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**Investments to Human Capital  
and their Efficiency Measurements**

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## **Investments to Human Capital and their Efficiency Measurements**

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### **Summary:**

The aim of the paper is to describe the term human capital and also the relevant related terms – social capital, organizational capital and knowledge. With regard to the importance of these topics, increasing orientation of developed countries towards knowledge economies, where the competitive advantage is based on knowledge and innovation, the paper describes the different ways in which human capital can be leveraged. As it is also stated in this paper, the investment itself does not assure the increase of human capital quality, therefore it is crucial to measure the efficiency of these investments. This is possible with several methods. These methods including the potential pitfalls are also described in this paper.

**Keywords:** Human Capital, Investments into Human Capital, Efficiency of Investment

## **Investice do lidského kapitálu a měření jejich efektivity**

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### **Abstrakt:**

Cílem stati je seznámit s pojmem lidský kapitál a zároveň s pojmy, které s lidským kapitálem velmi úzce souvisejí. Patří mezi ně sociální, organizační kapitál a taktéž pojem znalosti a kompetence. Vzhledem k důležitosti těchto témat s ohledem na směřování současných vyspělých ekonomik k tzv. znalostně orientovaným ekonomikám zakládajícím svoji kompetitivní výhodu na znalostech a inovacích je popsán způsob navyšování úrovně lidského kapitálu pomocí investic. Jak konstatuje tato stat', samotná investice nezaručuje navyšování kvality lidského kapitálu, je proto třeba pečlivě měřit efektivitu investic, což umožňuje několik metod uvedených v tomto materiálu včetně uvedení úskalí s nimi spojených.

**Klíčová slova:** lidský kapitál, investice do lidského kapitálu, efektivita investice

**JEL:** O150, O190, O200

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## **Introduction**

The transition from industrial economy of the twentieth century to the knowledge economy of the twentyfirst century causes major changes within the global environment. Success is achieved by flexible and effective economies, which are able to adapt quickly to the new market conditions. These countries usually dispose with mechanisms, which enable them to develop and support knowledge and innovations and effective use of technologies. With increasing intensity, these countries are focusing on those parts of the value chain, where the value added is the highest possible.

The main driving force of these changes is knowledge and innovation, whose significance is increasing together with the increasing speed of technological change and business.

The importance and role of human capital within the modern economic development is undoubtful. The term human capital is more than two hundred years old, but it became subject of studies only fifty years ago, where the production process became more labour demanding and the economic structure started to change in favour of sectors using mainly qualified labor force as its main working factor. Human capital was incorporated into economic theories, where it helped to find the answer to many unexplained questions. The prerequisite of homogenous labour was overcome, it's importance was confirmed and increases over time.

## **1. Definition of the term human capital and other closely linked terms**

### **1.1 Human capital**

Wider conception of human capital according to OECD understands under human capital knowledge, skills, abilities and characteristics of an individual that facilitate personal, social and economic wealth formation.

Gerry Becker, Nobel Prize Winner for economics, defined the term human capital as “abilities, skills and corresponding motivation to apply these abilities and skills.” Furthermore, he stated: “Human capital analysis results from the assumption that individuals decide about its creation as about an investment based on revenues and costs comparison.” Becker considers as main parts of human capital knowledge and health. As revenue he named improvement of employment and earnings and also non-monetary revenues, e.g. health and cultural profits. Costs are value of time and expenses made to obtain these investments.

*Davenport* (1999) noted that: “Humans have inherent abilities, behaviour and personal energy and these parts create human capital that they bring into their work. They, not their employers, possess this capital and decide when, how and where they will spend it to achieve certain goal.”

Human capital is created and formed during whole human life and its accumulation is continual process running from birth for lifetime. Development of human capital has not only to happen only at school or in the family, but also by practical training or at work. In any case, one of the most valuable sources needed for human capital development is time. The basic assumption is that the level of human capital is increasing in time, because of its conscious (or unconscious) development by active learning and experience gaining as well as by passive way.

