EVALUATION METHODS OF INVESTMENT IN HUMAN CAPITAL

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Abstract

Evaluation of investment in human capital is a crucial challenge to human resource development, and only a fair assessment of the appropriateness of these inputs for the social and economic terms, allows managing them effectively. In this article it set a task: - to present a social – economical aspect of investment in HC evaluation effectiveness; - using comparative literature analysis and synthesis to review the human capital evaluation methods, where are often aggregated the elements of investment in human capital evaluation and assessment of the level of human capital; to estimate the theoretical and practical applicability of these methods at micro- and macro-level assessment approach. The analysis of evaluation methods of investment in human capital showed that:
- the appropriateness of evaluation methods of investment in human capital is influenced by their level of application - whether enterprise or economy as a whole;
- the effectiveness of the methods appliance is limited by insufficient information base available in the macroeconomic level and its labour-intensive formation in the micro - enterprise level. At the same time, an analysis accomplished composes the assumptions for the further development of evaluation methodology of investment in human capital.

Keywords: Human Capital (HC), evaluation methods of investment in HC, HC evaluation methods.

JEL Classification: I21, M53, O32.

Introduction

Human capital is accumulation of knowledge, acquirement of appropriate skills, special abilities and competence for employees, all of which is the engine of country's economic growth, creating a competitive advantage. Likewise, it is important to understand that it is properly organized individual human capital is a keystone and an essential condition of emerging material values, because only an employee qualified and characterized by exceptional knowledge and skills can create, manufacture and disposal goods or services required to meet the needs of society (Royal, & O'Donnell, 2005). The level of human capital is closely linked with the quality of life and is an essential condition for a higher standard of living. These are the reasons that determine the increased attention to evaluation of human capital.

Evaluation of investment in human capital may be guided by following theoretical formula (1):

\[ E = \frac{R}{I}, \]  

where: \( I \) - investment in human capital; \( R \) - given results from this investment; \( E \) - human capital appliance efficiency.

Human capital is used not just in the deserted place, but it requires a certain level of development of the country. Therefore, we can talk about the investment from two stand points: first, investment in human capital from the economic interests’ positions, second, investment in human capital from individual positions. Among these investment options it is available both compatibility and contradiction. In the first case the investment in human capital has a clear and purposive practice, in the second one, there is a possibility for the development of the individual - human capital, seeking for individual interests. In the latter case, a contradiction may arise between the individual and the country's economic interests, but this problem in the formation of joint labor market requires a separate consideration. Today there is no doubt that human capital is the most important business success factor, but the calculation of its value, the efficiency of investment performance is complex and as yet unsolved problem in both the macro and micro level (for more details, see "Human Capital and it's a measurement Insight Attitudes" Sakalas & Liepė, 2010).

Objective of the paper. To review theoretical methods of investment in human capital evaluation and methods of human capital evaluation, analyze the latter appliance possibilities assessing the effectiveness of investment in human capital at micro- and macro- levels.

Research methodology. Comprehensive review of scientific literature, its comparative analysis and synthesis.
Social – economical aspect of investment in HC evaluation

People, as the complex elements of an organization are linked to dual relationships - common (social) and production (economical). These relationships are integrated with each other and therefore, the organization may be called the social - economic system. A key element of this system is the human being and its created capital. In order to reveal the economic substance of the human capital concept, it is important to emphasize its functional and targeted purpose.

From the functional objective approach, human capital - is formation and accumulation of certain stock of health, knowledge, skills, abilities, motivation through human investment, which is appropriate for use in a given area of social reproduction to enhance productivity and efficiency of production, together with the wage (earnings) growth (Diatlov, 1996).

Mincer (1974) and Schultz (1971) are famous as the pioneers in developing the investment approach of the HC. Both authors used Irvin Fisher's capital theory in the development of human capital theory and the identification of human capital in the economic sense. Capital theory argues that „the existing stock of assets in the mean time is called capital and a flow of services within a certain period of time is called income” (Fisher, 1906, quoted in Kelley, 1965). It follows that the capital is only useful when it is inserted into the process of production, income or value generation. Shultz (1971) emphasized that effective human capital utilization will benefit for all of society: individuals, enterprises, communities, nations and regions.

