

# Intellectual Capital as a Key Factor of Knowledge Management in Organizations

**Mariia Rizun**

*University of Economics in Katowice  
Katowice, Poland*

*mariia.rizun@ue.katowice.pl*

## Abstract

Human capital is considered as the main source of organization's competitive advantage. The necessity of identifying the notion of human capital from the point of view of its intellectual resources is justified. Knowledge is presented as the major component of human capital and the key factor in the process of intellectual products development. Implementation of information technologies in the process of knowledge management via development of the virtual educational platform is suggested with an objective to help enable the improvement of human capital application efficiency.

**Keywords:** human capital, intellectual capital, intellectual product, knowledge management, virtual educational platform.

## 1. Introduction

Transition to innovative economy is the strategic goal of any country at the current stage of economic development. This type of economy has been created and developed together with the growth of quality and value of the accumulated knowledge potential, which is the major national treasure and the main source of state's competitive advantages. The share of organizations' profit, gained as a result of applied knowledge, skills and talents, which in complex form the notion, defined in science as "*human capital*" (HC), has been rapidly growing recently.

Specialists on human capital and its intellectual resources claim that HC effective application in combination with other assets gives the possibility for an organization to gain real competitive advantage and, in particular conditions, may guarantee the leading position at the market [5]. However, the lack of highly-objective methods and mechanisms of evaluating the level of human capital does not enable drawing clear conclusions on the degree of influence of knowledge, skills and talents of employees on the effectiveness of organizations' activity [20], [19]. Because of that, organizations cannot fully use the possibilities of managing HC and increase the efficiency of its application.

Thus, the intellectual component of organization's resource base accumulates scientific and routine knowledge of employees, intellectual property and gathered experience, communication, organizational structure and information networks. On the one hand, it formulates a part of capital, which is difficult to evaluate and, on the other hand, it puts forth the questions of intellectual resources management.

In this connection the author sees the necessity of solving the following *scientific problem*: despite the fact that human capital and its element have been thoroughly studied in the recent years, its influence on organization's performance has not yet been examined. Material resources such as finance, raw materials, equipment etc. in many organizations are still considered to be the key factors of profit growth. Information technologies are widely used to support production processes, to manage accounting, even to keep track of human resources.

Yet organizations do not pay much attention to the necessity of providing IT support for the purposes of intellectual capital formation and distribution.

Existence of the above-stated problem has caused definition of the following objectives of the current research. The *first objective* of this research includes justification of the role of human capital in building competitiveness of the organization. For that purpose the author sees the necessity of identifying the structure of HC from the point of view of its intellectual component. The *second objective* of the paper is to develop the methodology of managing the intellectual component of human capital with the help of information technologies.

Achievement of the two objectives of the paper is supposed to help the author get the answer for two very urgent *research questions*:

1. What role does human capital play in organization's performance and building its competitiveness? How large is HC's influence on main indices of organization's performance?
2. How can IT be used to support the process of human capital management and, particularly, management of intellectual capital?

Solution of the above-mentioned scientific problem and realization of the objectives has resulted in formation of a particular *structure of the paper*. The second and the third parts present answers to the first research question, set in the paper: the second part reveals the detailed structure of human capital and presents the expanded definition of intellectual capital, formulate by the author; the third part focuses on intellectual capital as a key element of human capital and justifies the fact that knowledge should be referred to as a basic resource for all typed of capital. In the fourth part, which answers the second scientific question, the importance of knowledge management is highlighted and the author's suggestions about the improvement of knowledge application efficiency in organization's are described. The paper is finished by the conclusion, which contains the summary of theoretical part and author's practical suggestions.

## 2. The Entity of Human Capital

American scientists T.Schulz, G.Bekker, J.Mincer and J.Koulman are considered to be the authors of human capital theory. Supporters of this theory believe that a human, his skills, abilities and talents are the most important factor of economic success of any organization. Human capital is stressed to be one of the most important factors of innovative development. However, today there is still no unified definition of the HC notion. Moreover, there exist a number of approaches (concepts) of forming the definition (consumer, investment, productive, knowledge concepts etc.).

