

# HUMAN CAPITAL – DEFINITIONS AND APPROACHES

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## Abstract

This article describes the results of the research was focused on monitoring expert opinions on the nature of human capital and the location of this economic category in economic theory and management theory. The result of research is proposal for the structure of theoretical approaches towards understanding the nature of human capital and its place in science. The article specifically emphasizes the macroeconomic approach and the importance of human capital in production functions and for the achievement of extensive and intensive economic growth, too.

There are some accesses to the definition of human capital and approaches to the human capital according to some economists and economic theory schools. In microeconomic view, there are two basic approaches. In terms of business economics is human capital considered as production factor. According to the managerial view human capital is a business resource or asset which forms part of the market value of the company. The macroeconomic approach sees human capital as one of the production factors, respectively sources of economic growth. The research results is a summary of definitions of human capital, proposal of structure of different approaches to understanding the nature and importance of human capital.

**Key words:** human capital, knowledge, skills, production factors, production function, economic growth.

**Classification JEL:** M 12 Personnel Management; J24 Human Capital

## 1 Introduction

The introduction of the concept of human capital related with the economic science development. Economists wanted highlight and draw attention to the ability of other workers who worked with machines, designed the new machines which helped them at hard physical work. It is about these skills that are specific to every person for individual develop. We need increase our knowledge, abilities, and skills for progress of the human society.

The problem is that there is no single definition of human capital or a single view of the scientific understanding of its nature, status, and role. In the research, we want to confirm the hypothesis that there are at least two different scientific approaches to understanding the nature and importance of human capital.

## 2 Human capital – definitions and approaches

There are several definitions and approaches to understanding human capital. Ideas about the importance of human capital and investment in human capital was directly or indirectly associated with the importance of education as early as the beginnings of economic theory in the work of W. Petty and A. Smith.

### 2.1 Definitions of the human capital

The topic of human capital was further elaborated by economists, representatives of the Chicago School in the 60s of the 20th century. “Attention Chicago economists also focused on building human capital theory, which was a major contribution to theoretical research in education. Their theory of human capital has become a ‘decoration’ Chicago School,” (*Volejníková, 2005*).

The leader of this school was Th. Schultz who in 1981 wrote: “Take into account the innate and acquired skills. Those are important and may invest to expand, will form the human capital.” The most important author and promoter of human capital theory is G. Becker. In his

book *Human Capital* in 1964 developed a theoretical basis for deciding on investment in human capital (*Becker, 1993*).

N. Bontis, N. C. Dragonetti, K. Jacobsen a G. Roos defined the human capital as the human factor in the organization; the combined intelligence, skills and expertise that gives the organization its distinctive character. The human elements of the organization are those that are capable of learning, changing, innovating and providing the creative thrust which if properly motivated can ensure the long-run survival of the organization (*1999*).

Davenport says that people possess innate abilities, behaviors and personal energy and these elements make up the human capital they bring to their work (*1998*). M. Armstrong defines the human capital as knowledge and skills which individuals create, maintain, and use (*2006*).

New theories of economic growth characterized the human capital as the sum of the individual congenital and acquired skills, knowledge, and experiences of individuals. OECD defines human capital as knowledge, skills, abilities, and other characteristics that are relevant for economic activity.

## 2.2 Approaches to understanding the human capital

The above definitions imply different economists approach to defining and understanding human capital which have not been summarized and compared. To propose the structure these approaches, this is the aim of our research and present article.

After comparing different views on the definition and understanding of human capital, we can conclude that, in principle, there is microeconomic and macroeconomic approach. In microeconomic view, there are two basic approaches. In terms of business economics, the human capital is considered as a production factor. Managerial view sees human capital as a business resource or asset which forms part of the market value of the company. The macroeconomic approach sees human capital as one of the production factors, respectively sources of the economic growth (Figure 1).