The organization is the object where is the direct combination of land (in the broad sense), physical capital and labor force. Or, in other words, an organization is - an object which involves the primary economic (production) process and leads to one or another (fabric, intellectual or other) product.

The economical aspect of efficiency in the organization includes the targeted utilization of HC for organization to achieve its objectives, working effectively and profitably, and economically applying the resources of organization. The social aspect of the efficiency upraises in the implementation of individual goals and includes the satisfaction of employee's desires, hopes and needs in the management process. It can be expressed in terms of meeting the employee's desires and requirements (wages, self-fulfillment, satisfaction in dealing with coworkers, etc.). The social aspect can be measured through targeted recruitment and orientation to human inter-relations (Kumpikaite, Sakalas, 2002).

In scientific literature to identify and measure the effectiveness of HC management there are distinguished five groups of indicators, of which the first three involve the economical aspect, and the fourth and the fifth - the social aspect (Witte, 1995):

1. Performance efficiency (general economic efficiency). Indicators can be measured by profits, profitability, demand-supply compatibility;
2. Material efficiency of production process (performance indicators: deviation from the plan, defective products, complaints, delivery time and product quality);
3. Intangible efficiency of production process (performance indicators: solving problems and time, preparation for innovations, reduction and elimination of defective products, goal setting, time limited information, etc.);
4. The working morale (job satisfaction, sense of initiative, loss of working time, complaints, ability to assume responsibility, etc.);
5. The morale of inter-relationship between other individuals (assumption of dominance, arrangement for cooperation, friendship, respect, loyalty, teamwork, etc.).

Human resources are unique and if they are used improperly, their effectiveness may fall faster than other stocks. Conversely, investments in these resources give greater effect then such resources as money or equipment. It is therefore very important that human resources would be properly and well utilized.

HC value can be measured both quantitatively and qualitatively. The quantitative characteristics include parameters such as the number of employees, the number of hours worked. The qualitative characteristics reflect the knowledge, skills and characteristics that affect individual abilities and leads to growth in labor productivity. Accordingly the expenses to raise the level of these skills and productivity of human labor are defined as investment in human capital. These are costs that can be evaluated in monetary form or another, and are purposeful, because it is expected future return in the form of future earnings and income growth.

It is clear that investment in human capital is generating substantial economical and social effect.

A certain amount of investment in a person begins even when he is unborn. Lately there is growing recognition that the baby already being in the mothers’ womb is aware of the environment through the
sounds. Sound environment directly affect the overall infant psychophysical process, stimulates, perform micro-massage, and improve the development. It is therefore important to take care of the surrounding environment, since from the very first year of life the kid learns the most and it is fastest growth of the brain. During this period, is the formation of his personality, so all the "intellectual" investment is a very significant and create better opportunities for him in the future.

Another stage of the investment in human is the investment in education. It covers the costs of the acquisition of a formal education, including primary, secondary and higher education. Beyond doubt that the first training school is an investment that requires considerable cash injections, it would be a mistake to hold all expenditures on education as the current consumption. This is probably the most important kind of investments in human capital, since money spent on education, improving the quality of people's knowledge, is a very good investment for the future, which may lead to the country’s economic situation.

Not less important than investment in education is investment in human health, health care, health maintenance and etc. To the investment in HC may be assigned the directly related funds, such as investments to increase employee loyalty, self-learning promotion, creation of special motivation system (Sakalas, Liepė, 2010).

In addition to capital contributions to education and health, there are identified such investment as training costs for the production process, as well as the costs of people migration in order to change the working conditions, and the costs for fundamental scientific researches. In the scientific development process not only the intellectual innovations are developed on which are subsequently formed the basis of new production technologies and their applications, but it is implemented the transfer process of the people themselves as the subjects of economy.

However, all the funds allocated for investment in human capital should be targeted and efficiently distributed in a well-managed and controlled way, which requires the correct evaluation of the appropriateness of these inputs for socially and economically approach.