On the basis of works of leading scientists in the sphere of human capital analysis and management [2, 3], [6, 7, 8], [12], [16, 17] the author has developed an *expanded definition of human capital*:

Human capital is the economic category, which presents the system of human knowledge, skills, abilities and talents, formed as a result of obtained education and other investments into personal development, considered in combination with personal qualities and health (both physical and mental). HC is, at the same time, an aggregation of factors that allow their owner to obtain profit by means of creating economic goods and increasing their quality and value.

Since human capital is considered as a system, its composition and structure is of major scientific interest. In this case, to realize the objective of the research (identifying the structure of HC) it is rational to examine the HC classification depending on various factors.

Such classification was developed on the basis of works of the leading scientists [1], [10], [11] as well as added by the author's own suggestions.

Table 1 contains the *hierarchical classification* of HC depending on the following characteristics:

- limitation of application (*universal capital* – knowledge, which can be in demand in various spheres of human activity; *specific capital* – skills and knowledge, obtained as a result of

specific trainings and being a subject of interest only for the organization, in which they were gained);

- form of realization (*alive / embodied* – knowledge and health, embodied in a human; *not alive / materialized* – appears, when knowledge is reflected in physical, material forms);
- group of abilities (personal qualities);
- expenses (cost component).

**Table 1.** Human capital hierarchical classification

Source: developed by the author on the basis of analysis of scientific works

Limitation of application	Universal capital				Specific capital			
	Alive / embodied capital							Not alive / materialized capital
Form of realization	Health capital	Entrepreneurial capital	Intellectual capital	Professional capital	Labor capital	Social capital	Brand capital	Organizational capital
		Information capital				Health capital	Cultural capital	Information capital
Expenses			Education capital					

From the author's point of view the choice of such a list enables the following:

- 1) On the one hand – decomposition of HC by the levels (from the sphere of human intellectual resources application to particular elements in the structure of organization's capital value).
- 2) On the other hand - demonstration of the mutual subordination (interdependence) of HC elements, which allows conduct synthesis of particular characteristics to obtain the general ones. For example, the *health capital* (selected by the *Group of abilities*) is at the same time the *embodied capital* (by the characteristics *Form of realization*). It can be as well characterized as the *universal capital* (the characteristics *Limitation of application*).

Considering the fact that human capital is examined in a context of an organization, it is reasonable to study it from the point of view of a system – at micro-, meso- and macro-levels. Such a study presupposes identification of HC components, which (figure 1):

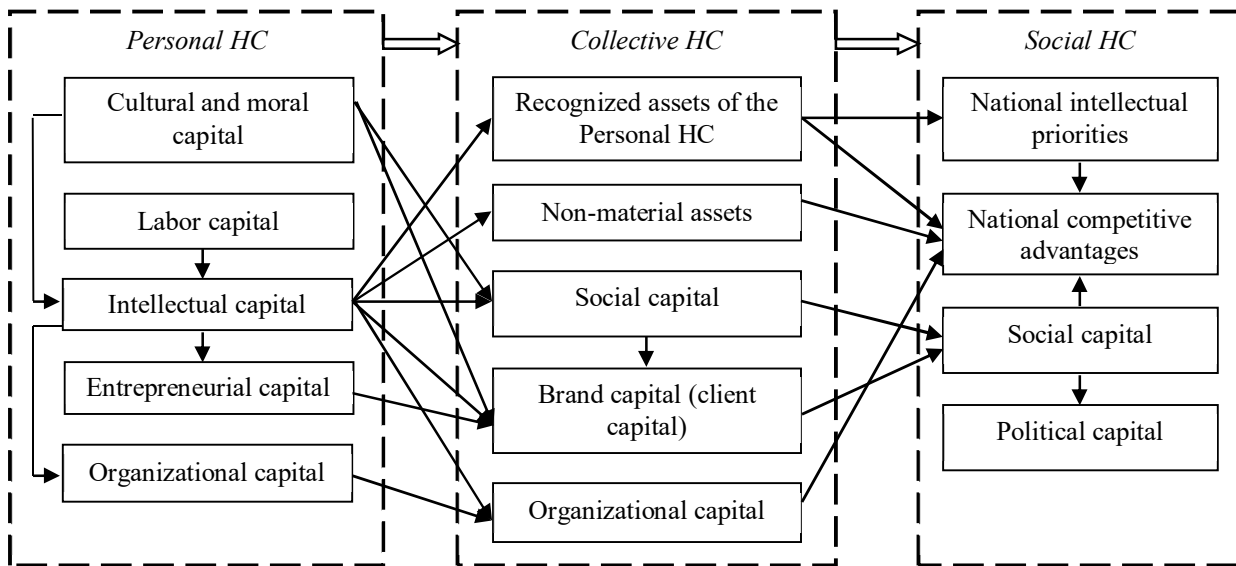
- belong to a particular person (internal personal);
- are a property of an organization where the person works (internal collective);
- belong to the state, where the person lives (external, social).

