HUMAN CAPITAL AND DEVELOPMENT TASKS IN THE LIGHT OF INCREASING THE EDUCATION QUALITY AND IMPROVING COMPUTERIZED INFORMATION SYSTEMS AND TECHNOLOGIES OF TRAINUNG

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Abstract. The objective of the article lies in the systemological analysis of the concept for human capital, as well as to identify most important factors in the formation of the concept for human capital and its relationships to the key issues of social and economic development, in the framework of the solution for the actual task on finding ways of increasing the education

quality and improving computerized information systems and technologies for training. Research methods. The research was based on concepts and tools of such theories as systemology, information, databases, information systems, information technology, computer systems, and technical means of education. Main research results. Key features and components of the concept for human capital as the basis for continuous improvement of the each human personality and production team, as well as society and economics as a whole, in conditions of the influence of negative natural and climatic factors, are identified. Progressive mutual contacts and mutual influences that take place in the system of mutually determined concepts, represented by the following terminology: "human capital"; "the human (person)"; "the worker (employee)"; "investor"; "development of social and economic processes"; "education quality"; "computerized information systems, and technologies of training", – are dedicated. The information model-prototype and concept for its practical implementation, to improve the quality in the selection and integration for compound components of computerized information systems and technologies of training, are developed. Scientific novelty. New concepts that identifying and generalizing the factors that have a powerful catalyzing effect on the progressive development and interaction of human capital, socio-economic systems, and education, are created. The new information model for the rationalization of the component composition in computerized information systems and technologies of training, are created. Practical`s significance. The implementation of proposed concepts and the information model in practical activities permit to significantly improve the efficiency for computerized information systems and technologies of training due to their improvement according to the criteria of expediency and optimality in the choice of composition and integration technologies for components.

***Keywords*:** *human capital, training, computerization, information systems, information technologies.*

Problem`s statement. The main component of ensuring the effective work for enterprises, firms, regions, and the country is a person (people). "Human capital" in recent decades is one of the most priority areas for research. The relevance and severity of the problems associated with the safekeeping, development and implementation of methods for using "human capital" is growing and requires further research, has both theoretical and practical significance. In particular, research tasks related to the issues on the mutual influence of the level for human capital and the quality of human education are highly relevant, taking into account the key role of computerized information systems and technologies of training.

Analysis of recent research and publications. Labor resources have played and are playing a critical role in society life. With the development of society, labor resources are also develops. Development is reflected in a change (increase) for the level of education and knowledge. By the middle of the 20th century, the possible level of education had become high enough level, and all this, first of all, due to the level of development in science and the educational system. The first to propose the term "human capital" in 1951 was Jacob Mincer [1]. Then this term was used by American economists Theodore William Schultz [2] and Gary Stanley Becker [3] to form the foundations for the theory of "human capital". Simon Kuznets also made a considerable contribution to the development of the theory on human capital. All of these scientists have received Nobel Prizes in economics for the creation and development of the theory on human capital, and now there is no doubt that human capital is the main factor in the formation of the "knowledge economy".

Following scientists carried out the further development of the created methodological foundation for the theory of human capital, expanding and concretizing its individual components. Numerous research results accumulated by them at the moment urgently need a generalized scientific review and analysis, systematization, certain unification, and bringing the conceptual base to the state of a single holistic perception. Further scientific researches in the phenomenon of human capital are also relevant in connection with the development of society, economics, education, modern computerized information systems and technologies of training.

The objective of the study. The main aim of this work is a systemological analysis for the concept of "human capital", initially related to the social and economic category of the characteristic features for the population, as well as identification the most important factors in the formation of the concept for "human capital" and its interconnections with urgent tasks of developing society and economics, increasing the quality of education and improving computerized information systems and technologies of training.

Research findings. Human capital is a relatively new naming for labor resources of high quality, with a high level of education and investment, introduced in the middle of the 20th century [1-3].

Human capital is an educated part of the labor resources with knowledge and tools for intellectual and managerial labor. The human (labor) capital of the organization (firm) is represented by the total labor capacity of workers, based on the level of their education, skills, psychophysiological abilities, professional and qualification skills, and the necessary organizational and technical conditions [4-5].