As follows from above mentioned definitions from various authors, human capital is specific by certain characteristics:

It is intangible asset

It cannot be separated from human, is not transferable

It cannot be consumed

It has a very low liquidity

From these fundamental characteristics can be implied considerable variability and instability of human capital as a factor of production within societies. It arises the need of efficiently managing the use and the development of human capital. For their further elimination, it is desirable to criticize human capital in wider context as a part of so-called *intellectual capital*. Michael Armstrong divided intellectual capital into three parts, namely into *human capital*, *social capital* and *organizational capital*.

## **1.2 Social capital**

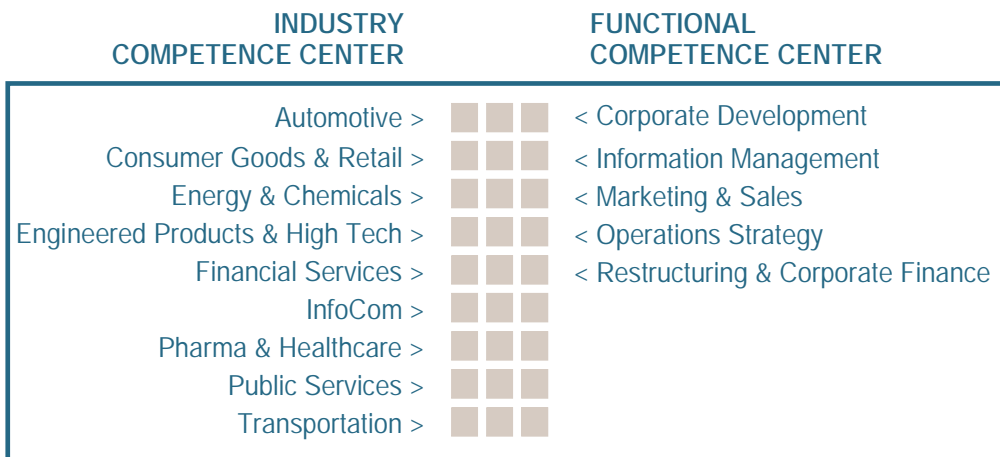
Social capital refers to knowledge resulting from connections inwards and outwards of an organization. *Putnam* (1996) defined social capital as “features of social life – network of relations, standards, expectation, obligations – that enables more efficient co-operation of actors in following their shared goals.”

World Bank gives this definition: “Social capital refers to institutions, relationships and standards that create quality and quantity of social interactions in the society... Social capital is not only complex of institutions that as a pillar bears the building of the society – it is the cement that hang them together.” However, it is necessary to point out that social capital does not represent institutions by themselves, but individuals as owners of human capital with possibility to leave the company and thus influence the level of social capital.



An example of a functioning social capital can be the *structure of competence centres of Roland Berger Strategy consultants* – see Picture 1. From this structure is noticeable organization of employees into groups according to industrial and functional specialization. These groups are just partially formalized, workers e.g. do not work in one building; they are spread all around the world. The company arranges the structural form by network of employees and formalized manager of this network. The aim of these centres is mutual cooperation on the topic connected with the given industrial or functional orientation. These groups create know how and knowledge that they try to formalize by transforming it into various forms of information, e.g. presentation, lectures, conferences, papers in professional journals, books etc. and spread this knowledge within the groups, thus within competence centres, as well as out of them.

**Fig.1: Competence centres of Roland Berger, an example of social capital**



Source: Roland Berger Strategy Consultants.

The fundamental assumption for creation of this system is the identification of necessary competences within the company considering the market situation and its development, determination of the management to support creation of these connection even despite of costs connected mainly with formation of knowledge within centres and information transfer among individual members and finally continual support of formal as well as informal aspects of the entire system.

