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Estimation of the cost of human capital in a small enterprise based on the extended Mincer equation

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Abstract. The article provides a comparative analysis of modern concepts and methods for measuring the human capital of enterprises: it describes traditional economic and statistical methods based on the analysis of investments in education, healthcare, and vocational training, as well as more modern tools that take into account the skills, competencies, motivation, and involvement of staff. Special attention is paid to integration models that allow for a comprehensive assessment of human capital, taking into account its contribution to production and innovation processes. The advantages and limitations of existing techniques are noted, as well as current problems and areas for their improvement. The authors emphasize the importance of a systematic approach to assessing human capital and the need to adapt it to the specifics of a particular organization or industry.

It is necessary to determine the cost of human capital, primarily to improve the wage system. The article reveals the characteristic features and differences of approaches to the assessment of human capital, provides the author's definitions of the category "human capital", and the modification of the wage equation by J. Mincer. Using an extended interpretation of the equation by J. Mincer, the authors estimate the cost of human capital of a small enterprise.

Keywords: evaluation methodology, micro-level, enterprise, value-added, investment, return.

Introduction

The quality of human capital is the largest expenditure item of the state; therefore, its assessment is an urgent problem. Therefore, in the presented article, which was prepared within the framework of the grant project of the Committee of Science of the Ministry of Science and Higher Education of the Republic of Kazakhstan AP26103857 "Economic assessment of the added value of human capital and its impact on the quality of life", assessment methods are investigated.

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In the twentieth century, the economic "breakthrough" of countries without absolute advantages (large territory, mineral resources, minerals) forced the scientific community to reconsider its attitude to the study of human capital at the micro and macro levels.

Let us recall that the history of the formation of the theory of human capital includes simultaneously the following scientific trends:

– political economists who have identified the category of "human capital" as an additional factor of production;

– financial economists who considered it necessary to give an economic assessment of human capital and use their calculations for practical purposes, mainly to improve taxation and life insurance systems;

– specifically, economic – here the first attempts were made to independently analyze certain types of human capital and assess their economic effectiveness.

Since the middle of the 19th century, practical economists, statisticians, financiers, and insurance agents have increasingly begun to turn to the idea of human capital, trying to determine the price of human capital in monetary terms and use the estimates obtained for their practical purposes.

Some economists used estimates of human capital to prove the crucial importance of its level for the quality of life of an individual, his family, and in a particular country as a whole, and on this basis to encourage the state to preserve the life and health of its citizens (T. Wittstein, E. Woods, K. Metzger, W. Farr, A. de Fauville, E. Engel).

Other scientists pursued purely pragmatic goals, such as helping insurance authorities establish scientifically sound compensation for illnesses and accidents, or offering government authorities a more equitable taxation system (M.Dawson, L.Dublin, A.Lotka).

For other economists, it was important to assess the human losses from wars and various kinds of natural disasters, as well as to determine the economic losses and benefits from human migration (K.Brace, R.Giffen, F.Kapp, E.Crammond, R.Mayo-Smith).

In the late nineteenth and early twentieth centuries, along with the search for scientific ways to measure human capital, the first studies began to appear in the field of determining the economic profitability of investments in human capital. Three issues were discussed in the most detail: migration of people, protection of their health and education (S.Strumilin, D.Walsh, I.Fisher, – a specific economic direction).

If we adopt the thesis that a person is not a means to achieve, but the goal of economic growth, then we explain the fact that human capital is considered in modern science as an additional and most important factor in a successful national economy, which should be invested not only by individuals and their families, but also by the state. The issues of human capital assessment, which will be discussed in this article, are considered to be among the most complex and discussed in the scientific literature.

The purpose of the study is to quantify the cost of human capital of a small enterprise using an expanded interpretation of the Mincer equation, which takes into account the impact of the level of education, professional experience and other individual characteristics of employees on wages.

Literary Review

The main part of the study is devoted to the review and analysis of the literature on methods of human capital assessment. The issue of estimating the added value of human capital is widely

considered in the works of foreign researchers using a variety of approaches — from cost and income models to econometric and index methods, such as Vilda Gizhene, Janeta Simonaviciene, and Oksana Palyakene [1], Uros Delevitz [2], Safonov Yu., Borsch V., Danylko M. [3], Jorgenson D., Fraumeni B., others. It is also worth noting scientists from the CIS and neighboring countries who study methods for assessing the added value of human capital, such as Abdalimova N.A. [4], Michurina O.Yu., Dubinina N.A., Karlina E.P. [5] and others.