The labor capital of the region and organizations is, first of all, people as resources of living labor available to each enterprise, region, as well as their cumulative abilities and capabilities that can be realized in labor behavior. Therefore, the labor capital of the region and organizations is determined by the strength in the individual labor potentials of workers, which, in turn, are formed from the labor potentials of separate production teams [6, 7].

In the scale of development, the specific classification of human capital is adopted, that is presented in Fig. 1.

Composition of labor potential is presented in Fig. 2.

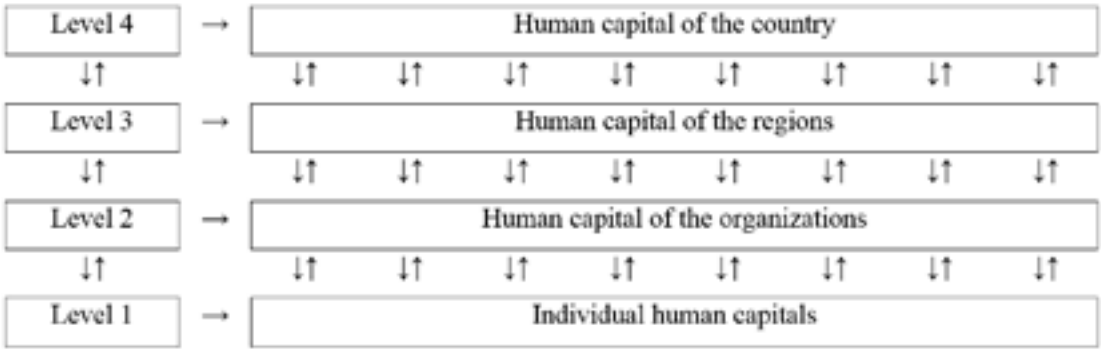

Fig. 1 – Levels of human capital

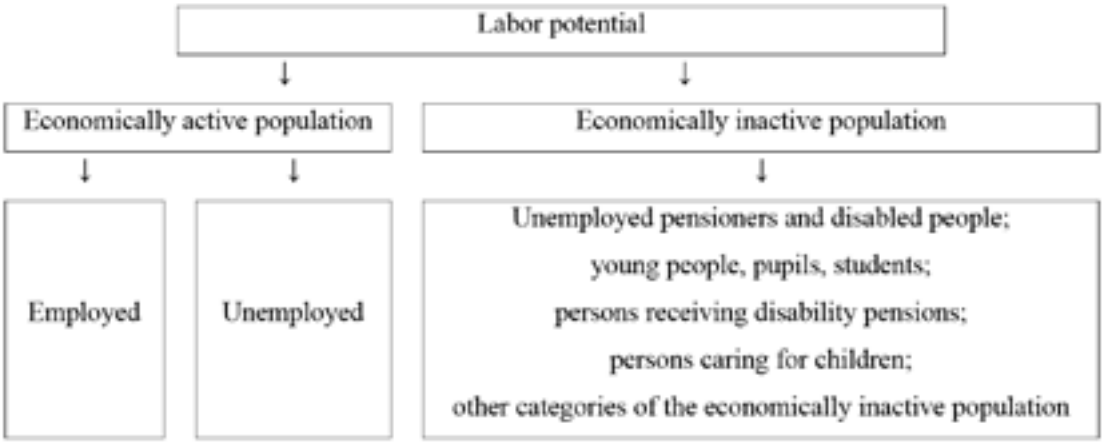

Fig. 2 – Composition of labor potential (labor resources)

At the moment, some names are used in the description of the characteristics for labor activity, reflecting disagreement in terminology and an unstable situation in this subject area.

These are the following terms: staff; labor resources; labor potential; work force; human resource; human capital; economically active population; economically inactive population.

Initially, researchers Jacob Mincer, Theodore Schulz, and Gary Becker, introducing this resource name, under the concept of "human capital" was meant a complex of the knowledge, abilities to labor and skills used to do the job and

meet the needs of human and society as a whole. That is, the totality of investments in a person was meant, increasing his ability to work, namely, education and professional skills [7, 8]. Further research have added here consumer spending per family: food, clothing, housing, education, upbringing, healthcare, culture and government spending for the same purpose.