### 1.3 Organizational capital

*Organizational capital* is defined as “institutionalized knowledge owned by the organization that is saved in databases, manuals etc.” (Youndt 2000) It is called also structural capital. As the name already suggests, it concerns knowledge owned rather by the organization than individual workers, although it could be exactly they who this information processed or formed. It is usually saved by

the help of modern information technology in various forms. It includes e.g. internal databases, manuals, procedures, presentations etc. The aim of the company is to broaden, care and improve organizational capital, because it assures partially independent and stability and also efficient knowledge transfer among workers. Employees, leaving every evening the company, take with them also their entire knowledge and skills, so for the company is essential to retain its organizational capital and at the same time it is necessary to protect it, because it can be carry out from the company and misused.

#### **1.4 Knowledge and its connection with human capital**

In terms of defining human capital, the term knowledge was mentioned several times. The term is closely connected with human capital, because exactly human capital creates knowledge and this knowledge helps to bridge over problems linked with human capital non transferability and non separability from its bearer. Knowledge becomes a main source of wealth of human, companies, regions and countries, but it can also contribute to inequality deepening among them and decreasing of social cohesion in the society.

What is actually knowledge and how it differs from human capital? Knowledge is variable mix of organized experience, values, contextual information from professional sight that lays down rules for evaluating and organizing new experiences and information. Knowledge is created and used in heads of knowledge workers. In organizations, it is often included not only in documents or databases, but also in organizational rules, processes, procedures and standards. Four possibilities of knowledge creation can be defined: comparison, effect, context and conversion. (Davenport; Prusak 1998)

Knowledge is classified on two levels. *Explicit* (formal) can be expressed in material form and saved for example in company information system. Some authors consider explicit knowledge as information, or do not see between both terms any difference. Explicit knowledge can be also well formalized, systematically organized, expressed, communicated and shared.

The second group creates *tacit* knowledge, which is hidden in heads of people and which is inaccurately called experience or intuition (Mládková 2004). Tacit knowledge is hidden and it is property of its bearer – people. Nevertheless, tacit knowledge can be shared between two people or groups of people, which allows passing this knowledge and its further utilization within companies. Instruments for tacit knowledge sharing are storytelling, apprenticeship and community.

## **2. Investments in human capital**

Investments in human capital are similar to investments in tangible assets. People decide about investments in tangible as well as in human capital according to profitability, risk and liquidity of particular project. Supposing rational behaviour of people, the net rate of return (gross income without costs) should be by all projects equal. By investments in tangible assets, people usually decide on the basis of analyses worked up by experts, competent consultants etc. By investments in human capital, people act more intuitively, despite subconscious comparing revenues and costs particular projects.

### **2.1 Types of investments in human capital and its connection with human capital**

Investments in human capital are of long-term character with expected positive (however considerably uncertain) result. The goal is creation or increase of the value of human capital using monetary and non-monetary means.

Investments can differ in their form; following forms are considered to be basic means of investments in human capital: school education, on the job, training, state of health improvement. All three areas are characterized by substantial length of investment resulting from non-separability of human capital from individual human being, its abilities, skills (eg. speed of learning and reception of new information, it is obvious that more capable people usually get more education and training) and also its health. These types of investments have at the same time different impact on level of income and consumption, level of invested amounts, revenue rate and also intensity of perception of the linkage between investments and revenues.

*School education* represents main type of investments in human capital and the biggest attention is given to it. The common four levels of education (preschool education, elementary schooling, secondary schools and tertiary education) are currently with increasing intensity complemented by a lifelong education programme that accents need of education continuity during the whole human life. This corresponds to the fact that human capital loses and forgets in the course of time certain knowledge, abilities and skills that it learned by way of education. Lifelong education programme can support further development of this knowledge and protect its decline.

*On the job training* represents increment of human capital in so called informal structures – i.e. outside school facilities, usually at place of work. It means obtaining knowledge and skills related to work that are necessary for correct and productive performance of working activities. The need for on the job training of employees results from several facts. School education offers first of all general knowledge and skills that are not sufficiently specific for performance of

working task. It is not problem or lack of school education, it is a consequence of differences in working activities, even within one (eg. economic sector).

