METHODOLOGY PRINCIPLES OF HUMAN CAPITAL EVALUATION IN MACRO-LEVEL

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Abstract

Human capital development requires substantial capital contributions - financial, material and time costs, which have to pay off over a longer or shorter time. Its effective use can't be analyzed in isolation. It must be assessed in relation with the internal and external factors of surrounding environment, observing a certain consistency. Integrated interpretation of the impact of these factors makes it possible to distinguish influence of each factor affecting the overall business's performance. This paper presents the evaluation process of six steps, based on which is formed the methodology framework of human capital evaluation in macro-level, highlighting the key moments and emerging problems. For effective evaluation of human capital, there has to be implemented in series the basic stages of evaluation process, also must be met a structured approach to the capital, bringing together both the tangible and intangible capital, and thus highlighting the aspects of changes, adaptation and flexibility in the value creation process.

Keywords: Human capital, HC, evaluation process, HC value, evaluation principles.
JEL Classification: I21, M53, O32.

Introduction

Today the quality of the public, its level, development and progress possibilities are determined by a number of various factors, which are characterized by their different expressions. However, all these factors in one way or another are related to the human resources and reveal the characteristics and dynamics of these resources. According to Melnikas (2002), precisely intellectual work is nothing else but the most important condition and assumption in any kind of progress. This is - the people, groups and public activities, the results of which are being developed on the base of mental work and mental energy.

When the global competition and demand of accountability is rising, the main objective of the human capital (HC) researches both at company level and country-level is to find an appropriate methodology that would help to determine the efficiency of this capital use and its value, to assess the returns to shareholders and stakeholders, and to monitor the overall workforce trends and patterns. HC evaluation, despite its apparent simplicity, is difficult to be expressed quantitatively, it is determined in a variety of assessment objectives and the existing weaknesses in the provision of information and of the possible diversity of approaches. But the biggest problem is that the content of the HC itself is very complex, multi-dimensional and hardly given for quantitative analysis.

Objective of the paper is to provide the core principles of human capital evaluation methodology in macro-level.

Human capital is closely linked with the physical (material), social and organizational capital and together they affect the overall economic performance. There has to be capacitated material, organizational and social conditions for existing staff competence to display. According to Schuller et al. (2004), if people are not able to develop their skills in collaboration with each other, to demonstrate and form confidence in their working relations, it does not matter what qualifications they have. Economic success on the total depends from available social competence and given opportunity. Therefore, human capital must be considered in conjunction with other forms of capital, considering the surrounding environmental factors. A complex interpretation of all factors influence would allow to identify the efficiency of human capital utilization rate and to distinguish each factor's impact on the overall economic efficiency in macro level.

Research methodology. Comprehensive review of scientific literature, its comparative analysis and synthesis.

Human capital evaluation methodology

Human capital resources are multiple: no single factor can fully reveal those HC characteristics that affect economic activity. It is also important to recognize that human capital is almost more than the sum of its parts, and that determination and measurement of the final number of specific skills can not fully reveal the evaluation of human capital resources.

A proper combination of different types of capital it is obtained a synergy effect. Investing, together with the innate abilities, is the most important human capital development condition. Investments are needed not only to education and training system, businesses companies as well make substantial investments into human capital development. Also no less important role in this process have recently played the development of personal competence, which also requires time and financial resources. All these costs are included in the cost of human capital formation, but their evaluation is quite tricky.

Generally, evaluation is - a complex process which requires pre-thought out and well planned. In the evaluation process of human capital there can be distinguished six core stages which implemented consistently allow the evaluation of intended object, in our case - human capital (Figure 1).
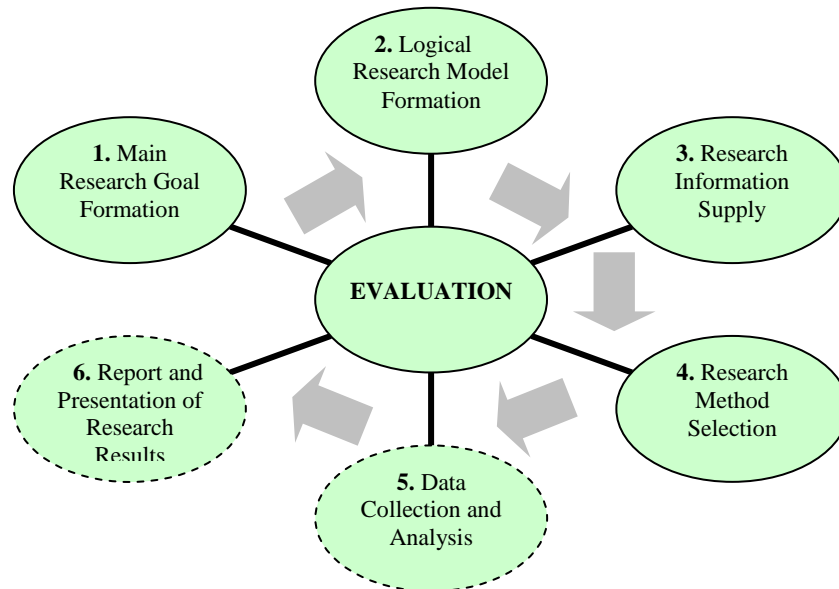