Thus, according to the interpretations of Western scientists, "human capital" is labor resources with a high level of quality in education, parenting and culture, as certain amounts have already been invested in the development of the human labor force. That is, there is, to some extent, a cost estimate of a person's ability to work, and human capital is the cost equivalent of the human abilities invested in him.

With the continuation of labor activity, based on the continuously ongoing development of science, and, consequently, productions, there is an increase in qualifications and knowledge, and, consequently, an increase in further expenses per person at a high level. The level of development of education, science, production technologies, and the economics has reached a high level, as well as efficiency and productivity of human labor have reached a high level. Human has become the most important resource of society.

The labor resources include the working-age population. Labor resources include both employed and unemployed in economics working-age population.

Awareness of a person began to be at the center of the development in society and economics, led to the fact that, starting in the middle of the 20th century, human capital management began to develop as a new scientific and technical direction.

Human is considered as the most important resource of society. As much as possible of his abilities can be realized if motives and needs are in harmony with his abilities. Human resources are now considered as the main assets of direct production, play a more important role in the development of the economics than material resources, because they have economic usefulness and social value.

A new outlook on labor force is approved, as one of the key resources of the economics, reflecting a real increase in the role and quality of the human factor in production, strengthening the dependence of production on the quality of education, parenting, motivation and the nature of the use of work force.

This is expressed in increasing requirements to workforce and in increasing expenses for the preparation and development of human resources from the state, family and business.

Researches of human capital under the United Nations (UN) organization development program determined the share of human capital in the national wealth of different countries, compared with the share of natural wealth (Table 1) [9, 10].

The share of human capital in the national wealth of countries is: not less than 50 % except for countries of "The Organization of the Petroleum Exporting Countries (OPEC)" – 47 % where such a ratio is objective; not less than the share of natural and reproducible capital taken together (for all countries except OPEC) where the minimum ratio of shares is 1:1 for the Russian Federation (RF) and the "Commonwealth of Independent States (CIS)" countries and the maximum is 2:7 for "The Group of Seven (G7)" and European Union (EU) countries.

Table 1 – National wealth of the world at the beginning of the 21th century

Countries	National wealth		Including types of capital		
	total, trillions of dollars	per capita, thousands of dollars	human capital	natural capital	reproducible capital
The countries of the G7 and EU	275	360	215	10	50
OPEC countries	95	195	54	35	15
CIS countries	80	275	40	30	10
RF	60	400	30	24	6
Other countries	100	30	65	15	20
Total in the world	550	90	365	90	95

The share of human capital is determined by human capital used in the production of various kinds of goods. If we consider it from the position of the enterprise, then the results of the enterprise's activity depend on the value of the specific qualification potential of employees (K_p), which is determined by the number of workers with different levels in education, that is, by the value of the impact of education, duration of training, advanced training and work experience [11]:

$$K_p = \sum_{i=1}^{m} N_i t_i + N_V \cdot 15 + N_S \cdot 12 + \\ + 0,25 \cdot \sum_{j=1}^{n} N_j t_j + \frac{1}{2,6} \sum_{k=1}^{p} N_k t_k. \quad (1)$$

In this formula: N_i is the number of workers with i class of education; t_i is the number of years on study in high school; N_v is the number of workers with higher education; N_s is the number of workers with secondary special education; N_j is the number of workers who attended continuing education courses; t_j is the duration of continuing education courses; N_k is the number of workers with k work experience; t_k is the work experience, years.

In relation to our conditions, a coefficient of 2.6 was obtained by academician S.G. Strumilin, who established that the level of knowledge for the year at school is increased by 2.6 times compared with the year of work at the enterprise.

Enterprises (firms), as well as the country's economics, benefit from a high level of human capital, but this must be achieved by improving education and the qualification level of personnel. Office expenses of American companies are increasing. According to forecasts, the duration of training is increasing the same.

The term "human capital" is used primarily by Western scientists. We believe that, in connection with the development of the economics, it is time for domestic scientists to use it more widely. "Human capital" is the main factor in the formation of the "Knowledge Economics" society.