The created scheme reflects the presence of the influence of some HC elements on the formation of another HC elements at the same level as well as at different levels.

The major result of the obtained structure analysis is the prevailing role of *intellectual capital* (IC) as a component of inner personal human capital, which has the largest number of influences (connections) on the formation of other elements at the scheme.

The author's version of the *IC definition* is as follows:

Intellectual capital is the key component of forming the qualitative (creative possibilities of innovative products' development and realization) and quantitative (value, balance) parts of human capital at the level of an individual; it is also a basis for forming all the other elements of human capital.



**Fig. 1.** Structure of interdependence of HC elements at micro-, meso- and macro-levels  
**Source:** developed by the author on the basis of analysis of scientific works

### 3. Intellectual Capital as a Key Factor of Organization's Competitiveness

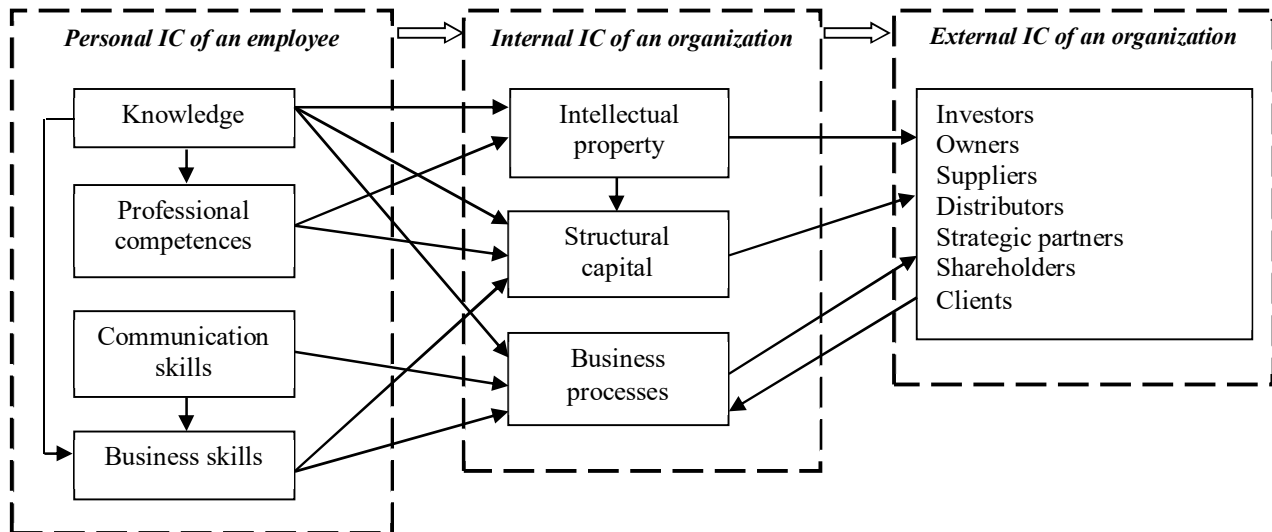
Intellectual capital is believed to be the determinant of today's social-economic progress. Any country's future strongly depends on the power of intellectual potential, since information and innovation are what presently define country's competitiveness. Modern science even distinguishes a separate area – intellectual economy, of knowledge economy. The phenomenon of *knowledge economy* can be characterized in a following way [4], [9], [14, 15, 13]:

goods and services, based on knowledge-intensive structures, and forms of business activities that correlate with up-to-date required pace of high-technological and scientifically-progressive innovation; strongly rely on intellectual and problem-solving capabilities (in the form of employees' knowledge, experience and skills; brands; competitive advantage; patents; customer relations; human capital; research and development; trademarks) and stipulate the organization's efficiency increase, more often attributable to positive synergy from leveraging knowledge informational and social engagement effects.

Taking into consideration the fact intellectual capital is examined as a part of human capital structure, it is reasonable to study its structure as well. That allows to define three levels of intellectual capital:

- 1) *Personal IC* – as a separate category and, at the same time, as a component of organization's aggregate IC.
- 2) *Internal IC* – formed by the resources created inside the organization with the use of personal IC. These resources take direct part in development of organization's intellectual product.
- 3) *External IC* (relational capital) – formed as a result of intellectual product development on the basis of organization's relations with people interested in this product.

The structure of connection of IC elements and the process of their mutual influence is presented at figure 2.



**Fig. 2.** Structure of interdependence of IC elements at micro-, meso- and macro-levels

**Source:** developed by the author on the basis of analysis of scientific works

The main result of this scheme analysis is the logical conclusion, which sets the interconnection between human and intellectual capital. According to the author's point of view, *knowledge* is, on the one hand, the major qualitative (non-material) resource for forming the system of IC elements at micro-, meso- and macro-levels. On the other hand, knowledge is the major quantitatively measures resource of an organization, formed as a result of a man applying his knowledge, creating computer programs, conducting projects, negotiating with partners etc. That is why the author bases the research on the suggestion that the development and improvement of mechanisms and methods of managing knowledge as the major intellectual resource will enable the increase of human capital application efficiency and, in such a way, will raise organization's competitiveness.

#### 4. Knowledge Management and Information Technologies

European concept of knowledge management defines the following stages of knowledge life-cycle in an organization [18]:

- 1) Knowledge revelation and identification (analysis of results of research and development, analysis of technological licenses, new technologies search etc.).
- 2) Stimulation of the processes of new knowledge creation (trainings, workshops, seminars, brainstorming, research and development etc.).
- 3) Improvement of knowledge application efficiency (brand commercialization, selection of experts, innovations introduction etc.).

It is necessary to pay attention to the fact that at the first stage of managing knowledge it is considered only through "material" intellectual products ( licenses, technologies etc.) – i.e. through the results of employees' knowledge application.

The author suggests that this stage should be added with the aspect of identification of the knowledge itself – as an intellectual component and the major "non-material" resource for the development of intellectual products.

It is also necessary to state that for the revelation, identification and collection of "material" IC and its further reporting in management systems organizations usually apply information technologies and other resources, which provide organization's competitiveness.

The suggested method of managing the "non-material" knowledge of an organization presupposes development of the *virtual educational platform* (VEP). Its functions at the stage

of knowledge revelation (stage 1) will include the measurement of “quantity” of personal and collective knowledge at an organization – by means of examination and quantitative identification of the *level of employees’ education*, i.e.:

- possession of high education, professional education;
- level of this education (bachelor or master degree, PhD degree, additional education);
- education, obtained by means of trainings at work.

The process of measuring knowledge “quantity” will allow to define the existing level of employees’ erudition as well as reveal the lack of knowledge in particular spheres of their activity.

