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HUMAN CAPITAL ASSESSMENT METHODOLOGY

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Abstract. The main *purpose* of the paper is to analyse the existing methods and procedures of estimation of human capital as a dominant factor in improving profitability and competitiveness of the enterprise. The main tasks of the paper are to study and analyse the concept of human capital and its characteristics, to systematise approaches and methods of estimation of human capital within the framework of the company and the national economy. *Methodology*. This study analyses the theoretical basis of the estimation of human capital at different levels. The method used is literature review. *Findings*. The article raises the problem of using human capital as one of the indicators of efficient development of the economy. The analysis of the methodology of estimation of human capital is carried out. The article considers current methods of estimation of human capital at different levels: micro-, meso-, macro-, as well as their comparative analysis. The characteristics of the basic approaches to the estimation of human capital are considered, the analysis of the problems of indirect methods of estimation of human capital, objectivity and sufficiency of data for the construction of estimates is carried out. External factors such as socio-psychological resources, environmental influences, human lifestyles, such as dietary intake, need to be taken into account in order to estimate human capital accurately. Each approach has its own strengths and weaknesses. The weaknesses are more related to the difficulties in quantifying some of the components of human capital and the difficulties in collecting, processing and statistically analysing information at all levels of the study. Each approach has its own strengths and weaknesses. The weaknesses are more related to the difficulties of quantifying some components of human capital, and the difficulties of collecting, processing and statistically analysing information at all levels of the study. The authors also found that the investment approach is the most popular and provides the most adequate estimates. *Practical implications.* The results of this study provide a methodological basis for improving the methodology of estimating the value of human capital. The analysed approaches can be used at different levels of the national economy (macro-, meso- and micro-) by different organisational structures for further management decisions.

Key words: human capital, method, assessment, national economy, labour.

JEL Classification: E20, E22, E24

1. Introduction

The development of the knowledge-based economy poses new challenges for researchers and practitioners, namely the development of techniques for estimating intangible assets, intellectual capital, etc. The complexity of estimating these categories is also due to the ambiguity of their formulation.

Human capital in the structure of a company's intellectual capital is fundamental and determines the successful development of the other components, so intellectual capital, or intangible assets, is an important component in valuing a company (Ani Matei; Artuc, Docquier, Özden, Parsons, 2015).

In today's environment, economic growth is more influenced by factors such as the innovativeness of the economy, intellectual capital, the quality of human potential, i.e., the key is the person and his/her capabilities. In the scientific literature, approaches to the study of the role of a person in economic processes have changed from the use of categories of labour, human factor to the application of the category of human capital. Human capital is one of

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the structural components of intellectual capital, which also includes relational capital (consumer, customer, brand, market) and structural (organisational) capital. Human capital is the only economic component with the ability to produce value, but it is very difficult to estimate (Ani Matei; Guillaumont, McGillivray, Wagner, 2017; 4 Techniques for Assessing Human Capital).

Although a number of researchers believe that the purpose of human capital assessment is fundamentally incorrect, the need for human capital assessment is undeniable. However, the use of financial indicators to assess human capital is widespread and rather scattered. There are different approaches to measuring the different components of human capital, but no clear methodology has yet been developed for its integrated assessment, nor is there clear guidance on the choice of methods in different situations.

2. Typology of Existing Methods of Human Capital Assessment

The conducted analysis of approaches and methods of estimation of human capital in Ukrainian and foreign practice allowed to assign the following criteria of their classification:
– on the economic level (macro-, meso-, micro-);
– on the used interpretation of human capital;
– on the used approach.

At the micro-level, the human capital of the individual is estimated, which is then summed up to give an overall estimate of the human capital of the organisation, or the human capital of the organisation as a whole; at the meso-level, human capital is estimated at the level of large companies and the region. At the macro-level, human capital is estimated at the national level, and at the mega level, human capital is estimated at the global scale.

The basic method of estimating human capital at the macro- (mega-, meso-) level is the calculation of the Human Development Index. It is an integrative indicator that takes into account: well-being factors (GDP per capita); health factors (life expectancy), educational level of the population and others.

It is most commonly used by public authorities at different levels as a tool to assess the effectiveness of investment in improving the quality of human capital.