*Improving the health condition* can include e.g. health checks, boarding contribution, contribution for wellness and spa programs, payments for fitness, improvements of working conditions on the working place, protective aids. etc.(Vodák; Kucharčíková 2007).

## 2.2 Human capital measurement

Together with growing importance of human capital and its relation to economic variables, the question of human capital measurement is increasingly important. Measuring the exact level of human capital is nearly impossible. Thus, all existing indicators of human capital represent approximate values expressing only some attributes of human capital. Among practiced methods of human capital measurement belong:

Achieved education level

Direct testing

Market value estimation

Costs of human capital creating

The most frequent approach to human capital measurement is certainly the *achieved education level*, or in other words, number of study years, eventually participation on further education.

Indicator of achieved education level allows the international comparison, because it is monitored on international level (e.g. in OECD countries)<sup>1</sup>. It is calculated as a ratio of inhabitants with certain achieved education level on total sum of economic active inhabitants. This method assumes that higher achieved educational level represents more quality and greater human capital. In case of ideal functioning of this model, presentation of certificate of graduation some educational level would be for the employer a reliable indicator of human capital level.

Although number of study years, or formally achieved education level, is a relatively reliable method of human capital quantification, it is not ideal. It would be ideal, if education systems were identically efficient. Also it skips the effects of informal education and learning.

For these reasons exists an effort to quantify human capital in a better way; one possibility is *direct skills measurement*. Under this term we should not understand

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<sup>1</sup> 15-64 years. Individual education levels are uniformly defined by The International Standard Classification of Education (ISCED)

only basic reading, writing and arithmetic skills, but also other abilities, as orientation in expanding world of information, and ability to employ this information. The term adult literacy was in introduction to International Adult Literacy Study defined as: "... it is used for qualification of particular mode of behaviour; the ability to understand and employ printed information in daily activities; at home, at work and in the community - to achieve one's goals, and to develop one's knowledge and potential. It defines wide group of abilities to process information." This conceptual approach points out various skills that create literacy in developed industrial countries. The term literacy was for testing purposes divided in three types: *prose literacy*, *document literacy* and *quantitative literacy*. Prose literacy considers the skills and knowledge needed to understand and use information from newspaper, fiction, explanatory texts. Document literacy involves skills and knowledge needed to gather and respond to information contained in official documents, schedules, maps and tables. Quantitative literacy involves skills and knowledge needed to application of arithmetic operations contained in written documents.<sup>2</sup>

In 1994, the large comparative project International Adult Literacy Survey (IALS) started, in which together with other twenty countries participated also Czech Republic in 1998. The aim was to demonstrate that adult literacy is very important part of human capital and that information about achieved education level or number of study years tells something about adult literacy, but absolutely not in so far that education and adult literacy can be considered as the same.

*Estimation of human capital market value* represents skills and abilities valuation on the labor market through pay. It is assumed that earnings depict margin labor productivity and human capital revenues. At the same time, it is valid that only the minority of pay difference between educated and uneducated employees is given by abilities gained in education process. According to some surveys, pay difference is from two third given by personal qualities and abilities that precede or are independent on education process and is just from one third given by abilities that are output of education process (Taubman 1976).

Measurement by means of *costs of human capital creating* is methodology based on Ederer study that present so-called European human capital index (Filipová 2008). Formal education is measured directly as expenditure for given education type; informal education is measured indirectly through opportunity costs. The indicator is expressed as sum of total investment in five types of education: 1. education in the family, 2. formal school education, 3. formal tertiary education,

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<sup>2</sup> By literacy testing, simple tasks are solved and results are expressed by a score, their total divide correspondents in five levels – 1 (the best), 5 (the worst). Level 1 and 2 are considered as unsatisfactory, level 3 is considered a suitable minimum for coping with the demands of social and economical life

4. formal and informal adult education, 5. informal education through work experience.