Figure 1. Main stages of evaluation process (adopted from Weiss, 2006)

Theoretical studies (Sakalas, Liepe, 2011) have shown that various authors are using different methodologies for HC evaluation, but there is no single model for evaluating the effectiveness of HC. Forming the HC evaluation methodology, the first four of the six steps in the Figure 1, requires the detailed consideration, therefore they will be analyzed in upcoming sections.

In the fifth step of the evaluation process is proceeded the data collection, analysis and conclusions are formulated, and in the sixth step is presented and delivered to the public and assessment institution the report of performed investigation. According to Kardelis (2002), in the last stage it is very important to ensure the validity of the research object, external and internal environment, the concreteness, brevity, solidity and provide a high level of visualization.

Main research goal formation

In the first stage of the evaluation process should be formed the main research question or a set the goal. Well formulated question is a foundation of the research project, therefore has to be assessed the possibility to collect the necessary data to answer the raised question or reach the goal.

Evaluating the human capital and setting the main research goal is important to bear in mind at what level will be done the evaluation of human capital. HC value can be considered at three levels:

 – <u>an individual level</u>, involve evaluation of the particular individual competencies and costs needed to achieve them. This is probably the most investigated area, which is encountered in assessing by the employees' suitability for one or another job approach (Murray & Efendioglu, 2007; Baron & Armstrong, 2007; Bontis & Fitz-enz, 2002; Mayo, 2001);
 – <u>an organizational level</u>, where may be given a group - unit level, organization and union - corporate level. Not only individual level, but also the organizational level considers the whole company through the integrated portfolio of capacities. Here emerge the problem of company's HC assessment and optimization in the value creation unit. On the other hand, there exist an intermediate group approach between the two levels, where groups of employees have their own

HC value. This dimension is particularly important when employees are compared within the company and then is explained whether the staff development means are really focused on HC value increase. Scientific researches at organizational level are deeply summarized in Scholz, Stein, Bechtel (2004) works;

– a macro level include evaluation of the HC at the level of country and different industry branches. Today it is one of the most problematic areas of research.

Although in all levels dominate the same methodological principles, there exist quite expressive problem solving features, which are determined by the information available, the receiving means and the like.

It should be noted that it is important not just what is embedded in the formation of HC (which is the determination of creation of value), but what is the efficiency of the generated HC, which is determined by the interaction of this factor with the material, organizational and social factors and the system affecting environment.

Efficiency, productivity studies in macro-level depends on both the environment and the development level of analyzed system. The environment is characterized by a level of work force competence, working-age population, economic situation, for example, unemployment level and so on. The intrinsic level and the results achieved are determined by the development level of individual system components.

Logical Research Model Formation

In the second step of the evaluation process is formed a logical and scientifically based research model. This stage seeks to show all the possible types of researched capital components, their aggregation and interaction description possibilities. In the development of this model should be observed the following basic principles:

– a systemic approach - treating all system elements as interlinked, influencing each other and influenced by the environment surrounding the system. This approach allows treating HC evaluation at economy-level as a subsystem of the overall HC evaluation system;

– reliability - the model must be methodologically grounded, structure logical based, its appliance results secure and logically read;

– universality - the model must be suitable for the HC assessment in other countries, observing the results should be comparable. Implementation of this principle it is achieved comparability of results between the parties;

– simplicity - the model must be clearly understood and easily interpreted.

Human capital may be an individual property, but its value in practice depends on many social factors and social relations. Therefore, it can not be considered and evaluated in isolation; it must be understood and analyzed in relation with other forms of capital, only then it will be possible to reveal his role in the overall economic efficiency development process.