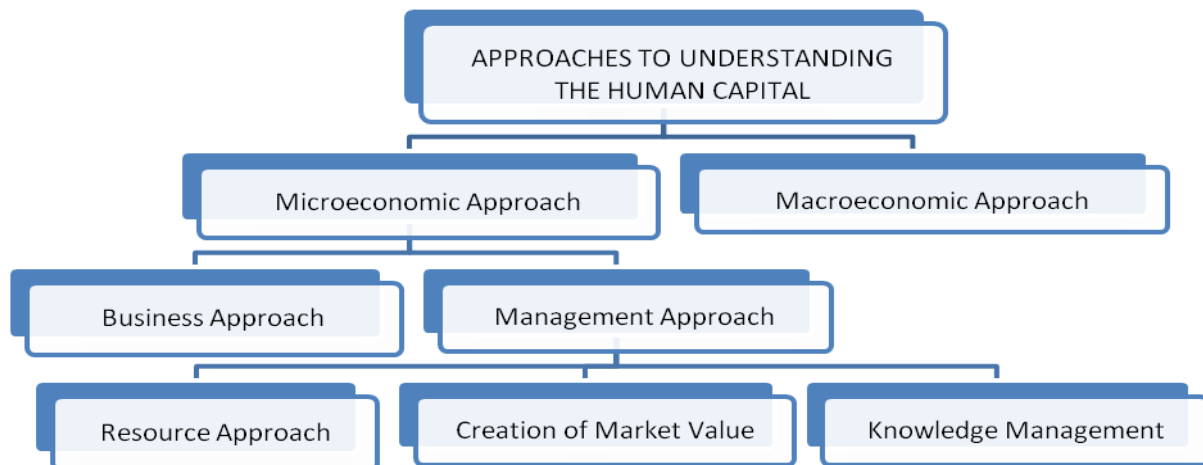


Figure 1. Structure of approaches to understanding the human capital

Source: own

### 2.2.1 Business approach

In terms of **business economics**, the human capital can be considered as one of the business production factors which are material, property, and human labor. All of which are also

costs to the company. But the human capital does not work directly. It is as one aspect of human labor – a qualitative aspect (Figure 2).

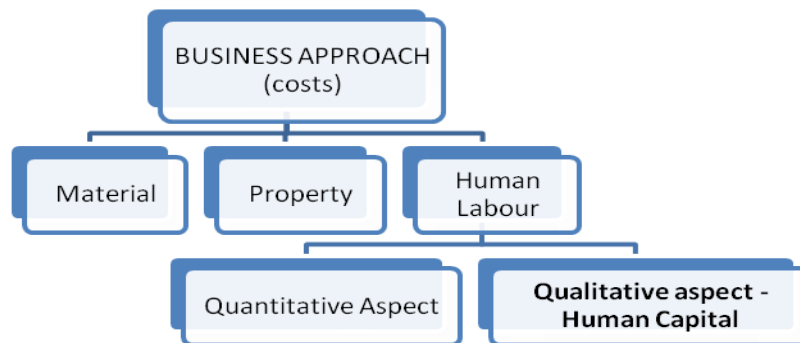


Figure 2. Business approach to the human capital – approach across costs

Source: own, according to: Ďurišová, M., Jacková, A.: Podnikové financie. EDIS – vydavateľstvo ŽU v Žiline. 2007

### 2.2.2 Management approach

Management approach considers the human capital as an intangible company asset which forms part of the intellectual capital and market value of the company. Views of the process of enterprise value creation are different according to the different authors.

### Resource approach

J. Koubek writes about **business resources** that are material (machinery, equipment, energy), financial, information and human. Human resources are of decisive importance in business management, economy, personnel work (2007). “The idea is important that the workers are the most valuable resource of every organization, without regard to the range of executed duties,” (Rosak-Szyrocka and Borkowski, 2007).

Human resources considered as the holders of human capital. In this viewing angle, it often happens that people equate human capital and human potential. Human potential is defined as the sum of available human and assumptions based on the production of goods and services (Vodák, Kucharčíková, 2011).

In organizations, the most qualified subjects in managing and motivating all employees are the right departments of human potential development (human resource management services, personal services), (Blašková, Hitka, 2011). Human capital represents the factor which gives a specific character to every organization. People form an element in the company which is able to learn, to innovate, to stimulate, and to make changes as well as to think creatively. This all is important for long-term successful operation of a company on the market (Vodák, 2010).

### Creation of Market Value

New and dynamically changing market environment forces companies to maintain their competitiveness in order to constantly provide customers with an exceptional value and creative search for ever new ways to create this value, how about it and how to inform their target market to provide (Kožená, 2010). Scandia is the first large company to have made a truly coherent effort at measuring knowledge assets. According to Scandia’s model, the hidden factors of human and structural capital comprise intellectual capital when added together (Edvinsson, Malone, 1997). See Figure 3.

*Intellectual capital* is the sum of human and structural capital. There are experience, organizational technology, customer relationships, and professional skills.

*Human capital* is combined knowledge, skill, innovativeness, and ability of the company's individual employees to meet the task at hand. Human capital cannot be owned by the company.