Applying human capital evaluation methods for the evaluation of investment in HC

As already explored above, human capital has a complex internal structure. On the basis of micro- and macroeconomic functions of HC, there is a need to assess both a separate individual, and their groups, as well as the whole of society in general. In practice, there are different approaches to the classification of HC evaluation methods (see Baron & Armstrong, 2007; Scholz, Stein & Bechtel, 2004; Vaskeliënė, 2002; Mayo, 2001), in this article the variety of methods is distributed in five groups. All these methods share the common indicators of HC evaluation and can be divided into natural and value. Natural indicators in micro level show the formal education, knowledge and intellectual level of individual, the distribution of the number of employees by qualification, working time losses caused by diseases and injuries, etc. Accordingly, in macro-level there are applied indicators of the working population, educational institutions, average life expectancy and so on. However, using just the natural indicators we cannot assess the capital contributions or investments in the HC. In order to evaluate the effectiveness of these inputs, measuring both the level of the individual and the economy, requires the use of value (quantitative) indicators, which include investment in human capital indicators, and accumulated human capital indicators, and human capital performance effectiveness indicators. All of these indicators can be found in the methods of HC evaluation. Therefore it can be argued that using the HC evaluation methods there may be assessed not only human capital alone, but also the investment in that capital and its economic effectiveness at both micro and macro levels.

First of all there should be distinguished the calculation of investment in HC itself and the calculation of effectiveness of these investment.

Calculation of investment in human capital in theoretical terms is simple. We have to calculate the direct value of investment in HC. Every enterprise can calculate the costs that the company has "inserted" into an employee. These are expenditures on staff salaries, social securities, qualifications and other material incentives and social incentives for employees. However, these investments do not include investments in education, and especially before school education. Ultimately in the process of human development, without education, there are a number of other factors that are affected by moral factors. There can not be forgotten the human capacity dependence from health care system, and etc.

Assessing the effectiveness of investment in HC, there may be used a number of parameters and indicators. To set the parameters that facilitate an efficient investment in human capital is a stiff task. In some cases, one of the parameters are useful in other cases - more acceptable are others. However, in the traditional economic literature, the following parameters of investment in HC are applied - the difference
between revenue and costs maximization; - investment payback period; - investment value; - the relationship between expenditure and income; - margin ratio of marginal revenue and marginal cost; - net income; - income rate. Every time making an investment decision, it is necessary to examine the existing conditions, to identify existing constraints and identify the best investment parameter.

The first group of methods involves the methods of market-oriented approach. These methods are based on the difference / ratio between the enterprise market (calculated on the basis of market quoted shares value) and book value (Stewart, 1997). This difference shows HC value. This argument is the most vulnerable: besides HC, there is promotion, brand and many other factors that claim for the market value increment. Which part of increment depends on human capital is difficult to say. However, these methods allow to demonstrate the importance of HC, they are simple, operating statistical system makes it possible to provide calculations with the required information, also is available a comparison of the results with other countries, company's and also allows to identify the main development trends of global compliance. Therefore, these methods continue to be refined.

Fitz-enz (2009), when counting the human capital market value, proposes to calculate the difference between the per capita full-time employees (2):

$$HC = \frac{Market\_Value - Book\_Value}{Full\_Time\_Equivalent}$$ \hspace{1cm} (2)

Tobin (1969) proposes to calculate the coefficient of market value and capital depreciation recovery costs. Other authors propose to link the company's market value with a series of financial and non-financial coefficients, some of which reflect the HC, for example, managerial skills, co-relations, relations with customers (Cap Gemini Ernst & Yong, Low, 2000). The main problem of this and other methods, using the value results of the work, is that there is no economic justification, where a part of the creation value depends on the different types of capital - material, structural and human capital. This greatly complicates the specific calculations. Evaluating investments in HC at the macro level, in the theoretical framework there can be accepted the cost-effectiveness of educational assessment scheme proposed by Bagdonavičius (2009), which distinguishes three phases: 1) to identify the costs structure and its value; 2) to analyze the possible benefits and to estimate the value; 3) to compare the costs and results. However, in the practical application we deal with the same problem, how to evaluate the educational performance.