The vast majority of methods allow the estimation of human capital at the micro-level, the most important of which are presented in Table 1.

Different groups of methods of estimation of human capital are also distinguished depending on the interpretation used: a person is capital in itself, or capital is a set of inherited and acquired abilities, or human capital is a resource used by enterprises to generate their income. Calculation of the value of human capital on the basis of tests in the business environment can be obtained on the basis of two business games, seminars, professional courses with

Table 1
Methods of measuring human capital at the micro-level

Classification feature	Assessment methodologies under review (assessment indicators)
Human capital structure	The structure of human capital has two components: basic and developed human capital, which differ in the way they are formed, their content and, as a result, the methods of assessment used.
Estimating depreciation by asset type	Considers human capital to be an inseparable intangible asset of the second category and applies intangible asset valuation methods accordingly. Refers to the estimation of the depreciation of each type of investment in human capital multiplied by the time of its real turnover. Asset models that take into account the cost of capital (similar to fixed capital) and depreciation.
Factors that determine the value of human capital	Income factor, cost factor, added value of human capital, return on investment.
Type of evaluation: quantitative or qualitative	Methods are divided into monetary and non-monetary (qualitative estimation of human capital). One of the most important monetary methods is the net value added model. The economic evaluation is the estimation of the income generated by human capital (individual); the price evaluation of human capital by the volume of investment; the reflection of the total value in the currency of the company's balance sheet. The integral assessment of human capital includes both natural and cost indicators of the assessment of human capital.
Cost type	Method of estimating human capital based on the calculation of human capital expenditure; method of determining initial and replacement costs of personnel; method of measuring individual costs of employees, etc.
Income type	Utility models. It is possible to estimate the economic consequences of changes in employee work behaviour as a result of certain measures, as well as the ability of an employee to bring more or less added value to the enterprise.

Source: compiled on the basis of (Ani Matei; Artuc, Docquier, Özden, Parsons, 2015; Becker, 1993; Borshch, 2020; Di Bartolo, 1999; Graham, Webb, 1979; Guillaumont, McGillivray, Wagner, 2017; Makazan, Los, 2020; Mincer, Solomon, 1974; Trovato, 2020; 4 Techniques for Assessing Human Capital)

the help of high information technologies. By adding an estimate of the value of the future competitiveness of human capital, a comprehensive assessment of a company's human capital can be obtained.

Foreign researchers, who consider human capital as a set of accumulated knowledge, skills and abilities, emphasise learning and socialisation skills in its composition. At the same time, one feature stands out: in the USA, socialisation skills are more in demand: the ability to work in a team, leadership qualities, and in the countries of South-East Asia, learning skills are more in demand: discipline, learning and academic achievement. This results in different approaches to measuring human capital (tests, interviews, etc.).

In the United States, individual human capital assessment methods are aimed at assessing the availability and development of socialisation skills. In American practice, there are currently two basic approaches to assessing and accounting for human resources:

(1) asset model;

(2) the utility model.

The asset model includes capital cost accounting (similar to fixed capital) and depreciation. The utility model suggests a direct assessment of the impact of a given investment in human resources (Policies For Human Capital Development In Georgia).

The first approach is based on a conventional fixed capital accounting scheme redesigned for human capital characteristics. The special accounts in the developed list take into account expenditure on human resources, which, depending on its content, is either considered as a long-term investment that increases the size of working human capital or is written off as a loss.

The utility model, in turn, allows the economic impact of changes in employee behaviour as a result of activities to be assessed, as well as the ability of an employee to add more or less value to the business.

At the same time, in Southeast Asian countries, assessment methodologies test knowledge, new learning, and so forth (Huges).

An examination of existing methods for estimating human capital has shown that, before choosing a method, it is necessary to determine the level at which human capital is being studied. At the micro-level, the second question is whether human capital is being measured for the purpose of buying a business or managing personnel, and then the approach used (depreciation, income, cost, etc.).

Procedure for selecting the evaluation method:

1. Determine the evaluation level.
2. Selection of research objectives.
3. Select the research approach.

Estimation of human capital in personnel management is mainly used to determine the appropriate salary of employees, to interest the person in further training, to increase the efficiency of production (productivity) and to motivate further career development and work in this company.