*Structural capital* is the hardware, software, databases, organizational structure, patents, trademarks, and everything else of organizational capability that supports those employees' productivity – in other words, everything that gets left behind at the office when employees go home. Structural capital also provides customer capital, the relationships developed with key customers (Bontis, 2001).

*Organizational capital* is the institutionalized knowledge possessed by an organization, which is stored in databases, manuals. It is often called structural capital (Edvinson, Malone, 1997) but the term “organizational capital” is preferred.

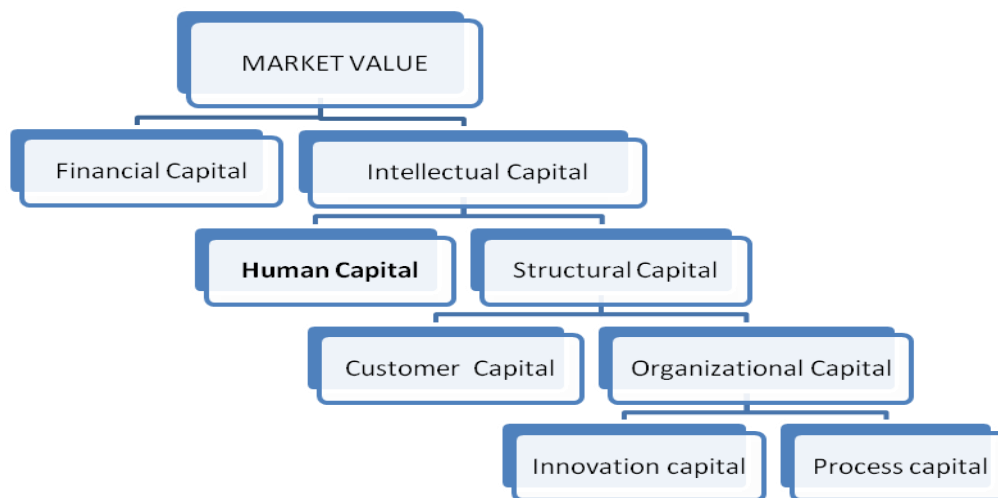


Figure 3. Process of Creating a Market Value of the Company

Source: Edvinson, L., Malone, M. S.: *Intellectual Capital: Realizing Your Company's True Value by Finding its Hidden Roots*. New York. Harper Collins Publishers. 1997

Organizations use different approaches for accumulating and utilizing their knowledge, and these approaches present themselves as different aspects of intellectual capital, i.e., human, organizational, and social capital (Davenport, Prusak, 1998). The concept of intellectual capital is based on the belief that the main resources for building competitive advantage are the intangible in nature. Edvinsson and Malone (1997) used for the first time the word, “intellectual capital”, instead of the accounting term “intangible assets”.

Sveiby identified intellectual capital as an intangible asset. He proposes a conceptual framework based on three families of intangible assets: external structure (brands, customer and supplier relations), internal structure (the organization management, legal structure, manual systems, attitudes, R&D, software) and individual competence (education, experience, skills), (Sveiby, 1997). The concept of individual competence corresponds to the concept of human capital which is given to this article and which is frequently used in theory. Sveiby proposes a method for the measurement of intangible assets (other authors refer to their intellectual capital) because intangible assets contribute to the increase in value. In traditional accounting, these assets are regarded as costs (1998). He argues that both non-financial measures to measure intangible assets and financial measures to measure visible equity can be jointly used to provide a complete indication of financial success and shareholder value (Figure 4).

M. Armstrong (2006) explained the concept of human, intellectual, social and organizational capital. Individuals generate, retain, and use knowledge and skill (human capital), and create intellectual capital. Their knowledge is enhanced by the interactions between them (social capital) and generates the institutionalized knowledge possessed by an organization (organizational capital).