First of all, we will consider the methods aimed at assessing the economic efficiency of investments in human capital. In particular, special attention should be paid to the methodology proposed by foreign researchers Vilda Gizhen, Janeta Simonaviciene, and Oksana Palyakene [1]. In their opinion, the assessment of investments in human capital is carried out in two ways: the assessment of human capital from a financial point of view and the reassessment of human capital by evaluating various variables. Many foreign scientists use empirical analysis to assess the economic effectiveness of investments in human capital. For example, researcher Uros Delevitz [2] in his research examines how the average PISA score, reflecting the quality of human capital, and the average length of schooling, reflecting the amount of human capital, affect the inflow of foreign direct investment (FDI) as a percentage of GDP.

Ukrainian researchers Safonov Yu., Borsch V., Danylko M. [3] in their scientific research cite a wide variety of methods for assessing value added to human capital. Including: assessment of income generated by human capital (economic assessment); quantitative assessment of the stock of knowledge, skills, and abilities acquired by a person; special skills (special human capital) – quantitative assessment; through methods of investing in human capital – in healthcare capital, education capital, cultural capital; assessment of human capital at the micro and macro levels; integrated assessment, including both natural and monetary indicators of human capital; social accounting matrix – macroeconomic assessment of human capital; price assessment of human capital by investment volume and reflection of the total value in the currency of the balance sheet of the company [3].

In her research, a researcher at the Institute of Economics and Demography of the National Academy of Sciences of Tajikistan, N.A. Abdalimova [4] studies the method of managerial added value (UDS). The essence of the UDS method is to measure the contribution of key management personnel to the added value of the enterprise [4]. Also, according to Russian scientists Michurina O.Yu., Dubinina N.A., Karlina E.P. [5], the added value of human capital is represented and evaluated in three directions: as an investment, as a cost, and as an asset. In addition, researchers identify a number of well–known methods for assessing human capital - individual, comparative, and expert [5].

The monitoring of existing foreign methods for assessing the relationship between the level of investment, high-quality human capital, its added value, profitability and quality of life has shown that none of them fully covers the entire range of these categories in a single analytical model. Moreover, there is no need to estimate the value of human capital at the enterprise level with its impact on the employee's salary.

Methodology

The main research questions consist of the following main points:

– An extended interpretation of the equation by J. Mincer provides a more accurate estimate of the cost of human capital.

– Different definitions of the concept of "human capital" have an impact on the interpretation and practical use of the results of its assessment.

– Taking into account the motivation, competencies and involvement of staff increases the accuracy of a comprehensive assessment of human capital.

– The results of the human capital assessment can be effectively used to improve remuneration systems and management decision-making.

The research hypothesis – Integration models of human capital assessment, which take into account not only investments in education and healthcare, but also skills, motivation and engagement, provide a more accurate and practical measurement of its value to improve management efficiency at the small enterprise level.

The article uses the following research algorithm (Figure 1):

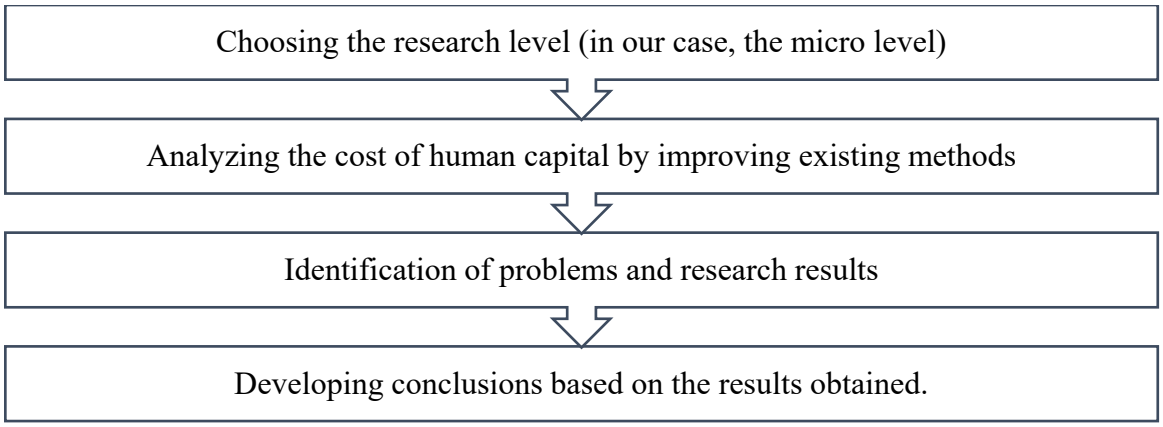

Figure 1 Problem research algorithm

Note: developed by the authors [5]

This study examined the works of economists from neighboring countries who are interested in the possibility of offering a universal methodology for assessing the human capital of an enterprise. At the same time, a specific goal is being pursued: to determine the salary fund and the costs of the company's management for the reproduction of human capital.

All modern concepts of human capital are united by the awareness of it as a set of funds of education, experience, and qualifications capable of generating income not only for their owner, but also for the enterprise in which they work. Human capital is a leading factor in economic growth, driving the innovative development of the enterprise and the intensification of production.