The greatest contribution to the formation of human capital is made by education with a high level of fundamentality, but culture, healthcare (health), and parenting cannot be discounted (Fig. 3).

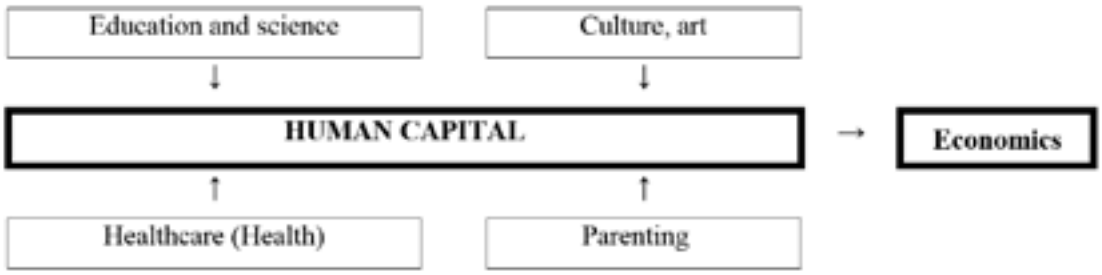

Fig. 3 – Components of human capital

Education is the main factor in the preparation and formation of "human capital". For Ukraine, education, in addition, plays one of critical roles.

As was shown in works [12, 13], for the countries of Eastern Europe, with their negative climatic conditions, and Ukraine refers to this class of countries, education is also the most important factor in blocking and mitigating the negative manifestations of natural and climatic conditions. For countries of Eastern Europe, with negative natural and climatic conditions of the natural environment, education must be attributed to the most important strategic industries, maybe equally important in significance as the country's defense industry.

We give an interesting example.

At the entrance to the university "Universiteit Stellenbosch (US)" in the Republic of South Africa (RSA) there is a panel with next content: "The destruction of any nation does not require atomic bombs and the use of long-range missiles. It only requires a decrease in the level of education. Patients die by hand of doctors who have received such a defective education; buildings are destroyed by hand of such the engineers who built these buildings; money is lost by hand of such economists and accountants; justice is lost by hand of the lawyers and judges who have received this education. The collapse of education is the collapse of the nation".

As an economic category, "human capital" was formed gradually, during a long time interval, and at first included such components as parenting, education, knowledge and health, which then referred to unproductive expenses. And only in the 20th century, thanks to the development of the economies of the countries and the achievements of nations, did the attitude to human capital change: investments in education and science began to provide the sharp, intensive development of those countries that went for it.

As an example, we remember Japan and the Russian-Japanese war of 1904-1905, which Russia lost, and experts determined that the main reason for the defeat was the low level of education. In this period, the average number of years for education of adult population in Japan was 5.4 years, in the United States of America (US) – 8.3 years, and average life expectancy – 51 years. In Russia, these indicators were like that 1–1.2 year and 33–35 years. Japan was ready to make a spurt in the 20th century and become one of the leading countries in the world [14].

South Korea is going through a similar condition now, and we will give such examples as achievements: a country with a population of less than 40 million people takes 5–6 places at the Olympiads, produces cars and ships of world class.

This was very well emphasized by Margaret Hilda Thatcher, the former Prime Minister of The United Kingdom of Great Britain and Northern Ireland (UK): "The country's wealth is not necessarily built on its own natural resources; it can be achieved even if they are totally absent. The most important resource is a person. The state only needs to create the basis for the heyday of people's talent".

Given examples emphasize that larger success achieve countries which have good education systems and the population of which has a high level of education, good health, optimism and happiness, high competitiveness, high level professionalism in most types of professional and economic activities, countries which are highly competitive in education, science, culture, and management. The population of such countries can be attributed to the category of the high human capital level.

The same countries, in the presence of a quality education, are able to form and grow a certain part of the population, called the elite. It is thanks to the elite that there can be progress in the sciences, art, industry, in all branches of civilization, the formation of social solidarity. And the representatives of the elite must show examples of this solidarity. In Japan after The Second World War, in the United States of America (USA) during the period of overcoming the World Crisis, the leaders of many enterprises and firms set their wages at the level of ordinary workers as a sign of social solidarity. If a simple worker bears the brunt while the political and business elite show a craving for a luxurious life, one cannot hope for improvement.