When buying a business, one of the first places to look when assessing its potential profitability is the people of the acquired company. This is due to the fact that it is not only the land, buildings, structures, machinery and equipment that carry value, but also the image, the logo, the past achievements, the prestige of the organisation – all of which is created by the company's employees. The professional and qualification potential of employees determines the possibility of effective use of the acquired property. From the point of view of estimating human capital as a part of the acquired property, adapted methods of estimating intangible assets prevail (Table). However, it is important to understand that the value of human capital will be high only if employees are interested in continuing to work with the new management.

3. Methods of Human Capital Assessment Used in Ukrainian Theory and Practice

The analysis of existing approaches to estimating the value of human capital in Ukrainian practice also revealed a wide variety of methods used:

– estimation of income generated by human capital (individual) (economic valuation);

– quantitative assessment of the stock of knowledge, skills, abilities acquired by a person;

– special skills (special human capital) – quantification;

– on the method of investment in human capital – in health capital, education capital, cultural capital (economic evaluation);

– assessment of human capital at micro- and macro-level;

– an integral assessment of human capital, including both natural and valuation measures of human capital;

– social accounting matrix – macroeconomic valuation of human capital;

– price estimation of human capital by the volume of investment and reflection of the total value in the currency of the balance sheet of the company (enterprise) – economic (Ani Matei; Borshch, 2020; Kokkinen, 2010).

At the same time, the main parameters characterising the company's human capital include the following indicators: (1) the proportion of employees in the company; (2) the age structure of the employees; (3) the average length of service in the profession; (4) the number of years that professionals have worked in the company; (5) the value added per professional.

Assessing human capital allows to correctly solve a number of methodological problems:

1) to justify investment in a business whose nature requires significant human capital expenditures;
2) to determine the compliance of the company's human potential with market requirements and the costs of its maintenance;
3) to consider human capital as one of the main factors of business profitability, to correctly forecast the company's income;
4) to determine the costs of developing or creating human capital when establishing an enterprise similar to the object of valuation;
5) to highlight the investment attractiveness of the company;
6) to forecast market prices for the company's shares;
7) to justify the weight of different business valuation methods in determining the final market value.

In general, the following approaches are used to assess human capital in business value: cost, income, expert and comparative.

The cost approach to measuring human capital can be implemented in two ways: indirectly and directly, the essence of which is as follows.

The indirect method is based on comparing the market value of an object of valuation with the replacement cost of the object. For this purpose, a coefficient is applied, which is determined by the ratio of the market value of the object to the replacement cost of the object:

$$q = \frac{\text{market value of the object}}{\text{replacement cost}}.$$

This method requires consideration of the following limitations:

1. The market value of an object of valuation should be determined using the income approach.

2. The replacement cost should be determined taking into account the actual operating conditions of the object of valuation.

3. It should be assumed that the business reputation of the object of valuation is fully determined by the human resources potential, and the impact of other factors is either not significant or fully taken into account in the formation of the replacement cost (location of the object, neighbouring real estate, etc.).

A direct method can also be applied, based on the determination of all the costs that the new owner of the company will have to bear in order to create human capital within the framework of a viable, adequate requirements of the modern market of organisational-managerial structure. The following costs should be taken into account:
– training and retraining of staff; upgrading their skills;
– marketing costs for recruitment;
– organisational, training and personnel costs;
– organisational culture costs.

In addition, the costs associated with the shortage of certain categories of workers in the labour market should be taken into account.

The income approach is based on the assessment of human capital by the degree of participation of the total employee in the organisation's income.

Management value added is defined as follows:

$$MVA = BVA - IofC - MC,$$

where BVA is the business value added; IofC is an income on the capital of the company in case of its alternative use; MC is a management cost.

The value of human capital as part of goodwill can be determined by the revenues generated by the company from sales to regular customers of the brand.

Since human capital includes many factors, its content should be assessed not only quantitatively, but also qualitatively. Qualitative assessments are carried out using expert methods, which allow not only group characteristics to be used in the assessment, considering the organisation's personnel as a whole, but also individual characteristics of employees (Schultz, 1961).