Human capital is formed, developed and implemented, bringing its owner income from investments. Investments in human capital begin in the family and educational institutions (birth, healthcare, upbringing), and are continued by the individual independently and with the help of employers interested in the long-term success of their company.

The formation, realization, and evaluation of human capital occurs at all levels of the economy: from the micro (person and enterprise/organization) to the mega level – human capital at the level of the international economy.

In this study, it is of interest to measure the human capital of an enterprise and the investments made by the employer aimed at maintaining, preserving, and developing the human capital of the company.

Rishko Yu.B., Malakhova E.M. [6] pay attention to several important points when analyzing the structure of human capital at the enterprise level:

– type of activity, specifics (production, commerce, innovation, education, etc.). When calculating quantitative indicators of human capital of an enterprise, this affects the "weight" of an asset characteristic of a particular industry. For example, in an educational organization, the most important component of the human capital of employees is the availability of higher professional education;

– the regional affiliation of the company. For example, there are differences in average life expectancy and other parameters between the southern and northern regions of the country [6].

The article presents methods for assessing human capital of industrial (Freeman I.M., Freeman E.M., Khudyakova E.G.), innovative (Chigoryaev K.N., Skopintseva N.A., Ulyashenko V.V., Tebekin A.V., Mitropolskaya-Rodionova N.V., Khoreva A.V.), commercial (Dobrovinsky A.P., Demyanenko Yu.V.) and "abstract" enterprises (Rishko Yu.B., Malakhova E.M.).

Researchers Rishko Yu.B., Malakhova E.M. attach great importance to the initial stage of measuring the human capital of an organization, which is a laborious and time–consuming process. Which activities should be started with, and which indicators will be used to evaluate the effectiveness of each employee. An economic entity may have its own algorithm.

In the work of Rishko Yu.B., Malakhova E.M., a scheme is proposed in which activities are planned in stages: at the very beginning of the process, immersion in the subject area is performed, then it is necessary to give indicators of human capital and calculate weighting coefficients, after that, an assessment is made using quantitative and qualitative indicators identified using questionnaires that provide positions and description of the employees' activities, expert assessment, and qualitative characteristics of the employee. At the end of the survey stage, information about the primary human capital of the organization is generated, then individual plans and working documents are drawn up, questionnaires are evaluated, in which average indicators are calculated, the coefficient of inconsistency is determined, colleagues are interviewed, and quality indicators are evaluated. In parallel with this stage, a large-scale survey with a hierarchical bias is underway, which contains the employee's self-assessment, surveys of the supervisor, colleagues and subordinates. The scheme for the initial stage of assessing the human capital of an organization is quite acceptable: concise and universal [6, p.73].

Freeman I.M., Freeman E.M. see the human capital of an industrial enterprise as the sum of the human capital of all categories of employees: industrial personnel (Q i.p.), specialists and employees (R s.e.), managers (S m.):

$$W = Q\ i.p. + R\ s.e. + S\ m. \quad (1)$$

The authors argue that the development of human capital increases the added value of the enterprise. In their article, they consider the assessment of the profitability of investments in human capital by the PWC Saratoga Institute based on added value. The calculation is designed to assess the impact of the company's staff on its profitability. The formula for the added value of human capital, HCVA (human capital value added):

$$HCVA = D – (OR\text{-}SRC)/KSHC \quad (2),$$

where D is the company's income; OR is the company's total expenses (minus wages and compensation); SRC is the cost of labor; KSHC is the number of full–time employees of the enterprise.

The authors criticized this method, which, in their opinion, should be applied only if the added value of human capital is determined at the end of a certain period: a quarter, six months, or a year. Using the PWC Saratoga Institute method, it is impossible to assess the dynamics of human capital during a certain operation and, accordingly, the contribution of each employee to the profitability and competitiveness of the enterprise.

Freeman I.M., Freeman E.M. propose a formula for added value, taking into account, in their opinion, the disadvantages of the method proposed by the PWC Saratoga Institute.

Researchers propose to calculate the added value of an enterprise (DV) by subtracting from the sum of the volumes of continuously manufactured and marketed products ($Н^{п.т.п}$) and first-time manufactured and marketed products($Н^{внв.т.п}$) and the sum of direct costs in the manufacture of permanently manufactured ($Z^{п.т.п}$) and marketed products and direct costs in the manufacture of products being manufactured and sold for the first time ($Z^{внв.т.п}$):

$$DV = (Н^{п.т.п.} + Н^{внв.т.п.}) – (Z^{п.т.п.} + Z^{внв.т.п.}) \quad (3)$$

The researchers have shown the relationship between the human capital of an enterprise and an increase in its profitability and competitiveness.

In their study, Freeman I.M., Freeman E.M. present a model for assessing the positive dynamics of an enterprise's human capital as the main factor in its efficiency and competitiveness.

The assessment includes indicators of effectiveness, cost-effectiveness, timely completion of the assignment and the employee's work experience.