Similarity of HC and physical capital is that both the tangible and HC has its price, performance opportunities, it also loses its value over time and must be reversed, and for utilization of the one and of the other must be provided with good organizational and social conditions. However, HC is not the owners' property; it is recruited for a certain period of time in mutually acceptable terms, which are often determined not by a real HC - the value of competence, but by the specific environmental or internal conditions. For example, unemployment, high educational level of unemployed people reduces the price of the country's work force. But the main difference is that HC may not be tangible, bought or otherwise used. HC is materialized in particular individual and in the market can only be sold only its service and itself HC management as the property can not be sold or transferred, unless in the case of slavery.

As already mentioned, the human capital affects both physical and structural and relational capital and vice versa. Examining the affect of each factor on result in isolation, we face a problem when the alteration of the overall result is attributed only to this factor. In scientific practice we can often face with a case where it is alleged that the same GDP growth rate has been received because of human capital increase, and because of the brand and because of the new techniques and technology changes. Significantly lower estimation errors will be in the case when the inter-related factors are combined into a single whole.

In order to detect the interface between different forms of capitals, it can be taken advantage of the "Skandia" value classification scheme (Bontis, 2000), which was a slightly transformed and adjusted for HC structural analysis and evaluation in macro level. The total capital value is divided into two major parts - the material and intellectual capital (see Figure 2). In the first row, intellectual capital is divided into human and structural capital. Human capital includes knowledge, qualities, organizational skills, flexibility, exceptional

talents and abilities of the people. Structural capital is associated with the processes, systems and intellectual property (trademarks, patents, copyrights, etc.). From the latter may be excluded relational (connections) capital, which includes a variety of business process affecting organizational relations with the outside operating partners, customers, suppliers, investors and other participants. This capital should be allocated to the two groups:

- the first one includes such clearly understandable, but hardly implementable indicators as image, credibility, and the like;
- the second one includes specific indicators, which reflect the state of already summarized characteristics. This is protection of industrial design, trademark, company brand, and name, advertising and similar.
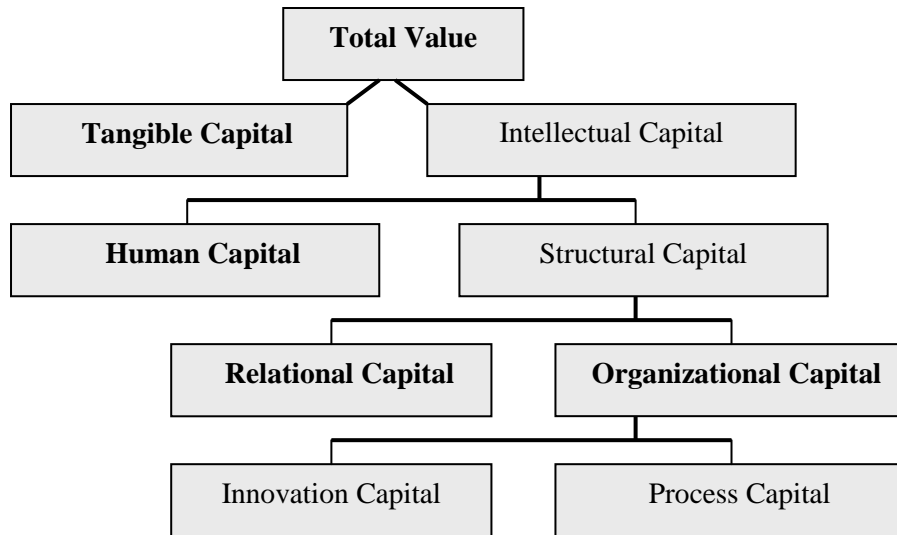
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                    ┌─────────────────┐
                    │  Total Value    │
                    └─────────────────┘
          ┌──────────────────┐   ┌──────────────────┐
          │ Tangible Capital │   │ Intellectual Capital │
          └──────────────────┘   └──────────────────┘
              ┌──────────────┐   ┌──────────────────┐
              │ Human Capital │   │ Structural Capital │
              └──────────────┘   └──────────────────┘
        ┌────────────────────┐  ┌────────────────────────┐
        │ Relational Capital │  │ Organizational Capital │
        └────────────────────┘  └────────────────────────┘
        ┌────────────────────┐  ┌────────────────────┐
        │ Innovation Capital │  │  Process Capital   │
        └────────────────────┘  └────────────────────┘
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Figure 2. Adapted intellectual capital structure by "Skandia"

Organizational capital demonstrates the innovativeness or an ability to innovate and expand. Process capital describes the value of internal efficiency. In "Skandia" scheme instead of financial capital was identified tangible capital, which consists of a long-term and short-term capital.