### **2.3 Human capital investments effectiveness**

Measuring the effectiveness of human capital investments is rather a difficult task. The difficulty is caused by the influence of other factors on human capital. Among these 'other influences' there can be almost everything, anything from weather to business cycle, babyboom, personal dissatisfaction, quality of infrastructure etc.. A broad range of factors may influence the numbers, every company is watching to observe the economic health and development of the business as revenues, profits and other business indicators, while we are investing into the human capital, hoping it will have a positive impact on the business development and competitiveness.

There are simple and common business procedures how to assess an investment., usually used for measuring investments into physical capital. After some adaptation, these can also be used for measuring human capital investments (investopedia.com, 2008):

#### *Pay back period*

Pay back period is the length of time required to recover the cost of an investment, calculated as:

$$\text{Cost of Project/Annual Cash Inflows}$$

If all other things are equal, the investor should prefer the investment with the shorter payback period. There are two main problems with the payback period method: 1. It ignores any benefits that occur after the payback period and, therefore, does not measure profitability. 2. It ignores the time value of money. Because of these reasons, other methods of capital budgeting like return on investment, net present value or discounted cash flow are generally preferred.

#### *Return on investment*

*Return on investment (ROI)* is a performance measure used to evaluate the efficiency of an investment or to compare the efficiency of a number of different investments. To calculate ROI, the benefit (return) of an investment is divided by the cost of the investment; the result is expressed as a percentage or a ratio.

$$\text{ROI} = (\text{Gain from Investment} - \text{Cost of Investment})/\text{Cost of Investment}$$

Return on investment is a very popular metric because of its versatility and simplicity. That is, if an investment does not have a positive ROI, or if there are other opportunities with a higher ROI, then the investment should be not be undertaken. The calculation for return on investment can be modified to suit the situation. This flexibility has a downside, as ROI calculations can be easily manipulated to suit the user's purposes, and the result can be expressed in many different ways.

### *Net present value*

Net present value is the difference between the present value of cash inflows and the present value of cash outflows. NPV is used in capital budgeting to analyze the profitability of an investment or project.

NPV analysis is sensitive to the reliability of future cash inflows that an investment or project will yield.

It is calculated with this formula:

$$NPV = \sum_{t=1}^n C_t / (1+r)^t - C_0$$

NPV compares the value of a dollar today to the value of that same dollar in the future, taking inflation and returns into account. If the NPV of a prospective project is positive, it should be accepted. However, if NPV is negative, the project should probably be rejected because cash flows will also be negative.

### *Discounted cash flow*

A valuation method used to estimate the attractiveness of an investment opportunity. Discounted cash flow (DCF) analysis uses future free cash flow projections and discounts them (most often using the weighted average cost of capital) to arrive at a present value, which is used to evaluate the potential for investment. If the value arrived at through DCF analysis is higher than the current cost of the investment, the opportunity may be a good one.

Calculated as:

$$DCF = CF_1 / (1+r)^1 + CF_2 / (1+r)^2 + \dots + CF_n / (1+r)^n$$

CF – cash flow

r – discount rate (WACC)

DCF models are powerful, but they do have shortcomings. DCF is merely a mechanical valuation tool, which makes it subject to the axiom "garbage in, garbage out". Small changes in inputs can result in large changes in the value of a company.

From the above mentioned methodologies of investment efficiency, the most frequently used one is probably the ROI indicator – return on investment, which can be variably adjusted with regard to available data or desired results.

One of the adjustments of the ROI indicator used for instance in the Saratoga research on key trends in human capital compares the pre-tax profit generated to the investment in compensation and benefit costs. It is calculated as follows:

$$\text{ROI} = \text{Revenue} - \text{non-wage cost} / \text{Number of FTEs} \times \text{average remuneration}$$

This ratio indicates how many units of currency are produced for every unit paid to an employee. The currency itself is therefore irrelevant and allows for cross comparisons between different economies.