This model is designed for one i-employee performing a specific production task – j.

The model is presented as the product of the ratio of the difference between the actual indicators (ф.) of the present (н.п.) and the previous periods (п.п.) to the difference in the planned indicators (п.) of the present and previous periods multiplied by the difference in the relative coefficient of significance of the task performed (λ) in the present and previous periods and by the value of the coefficient of employee experience (Q) in this facility:

$$Wi = (Pijф^{н.п} – Pijф^{п.п})/ (Pijп^{н.п} – Pijп^{п.п}) \times (Зijф^{н.п} – Зijф^{п.п})/ (Зijп^{н.п} – Зijп^{п.п}) \times (Tijф^{н.п} – Tijф^{п.п})/(Tijп^{н.п} – Tijп^{п.п}) \times (λij^{н.п} – λij^{п.п}) \times Q \quad (4)$$

The indicators in the model include: actual and planned results of activities (P), actual and planned costs (З), actual and planned time periods (T) required to complete this task, coefficients of significance of the performed task (λ) in the present and previous periods, and coefficient of work experience (Q).

The presented model gives management an idea of the quality of human capital and the expediency of further investments in this employee, and is also crucial when making other management decisions: creating teams to perform tasks of increased complexity, staff rotation, etc. [7].

A dynamic approach to assessing the effectiveness of an organization's human capital management in the context of the development of an innovative economy can also be traced in the work of Tebekin A.V., Mitropolskaya-Rodionova N.V., and Khoreva A.V.

$$Q = К_{пчк} \times К_{фучк} \times К_{прчк} \times К_{дрчк} \times К_{сэичк} \times К_{пчк} \quad (5)$$

The organization's human capital assessment model is represented by the product of coefficients that take into account the quality of work on the acquisition of human capital, the actual level of human capital, the potential and dynamics of human capital development, the synergetic effect, and losses from the use of human capital [8].

In some works, when trying to estimate human capital, a costly method is traced, based on the assumption that the price of human capital is equal to past investments in monetary terms or the resources spent on its creation – E. Engel's method [9].

Thus, researcher E.G. Khudyakova evaluates the human capital of an industrial enterprise according to the formula:

$$СЧК = И \times И_{ВЧКвИРП} \quad (6),$$

where the value of human capital in conventional units (СЧК) is equal to the product of the company's investment in the employee's human capital in conventional units (И) and the index of the contribution of human capital to the innovative development of the enterprise, in fractions of a unit (ИВЧКвИРП).

The author believes that using the above formula, it is possible to assess the human capital of an enterprise, taking into account the impact on its innovative development [10].

The human capital of an innovative enterprise (HC) is represented as the sum of the company's costs (Chigoryaev K.N., Skopintseva N.A., Ulyashenko V.V.):

$$HC = \beta_1 A + \beta_2 B + \beta_3 C \quad (7),$$

where A is the salary fund; B is the employer's investment in the intellectual capital of the company; C is the cost of employee health, β_1 is the coefficient of return on the salary fund; β_2 is the coefficient of return on investment in intellectual capital; β_3 is the coefficient of return on "health capital" [11].

Dobrovinsky A.P., Demyanenko Yu.V., assessing the human capital of a commercial organization, also apply the summary method. The assessment of an organization's human capital consists of such assessments as:

– measurement of human capital (HC) based on trials in the business environment (the price of human capital through real trials in the business environment + the assessment of the value of HC based on the knowledge system on management, economics and marketing);

– competitive evaluation of human capital;

– a promising competitive assessment of the value of the human capital;

– direct calculation of personnel costs [12].

Results and Discussion

The authors of this article also adhere to the cost method and consider the equation of American economist Jacob Mincer to be a universal assessment of investments in human capital, which summarizes the rates of return on each structural element of human capital of one employee and, thus, calculates his salary, which is the only assessment of human capital at the micro level [13]:

$$\ln W = ß_0 + ß_1 \cdot SCH + ß_2 \cdot EXP + ß_3 \cdot EXP^2 + ß_4 \cdot TEN + ß_5 \cdot TEN^2 + e \quad (8),$$

where SCH is secondary and higher education, EXP is work experience (calculated as the difference between age and the years spent on acquiring secondary and higher education and minus preschool years), TEN is the experience gained in this company; W is remuneration.

The coefficient ß characterizes the rate of return from each variable of the equation: $ß_0$, $ß_1$, $ß_2$, $ß_4$ – positive coefficients; $ß_3$ – negative.

J. Mincer did not take into account in his equation the rate of return on health capital, on which the state of human capital as a whole actually depends: the quantity and quality of education, labor productivity, entrepreneurial abilities, social mobility, etc.