Therefore, with the methodology presented in the first group, it is appropriate to analyze the factor analysis techniques, reflecting this dependence. This problem was analyzed in the works of economists Pascharopoulos (1995), Ankroust (1959) and Denison (1974). The latter accomplished a particularly broad and thorough investigation of HC efficiency, but there were researched not the direct investment in HC, but the results achieved. To obtain the most accurate data, he explored the influence of 25 factors contributing to national income growth, among them - the number of labor, gender, age, level of education, training, duration of work-day and week and the structural changes in the economy, inventions, knowledge, and others. His results of the research made it possible to say that because of the HC (education, training, knowledge-raising, health, etc.), the U.S. national income in 1929-1957 increased by nearly 50 percent, and in terms of per person employed - 90 percent. For these purposes were used the production function method, which one the first applied Ankroust (1959). Using the regression analysis and production function (3) there were compared the results of the production with the costs of industrial resources and estimated impact of investment in people to national income growth:

$$y=f(K^{\alpha}L^{\beta}H), \hspace{1cm} (3)$$

where: \(y\) – national income; \(K\) - capital; \(L\) - labor; \(H\) – factors, demonstrating the qualitative changes in the labor force (such as improvements in knowledge, education, skills, health, governance organization, etc.); \(\alpha, \beta, t\) - the coefficients of production function factors elasticity.

The anaylisis of the impact of these factors on the growth of national income is based on three assumptions:

1. A part of national income increment which can not be explained neither by increase of capital contributions nor by extensive work increase, it is considered as an increment which is attributable to investments in people;
2. The influence of individual factor growth is seen in the context of other factors stability;
3. It is intended that every factor increases the national income by the marginal productivity rates.
It can be argued that, although this group of methods is characterized by a number of disadvantages - national development features of researched country, random fluctuations and etc., but they open new possibilities for evaluation of different kinds of capital affect on the results obtained and extend the reliability of the value methods utilization.

The second group is focused on accounting-oriented methods, which operate on the data of personnel costs - wages and training, professional development costs.

These methods, focusing on the expected or even growth, calculate (4) the expected discounted value of earnings (Siegert, 1999):

\[
HC = \sum_{t=1}^{n} W_t \times \frac{1}{(1+i)^t},
\]

where: \(W_t\) - wage; \(n\) – number of years since the current team average to retirement age; \(i\) – the long-term interest rate (discount factor).

The comparison of the wage increase with the indicators of enterprise value and material property increase, it is possible to get the needed indicators for the management.

In the third evaluation methods group based on indicators it is combined a large variety of methods (Scholz, Stein, Bechtel, 2004): the value explorer method, the Intangible Assets Monitor method, intellectual capital index method, Skandia Navigator method; the employee value of the index method, the total HC model method and others. Methods based on indicators are used both in enterprise and individual level; they allow the assessment of HC in terms of both value, and relative terms - percentages, coefficients and etc.

These methods are assigned to the four stages of realization:

- Determination of the main areas of evaluation;
- Determination of basic assessment skills for each direction;
- Evaluation of the competence changes;
- Determination of the value measurement method.

One of the most theoretically based and practically verified is the Skandia Navigator method. It is composed of five areas of focus, which are the areas upon which an enterprise focuses its attention, and from that focus comes the value of the company’s intellectual capital within its competitive environment (Sakalas, Vaskeliene, 2002). This method helps to identify various components of intangible assets by combining five perspectives: - the financial aspect; – the customer orientation; - the process orientation; - the innovation and the development aspect; - the human aspect. HC value is calculated (5):

\[
HC = C \times I,
\]

where: \(C\) - absolute peak value of intellectual capital, which is reached in theoretical optimum use of HC, \(I\) - the coefficient of intellectual capital utilization efficiency.

An intellectual coefficient is calculated as the average exchange rate of nine coefficients:

1. Market share;
2. Customer satisfaction;
3. Management level index;
4. Motivation index;
5. Research - development resources index;
6. Learning time index;
7. Productivity and quality index;
8. Employee retention index;

These methods are applied in organizational or even individual level. This is determined by a large variety of assessment indicators that reflect specific of each organization and employees categories. On the other hand, the practical application possibilities of this method are very wide and only the problem of the information collection complicates the utilization of this method at economic level. However, we see a great potential of this method integration to economic or individual sectors level.