For comparison, there also exist other capital classifications. But as it was underlined earlier, in scientific literature HC is mostly analyzed in individual or organizational levels. According to Scholz et al. (2004), from the company's point of view, the general resources of the company's capital consist of financial capital, physical capital, organizational capital, relational capital and human capital. As can be seen from Table 1, the intellectual capital, including the HC is an important component of the company's capital resources (see Table 1).

Table 1. HC as an integral part of the company's value (Scholz, Stein, Bechtel 2004)

Enterprise capital resources = Enterprise value				
Financial capital	Physical capital	Human capital	Organizational capital	Relational capital
Liquid instruments; Requirements; Financial injections	Buildings; Machinery; IT	Knowledge / intelligence; Skills; Flexibility	Structural capital; Process capital; Market image	Relations with customers; Relations with suppliers; Alliances / Networks
Balance sheet assets +		HC +	Other intangible assets	
		Intellectual capital		

Intangible assets as other assets create value. People lend their personal human capital for the organization, as they hope for some kind of benefit back in various forms. They become an asset who is

capable of creating value for others, and the beneficiaries for themselves. Accordingly, Brooking (1996) allocate: Company = Material assets + intellectual capital, distinguishing in the latter:

– market assets (brand, customer loyalty, license, franchise);
– intellectual property as assets (innovations, patents, copyrights, secrets);
– human assets (that all the staff with his skills, experience, competence);
– infrastructure assets (communication technique and technology, communication culture).

As can be seen, a structural approach to capital combines various forms of capital, including both tangible and intangible capital, and thus highlighting the changes, adaptation and flexibility aspects of the value creation process. Therefore, the synergy although of different, but significantly affected by each other forms of capital, allows us to express the impact of all the factors on the overall outcome. In accordance with the presented "Skandia" scheme in Figure 2, we integrate all the capital forms in the following equation (1) in order to evaluate HC relative level in macro level:

$$Y = f(Ct; Ch; Cr; Co) \qquad (1)$$

here: Ct – tangible (physical) capital (long-term and short-term capital);
Ch – human capital (educational level, research and development, training and refresher course level and etc.);
Cr – relational capital (trademarks, patents, networks, copyrights, etc.)
Co – organizational capital (innovation proccesses, information technology level, etc.

In the scientific research practice there can be found different indicators and criteria of HC evaluation at macro level. Noorbakhsh et al. (2001) estimated the HC using the following evaluation criteria such as: students' number with acquired secondary education, the number of working-age population with secondary education and tertiary education. He states, that the first evaluation criterion indicates the flow of investment in HC, the other two - shows the quantity of tertiary education resources in the country. Warner (2002) proposed to calculate the rate of HC as a simple and standardized (of population in higher education) average of indicators (i.e, primary, secondary and tertiary level) and a subjective measure of learning quality collected in interviews with business managers. Hanson (1996) expressed HC through adult literacy level squared and showing the quantity of higher education and learning resources. For the indicator square there was used the outside hypothesis of higher education. Haveman and Wolfe (2003) expressed the HC's contribution to the economy in the number of population and demographic characteristics (eg, working-age population and the number of people employed).

The equation (1) is formed not just to apply the different combinations of particular capital forms and indicators reflecting them, but in order to use them as a whole, in this way revealing the influence of all factors on the outcome performance and to determine the rate of the variables, that contribute to the development of HC and the general economic well-being.

Human capital and its operating environment have to be compared and combined with each other in order to properly assess the human capital and its rate in macro level. In the equation (1) reflected HC (Ch) and other factors (Ct, Cr, Co) impact on the performance evaluation system, allows to go further to the determination of individual components expressing factors, collection of proper information data base and research method selection.

Research information supply

The third stage of evaluation process ensures the operations of information collection needed for the model formation. Evaluating HC, such indicators, as a number of learning years or level of education achieved reveal perfectly the skills and competencies of individual. However, their disadvantage is that they do not reflect the HC, which was acquired by not formal but professional training or gaining experience, in addition the different characteristics (in different countries) are hardly comparable. Evaluating human capital, are also used tests and questionnaires in which are assessed students achievement or adult skills (the Programme for International Adult Literacy Survey, IALS). Similar studies allow identifying only individual skills and competencies aspects and are limited by used methodologies (sample size, the issues and parties circle).