Denisenko M. B., Sagradov A. A. extended the model the missing variable:

$$\ln W = ß_0 + ß_1 \cdot SCH + ß_2 \cdot EXP + ß_3 \cdot EXP^2 + ß_4 \cdot TEN + ß_5 \cdot TEN^2 + ß_6 \cdot LMNP \quad (9),$$

where LMNP is the health score for the past month [14].

Another element needs to be introduced into the model:

$$\ln W = ß_0 + ß_1 \cdot SCH + ß_2 \cdot EXP + ß_3 \cdot EXP^2 + ß_4 \cdot TEN + ß_5 \cdot TEN^2 + ß_6 \cdot LMNP + ß_7 \cdot CUL + ß_8 \cdot CUL^2 + \quad (10),$$

where CUL is the valuation of investments in cultural capital.

This form of human capital, in modern terms, can also be monetized, since human capital, in addition to all the above elements, includes cultural properties of a person that are inseparable from their psychophysiological portrait and worldview.

High-quality cultural capital (knowledge of foreign languages, business etiquette, experienced use of PCs and various devices, communication skills, mobility, diligence, stress tolerance, etc.) helps its owner to successfully realize himself in the labor market, make a career, occupy a higher position and receive high wages, to work simultaneously in several projects/ on several sites enterprises, to receive income from entrepreneurial abilities (higher earnings from sales, income from securities transactions, etc.).

To evaluate the human capital of an enterprise, it is possible to transform the equation:

$$\ln WE = (ß_0 + ß_1 \cdot SCH + ß_2 \cdot EXP + ß_3 \cdot EXP^2 + ß_4 \cdot TEN + ß_5 \cdot TEN^2 + ß_6 \cdot LMNP + ß7 \cdot CUL + ß_8 \cdot CUL^2 + e) \cdot Ne \quad (11),$$

where Ne is the number of employees of the enterprise.

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One important point should be noted here, in our opinion: the above equation for estimating the human capital of an enterprise is applicable only in the case of the same value of the human capital of employees, which, of course, is unlikely. In practice, the human capital of an enterprise is the sum of the human capital of all employees.

Using the example of a company specializing in the field of printing and printing services, it is possible to calculate the cost of human capital of an enterprise.

Field research was conducted over a one-month period, during which the initial data for calculations for each employee were obtained: the type of position/ function in the company, age, years of study at school and educational institutions, tuition fees, work experience (length of service) indicating salary, actual salary, investments in health capital investments in cultural capital. Thus, the analyzed period included the years spent by employees on education and the acquisition of work experience, including work experience at this enterprise from the date of its foundation to the present.

The company employs 5 people: a director, a proofreader, an artist-designer, an offset printing operator, and a process operator (Table 1).

Table 1. Assessment of the human capital of Polygraph LLP

№	Position, age	SCH	EXP	EXP^2	TEN	LMNP	CUL	lnW
1	Head, 40 years old	10 years (school) + 4 years UNIVERSITY + second higher education (2 years)	10 years (wages – 100 000 c.u.)	3 years (wages – 120 000 c.u.)	4 years (wages – 200 000 c.u.)	20 000 c.u.	–	950 000 c.u.
2	Proofreader, 30 years old	11 years (school) + 4 years UNIVERSITY	4 years (wages – 80 000 c.u.)	–	4 years (wages – 120 000 c.u.)	5 000 c.u.	200 000 c.u.	567 750 c.u.
3	Designer, 28 years old	12 years (school) + 4 years UNIVERSITY		–	4 years (wages – 140 000 c.u.)	10 000 c.u.	–	422 500 c.u.
4	Offset Printing Operator, 32 years old	9 years (school) + 2 years college	10 years (wages – 90 000 c.u.)	–	4 years (wages – 120 000 c.u.)	7 000 c.u.	–	865 850 c.u.
5	Technology operator, 35 years old	8 years (school) + 2 years college	6 years (wages – 80 000 c.u.)	6 years (wages – 100 000 c.u.)	4 years (wages – 130 000 c.u.)	5 000 c.u.	–	270 250 c.u.
Total								3 076 350 c.u.

Note: compiled by the authors

lnW is the sum of the rates of return from each structural element of the human capital of one employee, on the basis of which his salary should be calculated. Ideally, lnW should be equal to 1 (100%). Indeed, every asset acquired and invested should make a profit.

$$\ln W = ß_0 + ß_1 \cdot SCH + ß_2 \cdot EXP + ß_3 \cdot EXP^2 + ß_4 \cdot TEN + ß_5 \cdot TEN^2 + ß_6 \cdot LMNP + ß_7 \cdot CUL + ß_8 \cdot CUL^2 + e \quad (12),$$

where SCH – secondary and higher education, EXP – previous work experience, TEN – work experience gained in this company, LMNP – health assessment for the past month, CUL – assessment of investments in cultural capital.

The company's management defines 20 assets that can be included in the employee's human capital and a coefficient that characterizes the rate of return on each element of human capital.