As the researcher of ethnic processes Lev Gumilyov noted, "when a super ethnos (or civilization in another terminology) as a social holistic system, going through the stages of birth, growth, rise and takeoff, enters a phase of decline, then instead of creators passionaries, that is, the elite of society, subpassionaries enter the arena [15]. Then the states and civilizations die.

Let`s note some more characteristic features of human capital.

Human capital means attachments, investments not only in a person, but also in an environment for the convenience of functioning and increasing the competitiveness of human capital, in the life safety. Convenience of functioning is provided by investment in hospitals, doctors, schools, theaters, in various tools of intellectual work.

The concept of "human capital" includes: acquired stock of knowledge, abilities, skills; the possibility of appropriate use of this stock in one or another field of activity what promotes growth of labor productivity and production; an increase in income that promotes employee interest leads to further investment in human capital; motivation.

All of the above can lead to the formation of a post-industrial economy with high labor productivity, good quality of life, the formation of moral foundations, and the triumph of laws.

The center for the preparation and formation of human capital is the higher education system, which through its units Higher Education Institutions prepares these personnel.

Consequently, the quality of training of graduated specialists depends, first of all, on the Higher Education Institution. Improvement and development of Higher Education Institutions, equipping them with advanced technical equipment and technologies, leads to an improvement in the quality of human capital, and the last – to the development of the economics, growth of Gross Domestic Product (GDP).

Both western and domestic scientists evaluate domestic labor resources (human capital) by the level of training below the western level [1-3].

This is primarily due to the decrease in the quality of higher education and the level of fundamental in education. This is especially true for engineering and technical specialties, where training is now often carried out on old (until the 1990s) technical laboratory equipment.

Secondly, the study load in the disciplines of mathematical and physical areas has been sharply reduced. Unfortunately, in Ukraine there are universities in which only one semester is allocated for the study of higher mathematics and physics.

Therefore, improving the quality of "human capital" must begin to increase in the Higher Education Institution by improving the methods of training, parenting and control, equipping with advanced technologies.

The decrease in the quality of training can also be explained by the fact that in Ukraine there are practically no machine-building enterprises now, specialists in these areas are not claimed, recruits for these specialties at Higher Education Institutions are often only 2-3 people. There is no motivation.

The concept that capital is made up only from physical assets is undermined, the concept that capital is any asset, physical or human, which has the ability to generate a stream of future income [1, 2, 3] is approved.

The defining features of human capital [1, 6]: is the main value of modern society and a fundamental factor in economic growth; the formation of human capital requires significant costs both from the individual himself and from society as a whole; human capital can accumulate; throughout life, it not only acquires knowledge, but also wears out, and, with the obsolescence of individual knowledge, the value of human capital changes; investments in human capital give a higher income, have a quite long period; differs from physical capital by degree of liquidity, is inseparable from its carrier – a living human person; direct income received by a person is controlled by him, regardless of the source of investment; the degree of return on the use of human capital depends on the individual interests of a person, his material and moral interest, worldviews, level of culture.

Thus, human capital is the stock of knowledge, health, skills, experience that a person has and uses to generate income.

The role of human capital in the development on the society of the future is predicted due to the growth of the role, level and quality of education. Without raising the level and quality of education, there can be no growth in human capital. Education is increasingly moving to the role of the main factor in the country's development. In the countries of Eastern Europe, education is turning into the strategic sector of the country; at the state level, it is necessary to make effective large-scale investments in education, science, parenting, culture, and art. Without education, a country cannot have a future. To stay afloat and at the advanced level, the state, companies and enterprises need to provide a high level of their citizens, workers, because new industries, new technologies are becoming more and more high-tech, they need high-level new special knowledge and skills. The gap between highly skilled and all other workers and specialists is growing rapidly, so self-improvement and individual improvement in their level of education is the most important condition for human well-being and improvement of society and the economics in the future. All of the above is especially relevant for the countries of Eastern Europe, for Ukraine, as a country with negative natural and climatic conditions.