In order to assess the value of HC, many studies have sought to collect data about income of human life period in the labor market's dependence on acquired education. However, this analysis overlooks the importance of "collective knowledge and skills", which are formed in organization and other collective communities. Analyzing in organizational level it should be noted that, despite the fact that HC is attached to an individual, by conjunction of various by volume and quality human capital forms, there can be developed

organizational level competence that exceeds the simple sum of individual capitals, i.e. synergy effect occurs. At the same time it is recognized that individuals can not fully use the company's specific HC, because the employer is generally considered to be the sole buyer of specific skills and the user. On the other hand, capital conjunction prevents to evaluate the contribution of particularly characterized employees. And finally, it is very difficult to assess in such a way the invisible, hidden and mixed HC forms.

Mentioned disadvantages of the existing evaluations require caution and a very careful choice of variables required for HC evaluation. HC indicators, based on a formal one index must be supplemented by specific indicators based on the evaluation of knowledge, skills and competences, though to do this in macro level is hard because of the scarcity of available data.

Assessing at micro level, the main HC evaluation criteria is individual's experience, intellect, his particular abilities, which depends on the embedded resources and costs for its development. However, the assessment based on these indicators can actually be carried out only for the individual, at best, for a small team.

Trying to assess the macro level, there should be used more aggregated indicators that reflect the country's socio-economic environmental factors, the original indicators have to be replaced by the secondary ones, not excluding indirect, based on questionnaires research methods.

Studies in industry (macro) level, as a rule are based on both quantitative - statistical yearbooks and special research data. However, the statistical data nomenclature provided by the statistical department is negligible, so it is necessary to use the derived data and the results of special studies. While the qualitative research data increases the flexibility of the research, allows performing the expert evaluations, to assess the feedback from participants.

Research method selection

In the fourth step of evaluation process has to be pursued a search for the reliable methods of information evaluation, that will best reflect the investigative process and help to achieve the goal. If the second step provides the cognitive logic, so in the fourth step – it is implemented the highest goal of cognition: "*... you can cognize it, if it can be measured and quantified; if it can not be measured or quantified, knowledge is poor and inadequate; this may be the beginning of the cognition, but hardly this way of thinking can be called a scientific (William Thompson, Lord Kelvin, 1894)."*

There is developed a mathematical apparatus for HC measurement to proceed, starting with index method, correlation - regression analysis, cluster formation methods, factor analysis, etc. Although it is not as easy as it seems, human resources can be measured quantitatively and qualitatively. The number of people, the number of hours worked is the quantitative characteristics. A qualitative characteristic are the skills, knowledge and attributes that influence human abilities and leads to productivity growth. Costs for the level of these skills to raise, as well as for increasing the productivity of human labor is called "human investment". In qualitative researches dominate observations, interviews, document studies and others, often is used the comparative method when the data is grouped, searched correlation between them.

The carried out analysis about the HC evaluation methods (Sakalas, Liepe, 2011) suggests that in the scientific literature there are developed various metrics (Pfau & Kay, 2002), measuring systems (Fitz-Enz, 2009), models (Huselid, Becker & Beatty, 2005) summarized HC evaluation methods (Scholz, Stein, Bechtel, 2004), whose selection is determined by their application level.

There asserts a clear differentiation of evaluation methods. There are used methods based on indicators, value-added, profit oriented and others methods. This increases the opportunities for applied methods differentiation, selecting the most appropriate methods for their particular situation. Unfortunately, there is underused the possibility of integrating the methods, which could greatly expand the use of the methods. Also, today's topicality is more focused on the HC evaluation in individual and organizational level, consequently in partial is forgotten the importance of this problem solution in macro-level. Proper use of the methods would allow to expand the information base opportunities and to raise the research level to the next scale.

Conclusions

The core principles of human capital evaluation methodology presented in this paper allows the formulation of the several essential statements:

1. In the formation of HC evaluation methodology, from the presented six steps of evaluation, the first four require the detailed consideration, whereas they show the main problems of an effective assessment;
2. The complex interpretation of all the factors affecting HC development, permit to distinguish the impact of each factor on the overall performance in macro level;

3. Tangible, relational, organizational and human capitals are complementary with each other. Researches show that human capital utilization rate is determined by the material and organizational conditions in which it operates (in good conditions – HC increases, and in the poor - HC reduces).

4. A statement that more educated individuals work more efficiently, productively and increase the competitiveness (and Angela Schuh, Schuh, 1989; Gallacher, 1999), must be considered in the context of the above statement.

5. In the HC evaluation process at macro level, there must be carefully selected and used more aggregated criteria and indicators that reflect the country's socio-economic environmental factors and influence the HC formation.

6. Structural analysis of different types of capital, including HC performance effectiveness evaluation, has to be one of the most important tasks for future researches and one of conditions to lift HC evaluation to a higher level not only at the level of the individual or organization, but also the macro level.

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