The coefficient ß is 0.05 (1: 20 = 0.05). We remind you that in the equation of J. Mincer $ß_0$, $ß_1$, $ß_2$, $ß_4$ are positive coefficients; $ß_3$ is negative.

Let's look at an example of evaluating the human capital of an enterprise in more detail.

The director is 40 years old, has two higher educations, and combines the leadership and functions of the Master of the Quality Control Department (QCD)– a specialist in process control. Responsible for compliance of manufactured products with customer requirements and regulatory documentation. The director is the organizer and owner of a business that has been successfully operating for 4 years.

According to Table 1, the value of the human capital of the head of the company (director) consists of the following elements:

$$\ln Wd = ß_0 + ß_1 \cdot SCH + ß_2 \cdot EXP + ß_3 \cdot EXP^2 + ß_4 \cdot TEN + ß_6 \cdot LMNP \quad (13)$$

The elements of human capital are measured in monetary terms (c.u.). According to the formula, we will make calculations:

lnWd = 0,05 + 0,05 · 1700 000 + 0,05 · 12 000 000 – 0,05 · 4 320 000 + 0,05 · 9 600 000 + 0,05 · 20 000 = 0,05 + 85 000 + 600 000 – 216 000 + 480 000 + 1 000 = 950 000, 05 c.u.

Let's explain the values SCH, EXP, EXP2, TEN, LMNP in this calculation.

1700 000 c.u. – monetary value SCH (years spent on acquiring secondary and higher education). The annual expenses of a family for the school needs of 1 child are 50 000 c.u., total for 10 years – 500 000 c.u.

6 years were given for higher education: 4 years for the first and 2 years for the second higher education. The cost of studying at universities was 200 000 c.u. Total: 200 000 · 6 = 1 200 000 c.u.

SCH = 500 000 + 1 200 000 = 1 700 000 c.u.

EXP = 12 000 000 c.u.

Recall that EXP is work experience (calculated as the difference between age and the years spent on acquiring secondary and higher education and minus preschool years). The head is 40 years old. EXP = 40 – 16 – 7 = 17.

Of the 17 years, he worked for one company for 10 years (the salary was 100 000 c.u. per month), 3 years – at another company (the salary was 120 000 c.u. per month), He has been running his own business for 4 years (the salary is 200 000 c.u. per month).

EXP = 12 000 000 c.u. (100 000 c.u. · 12 = 1 200 000 c.u. · 10 years)

EXP2 = 4 320 000 c.u. (120 000 c.u. · 12 = 1 440 000 c.u. · 3 years)

TEN (the experience gained in this company) = 9 600 000 c.u. (200 000 c.u. · 12 = 2 400 000 c.u. · 4 years)

LMNP – health assessment for the past month = 20 000 c.u. (10 000 c.u. is a monthly subscription to a fitness club, 5000 c.u. was spent on the purchase of a vitamin and mineral complex, 5000 c.u. for a monthly subscription to the pool).

Thus, lnWd = 950 000, 05 c.u.

We will calculate the cost of human capital of other employees in the same way.

Proofreader – 30 years old, higher education, speaks English.

The cost of the corrector's human capital is expressed by the formula:

$$\ln Wpr. = ß_0 + ß_1 \cdot SCH + ß_2 \cdot EXP + ß_4 \cdot TEN + ß_5 \cdot TEN^2 + ß_6 \cdot LMNP + ß_7 \cdot CUL \quad (14).$$

According to the formula, we will make calculations:

lnWpr. = 0,05 + 0,05 · 1550 000 + 0,05 · 3 840 000 + 0,05 · 5 760 000 + 0,05 · 5 000 + 0,05 · 200 000 = 0,05 + 77 500 + 192 000 + 288 000 + 250 + 10 000 = 567 750, 05 c.u.

Let's explain the values SCH, EXP, TEN, LMNP, CUL.

1550 000 c.u. – monetary value SCH (years spent on acquiring secondary and higher education). The annual expenses of a family for the school needs of 1 child are 50 000 c.u., total for 11 years – 550 000 c.u.

4 years were given for higher education. The cost of studying at universities was 250 000 c.u. Total: 250 000 · 4 = 1 000 000 c.u.

The corrector's EXP is 8 years old (30 – 15 – 7).

For 4 years, the proofreader worked in another company with a salary of 80 000 c.u.

EXP = 80 000 · 12 · 4 = 3 840 000 c.u.

The corrector has been working at this company for 4 years with a salary of 120 000 c.u.

TEN (the experience gained in this company) = 5 760 000 c.u. (120 000 c.u. · 12 = 1 440 000 c.u. · 4 years).

LMNP – health assessment for the past month = 5 000 c.u. (5000 c.u. for a monthly subscription to the pool).

CUL – 200 000 c.u. for 2-year English language courses.

Thus, lnWpr. = 567 750, 05 c.u.

Artist-designer – 28 years old, higher education.