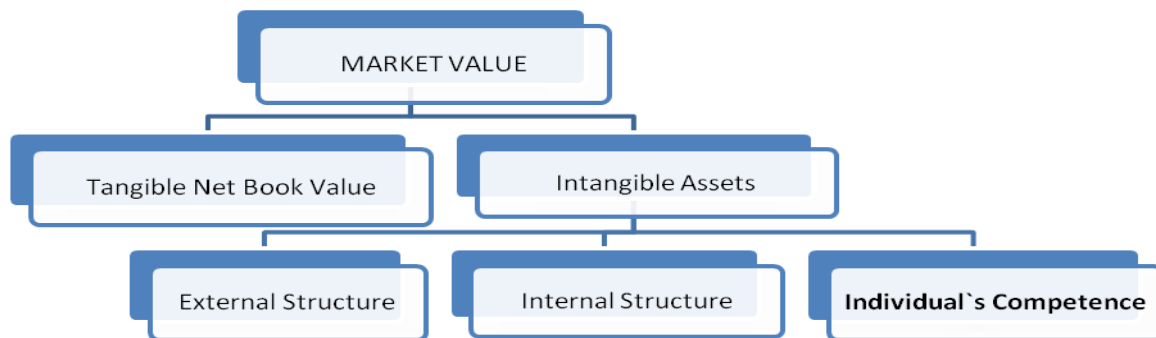


Figure 4. The Intangible Assets Monitor Framework

Source: Sveiby, K. E.: Measuring Intangibles and Intellectual Capital – An Emerging First Standard. 1998

### Knowledge management

P. Drucker (1993) was the first who enriched the management that there is a new kind of capital, and called it to the knowledge capital. He predicted that, while money capital will subside, the knowledge capital will promote. Knowledge or human capital is more and more considered the most valuable capital of the company. Human capital is not the same for everyone. Holder of knowledge capital can be creative and skilled worker or professional manager. The world is fast moving from a production-based economy to a knowledge-based one (Drucker, 1999)

Nonaka and Takeuchi (1995) said that knowledge management requires a commitment to “create new, task-related knowledge, disseminate it throughout the organization and embody it in products, services and systems”. At the organizational level, knowledge is generated from internal operations or from outside sources communicating with the corporate structure. Davenport and Prusak (1998) defined knowledge as sum of experience, values, contextual information, and expert insight that provides a framework for evaluating and incorporating new experiences and information. Knowledge management deals with the creation, acquisition, integration, distribution, and application of knowledge to improve the operation effectiveness and competitive advantage of an organization.

Linking human capital lies in the fact that human capital is viewed as a set of congenital and acquired knowledge but also skills, abilities, talent, inventiveness. Human capital is therefore part of the knowledge management.

### 3 Macroeconomic approach to the human capital

Economic growth is one of the main objectives of the economic policies of current governments. It is achieved extensive or intensive use of production factors. Therefore we know the extensive and intensive economic growth.

*Extensive growth* is the result of increasing the quantity of used production factors. Basic factors of production are land, labor, and capital.

*The land* as production factor includes all components of the natural environment. This source is often used for marking natural sources but some economists connected this factor with capital. It was the decisive factor of production to achieve growth, in the period before the Industrial Revolution. The most of the workforce is employed in agriculture in many developing countries, currently. If economic growth rate is too high, then there is the depletion of natural sources. For this reason, we are talking about sustainable growth not leading to their depletion.

*The labor* is another source of economic growth which is achieved through the increase of labor force. It is influenced by demographic trends, amount of labor force, scientific and technical progress level, the social division of labor, and labor productivity in various sectors. Present modern technologies require fully skilled workers for the operation and maintenance. Therefore it is necessary to increase the labor force qualification.

*The capital* is a rare resource. The term capital is very wide and capital as a source of economic growth includes buildings, machinery, equipment, technology. A prerequisite of capital accumulation is the creation of savings. Capital accumulation changes the ratio between production factors. At present, capital accumulation is increasingly directed to education and research. The economists demerged capital on physical and human capital in the 80-ies of the 20<sup>th</sup> century.

*The human capital* includes the natural ability, innate and acquired skills, knowledge, experience, talent, inventiveness. All these characteristics are components of the human capital. The essence of creation, increasing the value and effectiveness of human capital, is spending money now but expected benefits will flow in future. Forms of increasing the value of human capital are expenditure oriented for example to health, safety, science, research and education (Kucharčíková, 2009). You can see Figure 5.