The experience of using peer review is as follows. The contribution of staff to the results is defined as follows:
– development of new scientific directions;
– increased company revenues;
– development of customer relationships;
– coordination of unit activities;
– successful execution of linear functions.

The assessment is based on a matrix of professional maturity.

An employee's contribution to the growth of the company's value is defined in the following directions: (1) development of production; (2) increase in the company's income; (3) development of relations with customers; (4) coordination of the activities of subdivisions; (5) performance of linear functions.

Analysis and evaluation of human capital can be carried out by comparing the actual characteristics of employees with the requirements of internal corporate and professional standards.

The expert assessments obtained, which show the state of human resources potential and identified problem areas, can be used by the appraiser indirectly in revenue forecasting.

The comparative approach to assessing human capital can be based on pairwise comparisons with peer companies.

According to the authors, in the context of the problem of human capital assessment, the organisational structures and personnel of the following companies can be used as analogues:
– companies that have undergone restructuring and developed a management structure and human resources close to the ideal model; some synthetic

models that reflect the ideal business structure and human resources;
– companies that have been sold on the market and whose valuation reports contain information on human resources valuation;
– structures and personnel of companies similar in profile and business size but more successful in the market.

Since the essence of the comparison method is to identify the differences between the object of the evaluation and the analogues, an important problem has to be solved: the choice of the basis for the adjustments of the business costs and the determination of the values of the corrective factors. The main adjustments are for the following reasons: educational level, age characteristics, professional experience, professional knowledge, staff turnover, development potential, competitiveness of employees.

In fact, all of the above characteristics can be measured quantitatively, which makes the comparison problem solvable.

In general, approaches to human capital assessment in economics can be broadly divided into three directions:
1) investment estimation;
2) estimation of depreciation;
3) income estimation.

The first approach relates to the estimation of investment in human capital – the initial value of accumulated capital is taken into account, with the addition of additional investment in retraining and skills development carried out at the expense of the enterprise, as well as objects of intellectual property invested in the capital of the enterprise.

The second approach is to estimate the depreciation of each type of human capital investment multiplied by its real turnover. The general formula for estimating a company's applied human capital is as follows:

$$HC = \sum_{k=1}^{k} Ai \times Ti \times Ni ,$$

where Ai is the annual amount of depreciation investment in human capital; Ti is the depreciation period of this type of investment; Ni is an amount of objects to be depreciated.

The third approach is related to the assessment of the size of the company's human capital by counting backwards through the assessment of the resulting effect of using certain types of human capital. The calculation of the effect of each type of human capital allows us to estimate the total annual effect, which is divided by the average investment efficiency in the current year. In general terms, the third approach is expressed as follows:

$$HC = \frac{\sum Ehc + Elc + Eic + Eoc + Ecc}{Neofi} ,$$

where Ehc is the annual effect of health capital; Elc is the annual effect of labour capital; Eic is the annual effect of intellectual capital; Eoc is the annual effect of organisational and entrepreneurial capital; Ecc is the annual effect of cultural and moral capital (business reputation); Neofi is an investment efficiency standard with a ratio of 0.15 to 0.25.

4. Conclusions

The measurement of human capital is of great interest because of the complexity and variety of this category, as well as its importance for the efficient functioning of the economy. An analysis of approaches to human capital estimation allows us to highlight a number of characteristics in the choice of evaluation criteria.

The need to measure human capital is undeniable. However, the estimation of human capital is mostly based on financial indicators, which are rather scattered. Moreover, there is no experience in estimating human capital in Ukrainian enterprises.

Human capital is the only economic component with the capacity to create value, but it is very difficult to value. As shown above, there are different approaches to measuring individual components of human capital, but no clear methodology has yet been developed for its integrated assessment. Thus, despite the existing theoretical development of human capital issues, its measurement is not well developed and estimates of the size of this main asset are very scarce, fragmented and highly controversial. This is due to the lack of specific methodologies and the difficulty of collecting, processing and assessing the reliability of the necessary statistical information.