At the stage of new knowledge creation (stage 2) the author suggests to add the section, connected with the *education at workplace*. Such form of education is usually realized by means of lectures and workshops during working hours or in the end of the day. But at this stage the organization may face the problem of minimizing the time spent on education. Introduction of a VEP will enable distance education – at any time suitable for employees, without interrupting their work and without spending too much of private time on it. It is suggested that courses for the VEP can be developed on the basis of data, obtained by the measurements at stage 1, as well as of the tendencies of competence formation at organizations in Poland, Europe and around the world.

At the stage of *knowledge application efficiency improvement* (stage 3) development of a VEP can also be considered in connection with the questions of *stimulation and motivation* – factors that should increase employees’ interest in efficient application of their knowledge. In the author’s opinion, testing of all employees after the end of any course at VEP, development of a rating of the best students<sup>15</sup>, stimulation to increase the rating etc., should help increase the effectiveness of managing the “non-material” resource of the organization – the knowledge.

In general, the suggested concept of introducing the virtual educational platform as an element of knowledge management in an organization should enable the increase of efficiency of human capital usage and, as a result, will let the organization gain additional competitive advantage at the market.

## 5. Conclusions and Further Steps of the Research

In the process of realization of the research objectives the following results were obtained:

1. The author’s definitions of the notions *human* and *intellectual capital* were formed.
2. The following stages of analysis were performed:
  - analysis of human capital structure and its connection with other types of capital, which allowed to define that: *intellectual capital* is the key factor of forming the qualitative (creativity, innovativeness) and quantitative components of human capital at the level of an individual, collective and society, as well as the basis for formation of all the other elements of human capital;
  - analysis of intellectual capital structure allowed to reveal that: *knowledge* is the major qualitative (non-material) resource for intellectual capital formation at micro-, meso- and macro- levels; it is the main resource of any organization, which is used for creation of products and services, research and development, computer programs development, new clients attraction etc.

Recommendations on improving the methods of human capital management were suggested. They presuppose introduction of the *virtual educational platform* into the system of knowledge management in an organization. The platform should enable completion of the knowledge life-cycle with the following stages:

- 1) Measurement of the “quantity” of individual and collective knowledge of an organization by means of analysis and formalization of employees’ education level. The analysis is supposed

<sup>15</sup> Here and further „a student” means an employee of an organization, who takes courses at the developed VEP.

to be conducted with the help of questionnaires. Development of this tool of analysis is the next step of author's research.

2) Development of the complex of educational programs, oriented on the requirements of a particular organization and condition of a modern market – with the objective of increasing organization's competitiveness from the point of view of quality and quantity of its intellectual resource.

Development of the algorithm of virtual educational platform introduction is also a subject of author's further research. At this stage it is necessary to create the concept of educational programs selection, but, at the same time, it is required to formulate the technical specification of the virtual educational platform. This algorithm will give the possibility to make the platform universal for any type of organization.

3) Development of the system of additional motivation of employees, studying with the help of virtual educational platform – with the objective to increase their interest in using their knowledge efficiently.

The *value* of this research consist in the fact that it brings the knowledge in an organization to the highest level and justifies the necessity of managing knowledge as the key source of organization's efficiency. At the same time it suggests the concept of developing an IT based support system for knowledge creation. The *importance* of the research is justified by the fact that the developed virtual educational platform is supposed to fulfill a few functions, which are of high value for any organization: evaluation of the "quantity" of knowledge, possessed by employees – i.e. evaluation of organization's intellectual capital; development of educational programs considering all the specificities of the branch, where a particular organization operates, as well as the above-mentioned level of knowledge; motivation of employees in the following directions – improvement of their knowledge, creation of new knowledge and its distribution, a more effective application of their knowledge and skills. These functions of the educational platform, applied in an organization, are intended to increase the efficiency of human capital usage in it and, consequently, to help an organization to raise its competitiveness.

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