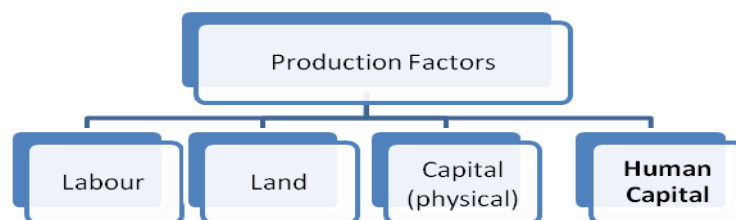


Figure 5. Macroeconomic approach to the human capital

Source: own

**Intensive economic growth** is caused by the increase in production per unit of input. This type of economic growth is influenced by the quality, efficiency and manner of combining production factors. The intensive growth factors include the technical progress and increasing of the total factors productivity. The intensive growth factors include the technical progress and enhancement of the total factors productivity. Determinants of aggregate productivity factors are: the level of work organization, technology, technical support, the level of education, motivation of employees to increase their performance, and also the natural and soil conditions. In the current period which is characterized by rapid and extensive introduction of technical innovations, education is the most important factor. It contributes to the technological progress, factors productivity growth, increasing value of the human capital and overall economic growth. New knowledge and skills must be adapted to current needs and possibilities of concrete firms and economies in an innovative and creative way. Economists Th. Schultz and E. Denison emphasized investments in education contribute to economic growth and its accelerating, already in the 50-ies and 60-ies of the 20<sup>th</sup> century.

According to Becker, economic growth cannot be explained by the growth of physical capital and technological innovation. An important role of human capital. Man is the epitome of human capital (*Volejníková, 2005*). Investing in people (human capital) is the main source of economic growth in a modern economy (*Schultz, 1981*).

### 3.1 Combination of production factors from the aspect of society historical development

Structural changes caused that at various stages of society development the importance and the combination of key production factors varied. If we look at the use of production factors in terms of historical development of society, then in the long term *agrarian society* considered the land as a key factor in combination with a heavy physical labor.

Several millennia-long primacy of land was terminated by the industrial revolution in England in 1760 and this was the start of an *industrial society*. The capital – again in combination with the physical labor – was the most important production factor in this type of society. Industrial society included the development of mechanization, automation, introduction of new technologies and techniques leading to higher labor productivity and to economization the labor force.

Industrial society was replaced by the *information society* (or post-industrial, knowledge society) in the U.S.A. in the 50-ies years of the 20<sup>th</sup> century. As a result of globalization and strong competition fight, important innovations, massive use of information and communication technologies (ICT) are very important in this type of human society (Figure 6). Introduction of robotics increases the importance of psychical labor to the detriment of physical labor. The human capital began to be regarded as an important source of economic growth.

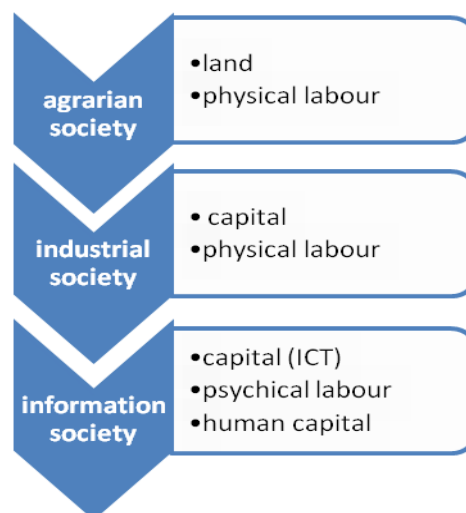


Figure 6. The combination of key production factors from the aspect of historical development of human society

Source: own

The basic prerequisite for the successful building an information society is a high level of education in economic subjects. Education is therefore crucial and from the perspective of ICT it has two levels. It is education in computer science. Here the education is the subject and object of science, too and the education is designed to prepare professionals in the field of informatics. The second plane is about education in other areas using the methods and means of informatics, when we talk about informatization of education (*Kucharčíková, 2011*).



There are different opinions and different economic schools about an importance of the human capital as economic input. Opinions on it are different in different economic schools depending on the conditions in which the economy worked, depending on the extent and level of processing available knowledge.

### 3.2 Human capital in production functions

The views, which are the key factors of production about, are not uniform and historically have gradually changed. This caused the forming of the same production functions which included various combinations of production factors to achieve the desired output of the economy.

Neoclassical theories of economic growth (from 50-ies of the 20<sup>th</sup> century) examined economic increase in term of supply of production factors. They considered the capital and labor as the basic production factors. Theories accepted substitution of these factors and natural resources included into the capital. Those theories were based on the *general production function*:

$$Y = f(L, K), \quad (1)$$

and its advanced form, called *Cobb-Douglas production function*:

$$Y = A \cdot L^\alpha \cdot K^\beta, \quad (2)$$

where: Y = real product (Gross Domestic Product),

L = quantity of consumed workload,

K = quantity of consumed capital,

A = the influence of other, immeasurable factors,

$\alpha, \beta$  = labor and capital elasticity coefficient ( $\alpha + \beta = 1$ ).