There are many ways of assessing human capital. Assessments are carried out at micro- and macro-levels. Each approach has its own strengths and weaknesses. The weaknesses are more related to the difficulty of quantifying some components of human capital, and the difficulty of collecting, processing and statistically analysing information at all levels of the study. It is better to use several evaluation methods in order to obtain objective and reliable information.

However, despite all the problems with human capital valuation and data sufficiency discussed, it was found that the investment approach is the most popular and has the most adequate estimates.

Despite the diversity of approaches to measuring human capital, each of them overlooks important aspects. This is mainly because not all structural components of human capital are quantifiable. This problem has to be addressed through various

indirect methods of assessment, which in turn is a labour-intensive process.

However, this is not the only difficulty in constructing estimates of human capital; it is very difficult to collect, process and statistically record information at all levels of the study.

In addition, a number of external factors, such as socio-psychological resources, environmental influences, human lifestyles, such as dietary intake, need to be taken into account in order to provide an accurate estimate of human capital. However, the set of structural components of human capital, such as health and education, can also be determinants. The resulting paradox therefore raises questions about the fairness of the assessment of existing human capital.

References:

Ani Matei, Reli Ceche Assessment of Human Capital and Development. Contributions from Structural Funds. Available at: http://aei.pitt.edu/94159/1/Lucrare_ACADEMOS_pdf.pdf

Artuc, E., Docquier, F., Özden, Ç., & Parsons, C. (2015). A Global Assessment of Human Capital Mobility: The Role of Non-OECD Destinations. *World Development*, vol. 65, pp. 6–26. DOI: https://doi.org/10.1016/j.worlddev.2014.04.004

Becker, C. S. (1993). Human Capital. A Theoretical and Empirical Analysis with Special References to Education. 3-th edition. The University of Chicago Press.

Borshch, V. I. (2020). Managerial capital in the healthcare system: theory and methodology. Extended abstract of Doctor's thesis. Chernihiv.

Di Bartolo, A. (1999). Modern Human Capital Analysis: Estimation of US, Canada and Italy Earning Functions. Working Paper No. 212. Dipartimento di Statistica, Universitàdeglistudi di Milano-Bicocca.

Graham, J. W., & Webb, R. H. (1979). Stocks and depreciation of human capital: new evidence from a present-value perspective. *Rev. Income Wealth*, vol. 25 (2), pp. 209–224. DOI: https://doi.org/10.1111/j.1475-4991.1979.tb00094.x

Guillaumont, P., McGillivray, M., & Wagner, L. (2017). Performance Assessment, Vulnerability, Human Capital, and the Allocation of Aid Among Developing Countries. *World Development*, vol. 90, pp. 17–26. DOI: https://doi.org/10.1016/j.worlddev.2015.05.005

Huges, A. Human Capital Assessment. Available at: https://www.alexanderhughes.com/service/governance_board_services/

Kokkinen, A. (2010). Assessing human capital in the national accounts – is there a feedback to theory? in *Proceedings of the 31st General Conference of the International Association for Research in Income and Wealth (IARIW), Session 8C, August 2010* (St. Gallen, 2010), pp. 22–28.

Makazan, Y., & Los, V. (2020). Methodical approach to the assessment of human capital level of machine-building enterprises. E3S Web Conf., 166 (2020) 13012. DOI: https://doi.org/10.1051/e3sconf/202016613012

Mincer, J., & Solomon, W. (1974). Family investment in human capital: earnings of women. *J. Polit. Econ.*, vol. 82 (3), pp. 76–108.

Policies For Human Capital Development In Georgia. An ETF Torino Process Assessment. Available at: https://www.etf.europa.eu/sites/default/files/2020-03/04_trp_etf_assessment_2019_georgia.pdf

Schultz, T. W. (1961). Investment in Human Capital. *The American Economic Review,* vol. 51, no. 1, pp. 1–17.

Trovato, M. R. (2020). Human Capital Approach in the Economic Assessment of Interventions for the Reduction of Seismic Vulnerability in Historic Centres. *Sustainability*, vol. 12, 8059. DOI: https://doi.org/10.3390/su12198059

4 Techniques for Assessing Human Capital. Available at: https://www.hightechpartners.net/blog-webinars/blog/4-techniques-for-assessing-human-capital

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