The cost of an artist-designer's human capital is expressed by the formula:

$$\ln Wa.d. = ß_0 + ß_1 \cdot SCH + ß_4 \cdot TEN + ß_6 \cdot LMNP \quad (15).$$

lnWa.d. = 0,05 + 0,05 · (600 000 + 1 120 000) + 0,05 · 6 720 000 + 0,05 · 10 000 = 0,05 + 86 000 +336 000 + 500 = 422 500, 05 c.u.

Let's explain the values SCH, EXP, TEN, LMNP.

1720 000 c.u. – monetary value SCH (years spent on acquiring secondary and higher education). The annual expenses of a family for the school needs of 1 child are 50 000 c.u., total for 12 years – 600 000 c.u.

4 years were given for higher education. The cost of studying at universities was 280 000 c.u. Total: 280 000 · 4 = 1 120 000 c.u.

The EXP of an artist-designer is 5 years (28 – 16 – 7), of these, 1 year was devoted to an unpaid internship, and the artist has been working at this company for 4 years with a salary of 140 000 c.u.

TEN (the experience gained in this company) = 6 720 000 c.u. (140 000 c.u. · 12 = 1 680 000 c.u. · 4 years).

LMNP – health assessment for the past month = 10 000 c.u. (5000 c.u. spent on gym classes, 5 000 c.u. on a monthly subscription to the pool).

The cost of human capital of an offset printing operator (32 years old) and a technology operator (35 years old) - it is calculated in the same way, with the only difference being that both have secondary specialized education and work experience at other enterprises.

The cost of the offset printing operator's human capital is expressed by the formula:

$$\ln Wopo = ß_0 + ß_1 \cdot SCH + ß_2 \cdot EXP + ß_4 \cdot TEN + ß_6 \cdot LMNP \quad (16).$$

lnWopo = 0,05 + 0,05· (450 000 + 300 000) + 0,05 · 10 800 000 + 0,05 ·5760 000 + 0,05·7000 = 0,05 + 37 500 + 540 000 +288 000 + 350 = 865 850,05 c.u.

The offset printing operator graduated from 9 classes and a special college in two years at a cost of 150 000 c.u. per year.

The EXP of the offset printing operator is 14 years (32 – 11 – 7). He worked for another company for 10 years with a salary of 90 000 c.u., 4 years in this company with a salary of 120 000 c.u. Investments in health amounted to 7000 c.u. over the past month (5 000 c.u. for a monthly subscription to the pool and 2 000 c.u. for allergy medications).

The cost of the human capital of the technology operator is expressed by the formula:

$$\ln Wto = ß_0 + ß_1 \cdot SCH + ß_2 \cdot EXP + ß_3 \cdot EXP_2 + ß_4 \cdot TEN + ß_6 \cdot LMNP \quad (17).$$

lnWto = 0,05 + 0,05 · (400 000 + 200000) + 0,05 · 5 760 000 – 0,05· 7200 000 + 0,05 · 6 240 000 + 0,05 · 5000 = 0,05 + 30 000 + 288 000 – 360 000 + 312 000 + 250 = 270 250, 05 c.u.

The technology operator graduated from 8 classes and a special college in two years at a cost of 100 000 c.u. per year.

The EXP of the technology operator is 16 years (35 – 10 – 7 – 2 (military service)).

He worked for 6 years in the same company with a salary of 80 000 c.u., he worked for 6 years at another company with a salary of 100 000 c.u., 4 years in this company with a salary of 130 000 c.u. Investments in health amounted to 5 000 c.u. over the past month (5 000 c.u. for a monthly subscription to the pool).

Summing up the calculated cost of each employee's human capital, we get the cost of the company's human capital per month:

lnWE = lnWd + lnWpr. + lnWa.d. + lnWopo + lnWto = 950 000,05 + 567 750,05 + 422 500,05 + 865 850,05 + 270 250,05 = 3 076 350, 25 c.u.

The annual cost will be 36 916 203 c.u., for 4 years of the company's existence – 147 664 812 c.u.

The equation of J. Mincer provides an assessment of human capital, on the basis of which wages should be calculated. In this particular case, the salaries of employees are much lower than the cost of their human capital. The company is in the growth stage, there is a desire to reduce wage costs by combining several functions in the job responsibilities of employees (head – Master of Quality Control Department, proofreader – translator, etc.). We are talking about positive and normative economic theory and practice. The formation of the company's payroll based on the assessment of the human capital of employees is a normative economy.

The labor market is currently undergoing tremendous transformations, primarily related to the crisis phenomena caused by the COVID-19 pandemic, ongoing labor migration and emigration, the aggravation of the deep socio-economic contradictions of capitalist economies, increased competition for jobs and globalization processes. Accelerating the innovative and industrial development of the economy, informatization and digitalization of society against the backdrop of a pandemic that has engulfed the whole world are new challenges for the state and the population. An atlas of new professions and new requirements for an economically active population capable of working in new ways, including remotely, has appeared on the labor market. In the face of increased competition, the cultural capital fund will be replenished with relevant elements that will allow you to find and maintain your jobs.