In the fourth group, the value-added methods are oriented to information provided by management accounting, therefore, the development of an adequate accounting system, they are easy to install in the company. This group of HC evaluation methods include: the value-added intellectual coefficient method, the market value-added, economic value-added, human economic value-added, labor economy, knowledge
capital, the total value creation methods and the method of cost-benefit analysis. The basic formula for HC calculation (6) is based on the difference between input and output values:

\[ HC = OUT - IN. \] (6)

The value-added intellectual coefficient method calculates the coefficients of physical and intellectual capital, which have to reflect the utilization effectiveness. The calculation of human capital efficiency coefficient is virtually identical to the methods of accounting methods group. This method is more structured, in addition to capital and human capital coefficient, it is excluded also the coefficient of structured capital.

Altogether, the methods presented in this group allow calculating the number of basic coefficients, which may be useful for evaluation of human costs utilization. For example, the excess profit for employee is calculated (7):

\[ EP = O - PC, \] (7)

where: \( EP \) – excess profit for employee; \( O \) – output per employee (labor productivity); \( PC \) – personnel costs.

In the theoretical context it is a valuable attempt to assess knowledge capital not at the amount of actual costs, but at the market prices of personnel (Kearns, 2005). It is also possible the development of these methods on the basis of cost-benefit, especially when the individual employee performance is evaluated.

The fifth group of evaluation methods includes the profit-oriented methods, which are also close to the methods placed in the second and fourth group. But there are some special features. For example, the effectiveness of HC is measured by a higher than average industry earnings (Stewart, 1997), it is distinguished the qualified and unqualified labor value, recovery rate (Bender & Röhling, 2001).

We will summarize the attempt of Scholz, Stein, and Bechtel (2004) to create an integrated HC evaluation model, where:

- HC value base allows the assessment of associate personnel costs, using an enterprise data and market situation;
- The losses of HC value emerge from the obtained knowledge aging, depending on the area of personnel performance;
- The compensation of HC value is given considering to the recovery tools of lost knowledge and their disposal cost;
- The alterations of HC value are calculated as the sum of all three components results.

This presented methodology improves the scheme of personnel costs – HC formation, but it does circumvent the results of the direct HC value. This integrated model shows that the combination of the different methods may allow improving greatly the existing methodologies of HC evaluation.

Conclusions

1. The concept of HC significance is very clearly expressed in qualitative - an ideological level, but not in the quantitative level. Therefore, for today's HC economy and management is an important task - to quantify the investments in HC and their utilization results.
2. Summarizing more than fifty methods of HC evaluation, we see that in all the (macro - organizations - individual) levels HC evaluation is carried out by comparing the investment in HC or their value with the results of their utilization.
3. The analysis accomplished about the evaluation of investments in HC suggests that a large number of methods whose selection is determined by their level of application. Today's topicalities are focused on HC assessment at the level of individual and organization, therefore is partly forgotten the importance of problem solving at macro-level.
4. Asserts a clear differentiation of evaluation methods. There are applied the indicator-based, the value indicators discounting, the value building and other methods. This increases the possibilities for differentiation of appropriate methods, by selecting the most relevant methods for their particular situation. However, there are underused the methods integration opportunities that could greatly expand the utilization possibilities of the methods. At macro-economic level, there are insufficiently utilized the indicators-based evaluation methods at the firm level. The proper appliance of these methods would allow expanding the information base opportunities and improving the current level of research into a new one.
5. The particular attention should be paid to the performance results evaluation issues. If in the organization and in the individual levels, for these issues recently are paid enough attention calculating the results of individual input – output, in the macroeconomic level the attention for these issues is incomplete. Therefore, the effectiveness evaluation of individual types of capital, including the HC, is one of the most important goals raising the research to a higher level, as well as in macro level.

6. Since the content of the HC is very complex, multi-dimensional and hardly susceptible to quantitative evaluation, therefore, in practical sense, an evaluation of investment effectiveness in human capital requires to formulate a complex scientific methodology of investment in human capital assessment, covering the social - economical factors. The implementation of conclusions presented would allow essentially improving the efficiency of HC utilization and appraisal theory and practice of investment in HC.

References