With the development of science and technical equipment, there is a constant acceleration in the emergence of new and updates of existing knowledge, methods, models of technical equipment and technologies that are beginning to be used in the daily life of a person and society. A person (employee) must keep track of all this in order to use all these new items in timely. Therefore, even after receiving an excellent education in a beautiful elite university, it is necessary to monitor the level of development on education and science in order to "not fall behind". This just fits into the concept of "lifelong education". And it should be a continuation of the concept of obtaining the first higher education at a university and consistent with the system of first higher education.

This explains that, in connection with the use of the concept on human capital, it became expedient to develop the Investors in People standard [16], established in 1991 on the initiative of the UK government, which was worried about the decline in labor productivity at the end of the 1980s. To eliminate this, it was proposed to develop a standard – a system that would take into account and combine into a single whole the interests of wage-earners and employers with the requirements of the country's economics [16].

The Investors in People standard, streamlining personnel management processes, takes into account the nuances of interaction between staff and employers in a multi-aspect and comprehensive manner, including as key issues related to the system of motivation, training, assessment and remuneration [16].

A system based on the application of the Investors in People standard, in which all key aspects of investing in people are de facto standardized, is rightly considered a good human-centered system for business improvement [16].

Since 1993, certification in accordance with the Investors in People standard has been carried out by the public organization "Investors in People". After receiving a certificate of compliance with the Investors in People standard, which is valid for three years, organizations and enterprises must systematically undergo verification of compliance with the requirements of this standard [16-21].

The Investors in People standard is applied in seventy countries, while the number of holders of a certificate of compliance with this standard is more than forty thousand (in particular, more than thirty percent of UK residents are employees of organizations and enterprises that have been certified by Investors in People) [16-21].

The Investors in People standard is based on the following fundamental principles [16-21]: a) obligations (organizations and enterprises, striving for a positive result of certification and obtaining a certificate, are obliged to carry out the development of their employees, respect and take into account their opinions and points of view in the decision-making process, provide them opportunities for further career development); b) planning (companies must have clear business plans that are transparent and unambiguous for each employee to understand); c) action (firms should not only in theory, but in practice stick to the principle that employers and workers are a single whole in achieving common goals and obtaining planned results, and also be truly interested in the development of people who work for them); d) assessment (research of the potentially, planning of expected, obtaining and analysis of real results of training people, as well as mutual coordination of employee development programs and company goals).

Investing in people can be considered as the most effective resource in business development.

It is extremely important for a person to feel successful, as well as to perceive recognition and high appreciation of his work by other people.

In order to be characterized by performance and competitiveness, to respond in a timely manner to changes and challenges caused by phenomena and events taking place in the world, a company needs to systematically and consistently develop and train employees, improve their knowledge and skills, develop new skills and provide them with opportunities to succeed.

In the initial version, the Investors in People standard were a rather bulky system based on a large number of principles and indicators, was required the introduction of many documents and the performance of a large number of works with them [16-21]. Employers considered the factor of the abundance of "paper" work as such, which makes the implementation of the Investors in People standard difficult, and therefore this standard has been repeatedly improved. As a result, in 2005, the developers of the Investors in People standard proposed its new lightweight version, mainly focused on the business sphere.

The Investors in People quality standard, as an addition and development of generally accepted international quality systems in the field of creating effective management systems for organizational structures (such as ISO 9000), can equally serve as the basis for creating new ISO series standards or act as a separate independent standard. The application of this standard leads to increased mutual understanding and harmonization of relations between wage-earners and employers, what causes an increase in labor productivity, profits and people's satisfaction with their work.

The leaderships of Ukrainian enterprises and organizations are becoming increasingly adhered to such an opinion that increasing the efficiency of activities in conditions of intensive development requires reinforced attention to structuring processes, describing functions and streamlining the areas of responsibility of workers. By introducing advanced technologies and management standards, one can achieve a significant improvement in organizational structures and increase their effectiveness.

The Investors in People standard aims to comprehensively improve the business as a holistic system based on the construction of an appropriate management strategy, which includes setting strong emphasis on the active and comprehensive involvement of employees in decision-making, very careful formation and formulation of goals and objectives, and a social orientation factor [16-21].

