a scale where 625 represents advanced attainment and 300 represents minimum attainment.

Learning-adjusted Years of School. Factoring in what children actually learn, expected years of school is only 9.1 years.

Adult Survival Rate. Across Uzbekistan, 87 percent of 15-year olds will

survive until age 60. This statistic is a proxy for the range of health risks that a child born today would experience as an adult under current conditions.

Healthy Growth (Not Stunted Rate). 89 out of 100 children are not stunted. 11 out of 100 children are stunted, and so are at risk of cognitive and physical limitations that can last a lifetime [20].

In addition, the United Nations’ HDI rank gives us to know about Human Development Indexes (a summary measure of average achievement in key dimensions of human development: a long and healthy life, being knowledgeable and have a decent standard of living) of all members of the organization. According to this HRI index, the Republic of Uzbekistan’s human being is 108 out of 189 countries. Uzbekistan is involved in the high human development group. We may see via this table that Uzbekistan has risen one place (Table 5).

Table 5

Human Development Index and its components, 2018 [21]

Human development index (HDI)	Life expectancy at birth	Expected years of schooling	Mean years of schooling	Gross national income (GNI) per capita	GNI per capita rank minus HDI rank	HDI rank
0,710	71,6	12,0	11,5	6 462	18	109

Methodology

This research is a literature review of empirical and theoretical studies and for this reason the secondary data were used in the data collection process. This literature review considered as qualitative research because of research objectives involve describing of international experience of human capital calculation, interpreting its meanings, and understanding concepts. The data of research consisted of 81 journals and books, and corresponding 24 journals, books and internet sources chosen for research. These data collected from open research websites. The process of analysis data is involved of analyzing the meanings and perceptions of human capital calculation methods in international practice. The research is explanatory in nature and there is no specific collection method.

The organization of the research is the following order: creating the research’s corresponding structure, collecting secondary data, analyzing the international methods of human capital calculation, development conclusion and recommendations and finally preparation the full research paper.

The research purpose is:

-To study the international experience of human capital calculation.

The research objectives are:

-Describing of international experience of human capital calculation;

-Interpreting its meanings and understanding concepts.

International calculating methods of human capital

Human capital measurement can be divided two approaches: indirect and direct. According to [10] this approach is based on the assumption that the discounted value of the benefits that the capital stock will deliver over its life will be equal to the current monetary value of the capital asset. In the context of discussions on sustainable development, the total capital assets of each country may be thought of as generating a stream of benefits in the form of consumption goods in the future. Therefore, by taking the discounted value of the future consumption flows (taken as a proxy for total wealth), and subtracting from this amount the monetary value of those capital goods for which monetary estimates of their current stocks are readily available (i.e. produced capital, market value of a range of natural assets, and net foreign assets), may provide an indirect (i.e. residual) estimate of the value of those capital stocks for which no monetary value can be observed on the market.

Direct approaches derive a measure of the stock of human capital from information on its various components [10]. Direct approach also involves [22] three major approaches to measuring human capital: the cost-based approach, the income-based approach, and the educational-stock-based or indicators approach [22].

According to [23] human capital measurement is based on a nonlinear Mincer-type wage function:

$$\ln X_{it} = \frac{\alpha}{1-\psi} s_{it}^{1-\psi}, \qquad (1)$$

Here X_{it} is human capital, s_{it} is years of schooling, and i is the index of years of schooling. We employ the nonlinear function because the internal rates of return on education are different amoung education levels. The values of parameter α, ψ in a baseline case are 0.32 and 0.58, respectively which is the point estimate of Bils and Klenow [23].

The researcher [18] considered a lower value, ψ = 0.28, which is the point estimate minus two standard errors and aggregated the human capital of Japan’s macro economy:

$$X_t = \sum_i X_{it}. \qquad (2)$$

The researchers [24] calculated the cost of the Human capital of Kazakhstan 2008-2013 years via (3) method.

$$H = \left[(n \times I) \times R + \left[\frac{(1+g)^n}{(1+e)} \right] \right] \qquad (3)$$

Here:

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.

Human capital has become one of the important components of modern development, both in individual countries and in the world community as a whole. Therefore, a certain classification of human capital levels can be given:

- individual human capital - individual degree;
- human capital of the organization (firm) - micro level;
- regional human capital - meso level;
- national human capital - macro level;
- interethnic (global) human capital - global level

Procedure for identifying and evaluating the level of human capital of the country in terms of sectors and regions in order to increase it.

The human capital index determined by the following formula, multiplying the 3 main components, in the standard of living of children under 5 years of age, education and health:

(4) HCl = S x E x H, here:

HCI - human capital index;

S - level of vitality;

E - level of education;

H - level of health;

Life expectancy is calculated by deducting the mortality rate of children from 1 to 5 years according to the following formula:

(5) S = 1 - U5MR, here:

S - level of vitality;

U5MR is the survival rate of children under 5 years of age.

Under-5 mortality rates determined and reported by the United Nations Inter Agency Group for Child Mortality Estimation. In the example of the Republic of Uzbekistan:

Mortality rate of children under 5 years of age in the Republic of Uzbekistan (in promille, ‰)

Nu.	Years	Idex	Low	High
1	2015	22,76	20,03	25,78
2	2016	21,09	18,55	23,97
3	2017	19,65	16,98	22,63
4	2018	18,44	15,54	21,84
5	2019	17,43	14,19	21,42

The table above shows that the infant mortality rate in the Republic of Uzbekistan in 2019 was 17.43 ‰. If the promille is reduced to the form of an integer, it becomes 17.43 / 1000 = 0.01743. If we subtract 1 from 0.01743 according to the formula, the result is 1 - 0.01743 = 0.98257. That is, in 2019, about 98% of children under 5 in our country will continue their life cycle. These 98% of children create human capital by pursuing a school education in the future.