Conclusion

Human capital is the knowledge, properties, skills and abilities of an individual acquired by him to be in demand on the labor market and receive high wages. Its structure includes education (quantitative and qualitative indicators), qualifications, experience, availability of factors of production and factor incomes, and psychophysiological and cultural properties of a person.

A comparative analysis of the methods of measuring the cost of human capital of an enterprise has shown that there are similarities and differences in approaches to this complex and ambiguous issue. There is a continuity of traditions in solving the problem (a costly method dating back to the classics of political economy) and innovation (consideration of the structural elements of human capital in dynamics and specifics). The authors are of the opinion that it is necessary to create a unified model for assessing human capital at the micro level, because, despite the existing objective differences between enterprises, there are also typical features that bring the content of production activities to a common denominator: innovation, digitalization, remote work, etc.

As for the modification of the equation by J. Mincer proposed by the authors, it is necessary to take into account that most companies today are focused on optimization, and the management of enterprises/organizations place increasing demands on employees, so the wage equation will be supplemented with new elements.

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The contribution of the authors

Aigul Maidyrova – is the organizer of the study, the author of the theoretical and methodological provisions of the study, the formulation of conclusions, and the final approval of the version for publication.

Jamilya Seitkhozhina – is the main author, data collection, processing and analysis, and calculations based on the extended model of the J. Mincer equation.

Tolepov Adil – reviewed the literature, compiled research questions and methods, as well as the technical design of the article.

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Минцердің кеңейтілген теңдеуі негізінде шағын кәсіпорындағы адам капиталының құнын бағалау

Андатпа. Мақалада кәсіпорындардың адами капиталын өлшеудің заманауи тұжырымдамалары мен әдістеріне салыстырмалы талдау берілген: білім беру, денсаулық сақтау және кәсіптік оқытуға инвестицияларды талдауға негізделген дәстүрлі экономикалық және статистикалық әдістер, сондай-ақ дағдыларды, құзыреттерді, мотивацияны және қызметкерлердің қатысуын ескеретін заманауи құралдар сипатталған. Адами капиталды оның өндірістік және инновациялық үдерістерге қосқан үлесін ескере отырып, кешенді бағалауға мүмкіндік беретін интеграциялық модельдерге ерекше назар аударылады. Қолданыстағы әдістемелердің артықшылықтары мен шектеулері, сондай-ақ ағымдағы мәселелер мен оларды жетілдіру бағыттары атап өтіледі. Авторлар адами капиталды бағалауға жүйелі көзқарастың маңыздылығын және оны белгілі бір ұйымның немесе саланың ерекшеліктеріне бейімдеу қажеттілігін атап көрсетеді.

Адами капиталдың құнын, ең алдымен, жалақы жүйесін жетілдіру үшін анықтау қажет. Мақалада адами капиталды бағалау тәсілдерінің сипаттамалары мен айырмашылықтары және "адами капитал" санатының авторлық анықтамалары келтіріледі. Дж. Минсер теңдеуінің кеңейтілген интерпретациясын қолдану арқылы авторлар шағын кәсіпорынның адами капиталының құнын бағалайды.

Түйін сөздер: бағалау әдістемесі, микро деңгей, кәсіпорын, қосылған құн, инвестициялар, қайтарым.

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Оценка стоимости человеческого капитала в малом предприятии на основе расширенного уравнения Минцера

Аннотация. В статье представлен сравнительный анализ современных концепций и методов измерения человеческого капитала предприятий: описаны традиционные экономические и

статистические методы, основанные на анализе инвестиций в образование, здравоохранение и профессиональное обучение, а также более современные инструменты, учитывающие навыки, компетенции, мотивацию и вовлеченность персонала. Особое внимание уделяется интеграционным моделям, позволяющим комплексно оценивать человеческий капитал с учетом его вклада в производственные и инновационные процессы. Отмечаются преимущества и ограничения существующих методик, а также текущие проблемы и направления их совершенствования. Авторы подчеркивают важность системного подхода к оценке человеческого капитала и необходимость его адаптации к специфике конкретной организации или отрасли.

Необходимо определить стоимость человеческого капитала, прежде всего, для совершенствования системы оплаты труда. В статье раскрываются характерные черты и различия подходов к оценке человеческого капитала, приводятся авторские определения категории "человеческий капитал" и модификация уравнения заработной платы Дж. Минсера. Используя расширенную интерпретацию уравнения Дж. Минсера, авторы оценивают стоимость человеческого капитала малого предприятия.

Ключевые слова: методика оценки, микроуровень, предприятие, добавленная стоимость, инвестиции, отдача.

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