The Investors in People standard assumes the development of business strategies for organizations and enterprises based on the application of new politics and philosophy of people management. The main concept of the philosophy on employee ownership in the general goals of the company is that employees not only do not get scared of changes, but also initiate them, are aimed at further development and prosperity of the business.

As a whole, and at any preparatory stage of the certification process regarding compliance with the Investors in People standard, companies do not need to carry out large volumes of work and submit ambitious but formal business plans.

An employer must have a realistic business plan that has the property of high transparency: both managers at different levels of the hierarchy and executing workers must clearly and unequivocally understand the ideas of this plan, their tasks in its implementation, as well as the principles of building for internal communications [16-21]. Only in this case can we say that the company management has organized a good management system and adjusted the required information flows.

If employees understand what they need to do and know the ultimate goals that they need to achieve, then their chosen path to success will be more effective, and the amount of unproductive costs will be reduced. Thanks to the introduction of the Investors in People standard, the thinking style of managers changes in the direction from intuitive approaches to systemic, targeted mental activity.

Those organizations and enterprises that in practice show their attitude to employees as the most valuable capital acquire huge reserves for further development.

In the last period of time and in many countries of the world, actively used terminology, denoting the concepts of "cadres" and "human resources", is changing – they are replaced by such more delicate and tactful words as "people", "employees", "workers", "staff". Thus, it is more advisable to talk about the standard for the development of people, not human resources. The documentation that describes the relationship between companies and people should also contain the correct wording. In particular, the term "continuity policy", is used in the Investors in People standard, replacing the habitual concept of "personnel reserve" [16-21].

The uniqueness of the Investors in People standard is that it focuses on people.

The main idea of the standard is the development of working people, regardless of which direction of the business they carry out their labor activities, both it be a small company or a large enterprise, in order to achieve specific positive results.

The Investors in People standard regulates and streamlines personnel management processes, ensures their transparency and understandability for people, comprehensively and in the complex takes into account issues related to wage-earners, affecting systems of their motivation, training and advanced training, performance assessment and professional level, salary.

The mandatory requirements of the Investors in People standard include the fact that the company's management is obliged to provide all its employees with equal opportunities for professional development, career growth and further development of potential [16-21].

As an illustrative example on the implementation of the Investors in People standard, it should be noted that in the UK, employees, as a rule, do not quit companies certified in accordance with the Investors in People standard. The minimum staff turnover is explained by the fact that one of the fundamental principles of these companies is the duty of the head towards the staff (each employee and the team as a whole) to carry out their development and advanced training. The Investors in People standard, having a humanistic basis, directs managers and executives to systematic, continuous development, raising the qualification level, and obtaining a highly developed corporate culture [16-21]. Ultimately, all this forms the elite of society.

This standard has become known in Ukraine. Successful national companies, in which a regular management system has been debugged and personnel management processes built up, declare their readiness for certification on compliance with the requirements of the Investors in People standard.

This standard will help many domestic companies to improve the management system, make it more efficient, and, therefore, increase the efficiency for the entire economics of the country.

Turning to further issues to be considered in this research it is important to emphasize attention once again on the fact that a higher level of negative natural and climatic conditions in the countries of Eastern Europe leads to complication and appreciation in conditions

for living and employment of the population in these countries.

The corresponding negative impact is carrying out on all spheres of human activity, in particular, on the conditions of training.

Successful assimilation of knowledge and skills becomes more complex, slow and resource intensive process.

There is a need to invest more varied support, funds, time and intellectual efforts to achieve the desired level for intensity and effectiveness of the training.

Appropriate task is staging a major focus on modern and innovative computerized information systems and technologies of training [22-24].

It is extremely important turns out to be much more careful preliminary planning on suggested components of the environment and ensuring effective control for the processes of computer-based training.

The objective of that planning is cost optimization of financial, hardware, software, organizational, intellectual, time, and other resources.

The main problem is that at this time has accumulated and continues to increase numerically a sufficient large amount of tools (technical tools, approaches, tricks, ways, techniques, concepts, methods etc.) with a wide spectrum of applied focus, which can provide support for information systems and technologies of computer-based training [22-24].