By using these common methods we often face the difficulty with conversion of HR processes and results into financial reports. To help the businesses to transpose the results of training, schooling and other human capital investments into hard facts, which enable them to assess the effects and compare them perhaps with other companies within the sector or across, it is possible to follow these six steps (Vodák; Kucharčíkova 2007):

- Determination of the factual deficiency/gap, e.g. one mistake, one employee's complaint, one customer complaint.

- Classifying this deficiency with a financial value.

- Calculation of the performance gap before the investment.

- Calculation of the change in performance gap after the investment.

- Adjustments for other factors.

- Calculation of return on investment.

For better evaluation of the investment's results it is also possible to use a control group. That means only the control group will undergo the investment and there will be another group of workers, to which we will compare the results. It is crucial to evaluate the performance before and after the investment and to allow time for behavioral change and application. We should also repeat the evaluation after a certain period of time. There are several performance indicators, which we can observe in order to reveal efficiency of investment: productivity, quality, customer response time, cost control etc. The hard data indicators can be e.g.:

- Downtime duration.

- Number of defect products.



Sales volume.  
Production unit.  
Customer satisfaction index.  
Response time to orders.  
Number of accidents at work.

The examples of performance results can than be e.g. reduction of scraps by 5%, reduction of absenteeism by 10%, increase of annual turnover etc. As mentioned earlier there are various other things that can influence the observed indicators. To isolate these distortions we can use trend lines, which project the development of the values as if the training or other investment had not happened. The projection is compared to the actual data after training.

## **Conclusion**

Despite the high number of definitions and concepts of human capital, they all have several features in common – the abilities, that are possessed by a human being, intelligence, skills and other qualities and characters, that enable the person to create a value. Of course under the condition he/she is willing to.

As this material states, the problem with human capital simply is, that it is human. That means it is an intangible asset, which cannot be separated from human and is not transferable. Moreover it has a very low liquidity.

Despite the great advantages, which the human capital can mean for a business and the great output it can create, these obstacles most probably caused the emergence of the organizational capital concept. Organizational capital tries to institutionalize knowledge. In other words in tries to build a bridge between the human possessor of individual abilities and skills and the organization with the help of all possible technical means as e.g. databases, software programs and all available procedures: creation of manuals, presentations etc. The created organizational capital assures partially independency and stability and also efficient knowledge transfer among workers.

To increase the value added by human capital, it is necessary to constantly increase the value of human capital itself. This can be done with different sort of capital investments. The main groups are: school education (formal learning), on-the-job training and state of health improvement.

As human capital is of such interest to many business stakeholders, it has to be somehow measurable. This is possible with several methods. These methods are: achieved education level, direct testing, market value estimation and cost of

human capital creating. All of them enable, in different ways, to compare the level of human capital.

With a knowledge on measuring human capital, increasing its value, the next logic step to complete the business approach towards human capital is to measure the efficiency of investing into this capital. There are usual business approaches based on net present value, pay back period, discounted cash flow etc. With some adjustments all of them can be used also for human capital investments. Among the frequently used method is the return on investment, popular for its versatility and simplicity. With adjustments it can be e.g. used for comparison of the pre-tax profit generated to the investment in compensation and benefit costs.

In general, it is difficult to transfer the soft HR tools as training into the hard facts of finance. The universal process, which makes it feasible, consists of several steps: determination of the factual deficiency/gap, e.g. one mistake, one employee's complaint, one customer complaint, classifying this deficiency with a financial value, calculation of the performance gap before the investment, calculation of the change in performance gap after the investment, adjustments for other factors and calculation of return on investment.

The importance of a high-quality human capital investment program is so crucial for any company, which wants to succeed in the global market, that the awareness towards the measurements of investment efficiency should be adequately high.

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