This production function was extended by American economist R. Solow by another growth factor – technological progress. He saw the technology as an autonomous ongoing at the time thus as an exponential function in the time. Solow said the economy continuously increasing its savings rate, will have a higher level of production but this economy will not achieve a consistently higher rate of economic growth. Permanent growth rate of production per unit of labor input depends on the rate of technological progress and not the savings rate (*Volejníková, 2005*).

The recognition of technological progress as a new factor of economic growth means a qualitative change in the development of growth theories. Solow edited general shape of the production function as follows:

$$Y = f(L, K, t), \quad (3)$$

where: t = technical changes as a function of time.

Following the introduction of neutral technical progress the form of production function can be developed – Cobb-Douglas function – modified:

$$Y = A \cdot L^\alpha \cdot K^\beta \cdot e^{rt}, \quad (4)$$

where:  $e^{rt}$  = time factor which reflects the influence of qualitative changes in production, including technological progress.

New theories of economic growth – theories of endogenous growth (80-ies and 90-ies of 20<sup>th</sup> century) brought further change. They divided the capital as a production factor and source of economic growth into the physical and human capital. Physical capital is created by machinery and technical equipment. The human capital is characterized as the sum of the



individual congenital and acquired skills, knowledge, and experience of individuals. Endogenous growth theories can be divided into two basic groups.

The first group considers the most important factor of economic growth as a result of innovation, scientific research and development. The leaders of this group are P. Romer, G. Grossman. According to the second group including R. Lucas, P. Romero, S. Rebelo, the technical progress is related to investment in the human capital. Production function in endogenous theories of economic growth takes the form:

$$Y = A \cdot K, \quad (5)$$

where: Y = real product (output) economy,

A = coefficient reflecting the level of technique and technology,

K = capital – including physical and human capital.

New growth theories also explain the paradoxical situation where investment in psychical capital without increasing the level of education of the population does not lead to economic growth. By contrast, investment in education and science are ineffective if they exceed the absorptive capacity of the other production factors (*Lisý, 2005*).

N. G. Mankiw, D. Romer and D. R. Weil (*1992*) included in the original Solow model a new factor, the human capital, in 90-ies of the 20<sup>th</sup> century, as follows:

$$Y = A \cdot L^\alpha \cdot K^{(1-\alpha-\beta)} \cdot H^\beta, \quad (6)$$

where: H = human capital stock.

According to Schultz (*1981*) investment in human capital is the major long-term factor explaining the modern economic growth and development. To achieve and maintain a modern economy, continuous investment in human capital must occur alongside investments in other forms of capital and technology.

Human capital is an important source of extensive and intensive growth, too. “Economic growth is closely linked to the speed with which world get ready to use new technologies, especially in the information and communication field,” (*Tokarčíková, 2004*). “Human capital is relatively young production factor. Because it is closely related to the production factors of labor and has features in common with the labor, analysis and research work are often not explicitly mentioned,” (*Tokarčíková, 2010*).

The new modern theories of economic growth (80-90 years of 20<sup>th</sup> century) had begun to take the human capital as one of the main factors of economic growth. New growth theory is based on the assumption that the production function is not affected only by labor and capital but also by education, improving the quality of labor and capital, better infrastructure which are unaffected by exogenous but endogenous. This means that the growth of education and upgrading skills operate as a multiplier which makes for faster economic growth. These economic theories identified physical and human capital. Physical capital involves the machines, the equipment, and the technologies. Human capital is the sum of inborn or obtained knowledge, competencies, skills, and experiences of the individuals.

There are realized extensive industry changes, at present. “Innovations are changing the style of working life, emphasize the importance of education, creativity, communication and cooperation,” (*Chodasová, 2008*). Knowledge-based society requires more and more expertise, and therefore it promotes lifelong education, improvement of scientific, and research activities for continuous self-education and improving the quality of work skills and habits that bring a positive effect on economic performance. The importance of human capital for economic increase can be characterized in relation to the implementation of the structural changes that contribute not only to quantitative but mainly to qualitative changes in the development of society and its output.

## 4 Conclusion

Human capital is an economic category which is now often used. Based on realized theoretical research, we have confirmed the hypothesis that there are at least two different scientific approaches to understanding the nature and importance of human capital. The research results is a summary of definitions of human capital, proposal of structure of different approaches to understanding the nature and importance of human capital.

There are some accesses to the definition of human capital and approaches to the human capital according to some economists and economic theory schools. In microeconomic view, there are two basic approaches. In terms of business economics, the human capital is considered as the production factor. According to the managerial view, the human capital is a business resource or asset which forms part of the market value of the company. The macroeconomic approach sees human capital as one of the production factors, respectively sources of economic growth.

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