Education. This part of the index covers the quantitative and qualitative

indicators of education. The quantitative indicator of education includes the school years that a child can receive before the age of 18 years. This includes the years of education between the ages of 4 and 17. Information on school age limits in different countries can be obtained through the UNESCO Institute for Statistics (UIS; http://data.uis.yunesco.org/);

(6) E = Exp (f (E_{YS} x H_{TS} / 625) - 14), where:

E - children's education indicator;

Exp - exponential;

E_{YS} - years of schooling that a child can receive before the age of 18; (In Uzbekistan, this figure is 12 years).

H_{TS} - (harmonized test score) quality test score;

3. Health. In order to supplement this component of the index, two reliable methods are used for the general health environment:

a) the life expectancy of adolescents - the number of children under 15 years of age is determined by dividing the result by 1;

b) malnutrition in children under 5 years of age;

Adolescent survival rates are recorded in 197 UN countries.

(4) H = Exp (¥ century x (adolescent survival rate -1) + ¥ (S) x malnutrition rate -1)) / 2, where:

H - health;

Human capital at micro level

Russian scientist K.N.Chkoryaev proposed one of the methods of assessing human capital at the individual and firm levels. According to the method proposed by Chkoryaev, this is an investment (value) approach to assessing the value of human capital. Scientist K.N.Chkoryaev acknowledges that to evaluate the impact of human capital on a company’s financial results, a company needs to have a quantitative expression of it. Based on this method, all costs related to human capital are divided into three main groups:

1) the wage fund (all payments made to workers, including salaries, taxes, bonuses, incentives, etc.);

2) the cost of intellectual capital (training costs, retraining, advanced training, participation in conferences, seminars, research, etc.);

3) “health capital expenditures”. “Health capital” means funds allocated to people to shape and improve their health and ability to work, such as medical examinations of employees, additional health insurance and other preventive measures and disease prevention.

Thus, in the scientific form, an additional model emerges that serves as the sum of three components in the quantitative determination of human capital:

HC = A + B + C, here

A - the salary fund of the organization;

B - the cost of intellectual capital of the organization;

C is the cost of the organization's health capital;

The authors also say that the calculation should also take into account

that each item has its own return cost. Accordingly, the weight b is added to each recurring cost. Then the formula is:

HC = Ab1 + Bb2 + Cb3

Human capital at macro level

The definition of human capital at the macro level is based on 2 elements:

1) the wage value of human capital;

2) formation and investment value of human capital;

To calculate the value of human capital in monetary terms, there are 4 components:

1) Basic value of human capital;

2) Depreciation of the value of human capital;

3) Restoring the value of human capital;

4) changes in the value of human capital due to the influence of motivation;

The introduction of techniques for the systematic assessment of human capital at the macro level is based on the following basic principles. The labor market of the economy is influenced by the specific laws of the labor market in a market supported by the assessment of workers ’wages. Actually, paid wages do not always guarantee the retention of a skilled workforce, so it is important to assess the role of the difference between actually paid and required wages in order to achieve the set goals.

The formation of human capital should provide dynamic aspects of evaluation. Only after assessing the value of human capital at the exact time one can proceed with the dynamic assessment of the value of human capital. Determining the value of human capital at the macro level requires a long-term guaranteed test of the full knowledge, skills and abilities of employees. In this regard, the employed population of the country is the basis of the value of human capital

Conclusion and recommendations

The country requires the development of a state policy of labor planning for the development and support of various sectors of the economy and the development of human capital. Labor resource planning is reflected in the development of human capital to meet the development needs of the economy. For the proper use of labor resources, it is important for the country to create opportunities for quality education for its population, to train and retrain qualified personnel in other areas related to the development and sustainability of digital technology-based industries and sectors. Without professional training, effective human capital cannot be developed. Therefore, it is emphasized that countries with advanced technological development have highly qualified labor resources.

The country still has a number of pressing problems and shortcomings in the development of human capital and its qualitative improvement, including:

first, the imperfection of organizational, legal and socio-economic mechanisms for the development of human capital in the conditions of

innovative and knowledge economy and digital transformation;

second, the cooperation between education, science and industry in the development of human capital is not purposefully systematized on the basis of the innovative model of “higher education-territory-need”;

third, the methodology for identifying and evaluating key indicators of human capital by sectors and regions as an important factor in the development of the national economy has not been developed;

fourth, the country has not developed a strategy for the effective use of "demographic dividends" in the harmonious implementation of rational education and employment policies that directly affect the efficiency of human capital;

fifth, there is no mechanism for improving the professional and vocational training of industry and industry personnel, the practice of studying them in the workplace and away from the workplace, as well as the exchange of experience and knowledge between generations;

Based on long-term goals, the development of human capital in the country will be based on the following priorities:

the first is the development of measures for the increasing human capital on the basis of the principle of “Life-long learning”;

second, to increase the role and importance of the health system in the development of human capital in the country;

third, accelerating the flow of investments aimed at increasing the competitiveness of human capital on the basis of basic and specific factors;

fourth, to develop a methodology for identifying and evaluating the level of human capital of the country by sectors and regions;

fifth, the development of motivational mechanisms to encourage employees to improve their professional skills in enterprises of the economy and social sphere;

sixth, improvement of mechanisms to increase decent employment, income and living standards;

seventh, development of directions of innovative development of human capital in the conditions of transition to digital economy.

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