Particularly expressive is getting the relevance of specified problem, given the numerous model series of equipment for technical support, which is constantly evolving.

Even greater is the number of possible ways to combine the components of the specified tools with a view to their integration into a holistic system and one unified effective control of them.

Therefore, the problem arises of multi-criteria selection in that tools and approaches to their integration that would be optimal to perform specific practical tasks under the certain conditions and under compliance with the certain requirements.

An important basis for solving this problem is to provide proper opportunities on orientation in the lists of components for the existing instrumentation.

First of all, we are talking about the possibility of familiarization with the names of varieties of the components for the tools (classes, types, model series, specific models, etc.) and their manufacturing companies in a single environment.

Then we are talking about opportunities on single access to brief descriptions of the characteristics, the predominant areas of use, target users categories, ways for integration and methods for control of the toolkit components.

Accordingly, there is a need to create and maintain databases of lists on the toolkit components.

Within the specified system, active monitoring of new elements of lists (primarily, based on information from the websites of manufacturing companies), as well as the prompt formation and correction of lists (updating, systematization, restructuring, etc.) is relevant.

It is necessary to develop appropriate structures of databases and knowledge bases, build models of intelligent software Internet agents to monitor and select information, and apply technologies in expert systems of artificial intelligence.

Consider the more global scale of the problem in expanding the range of opportunities for optimizing computerized information systems and training technologies based on providing reinforced awareness of their appropriate organization and functioning.

In this view, it is relevant to develop the structure and content of information models (prototypes and implementations) that integrate into a single logical unit the matrices of characteristics (names, values, short and extended interpretations and descriptions of parameters) for all relevant elements and components of the above systems and technologies (objects, phenomena, processes, flows, relationships, etc.).

It is advisable to implement the matrices of characteristics in the format of database tables and spreadsheets with a common block of user interface and control.

The structure and content of the prototype information model has been developed (Fig. 4), which relates to the following aspects of the consideration: environment (external environments and interaction with them); features of the internal organization and life cycle (in the format of descriptions, comments, conditions, requirements, assumptions, restrictions, etc.); conditions and levels of support (hardware, software, mathematical, informational, organizational); resources – material (funds, technical equipment, expendable materials), human, time.

The matrix of names for the basic types of system and technological structures	The matrix of names for the actual and prospective tasks to achieve set goals	The matrix of names for the existing advanced ways and technologies of activities	The matrix of names for the required current and final results of activities	The matrix of names for the specific circumstances of organization and functioning
The matrix of names for the compound parts of elemental and component base	The matrix of needs in the elemental and component base in the order to perform tasks	The matrix of tools and methods for applying the elemental and component base	The matrix of needs in the elemental and component base to assess the achievements	The matrix of requirements to the compound parts of elemental and component base
The matrix of names for the compound parts of resource support	The matrix of needs in the resource support for assignments	The matrix of elements for the technologies required to resources use	The matrix of needs in the resource support for the purpose of checking results	The matrix of conditions on the compound parts of resource support
The matrix of names for the target categories of users and user's groups	The matrix of needs and capabilities for the users when performing specific tasks	The matrix of user requirement in case of implementing specific technologies	The matrix of user features relevant to achieve the preset results	The matrix of characteristics for the restrictions specific to target categories of users

Fig. 4 – Information model, a prototype on the base complex of the characteristics-reasons for the choice in the compound parts of the computerized information systems and technologies for training

Conclusions. As a result of the analysis, it was proved that "human capital" is the dominant in the stable growth for the economics of countries, and education is the most important component part in the development of human capital. But the education component alone is not enough: in addition to education, parenting, culture, and healthcare (health) are also necessary. If these components exist, then there is a real opportunity to ensure the high quality of human capital, life, conditions for an effective industrial economics, which is transformed into a post-industrial or innovative economics, and guarantees the stable functioning and development of the country.

It is advisable to switch to using the Investors in People standard, in the practice of using which positive results have been shown. The intensification in the processes of introducing into practice the organizations and enterprises of Ukraine of this international standard will be a powerful catalyst for strengthening and developing the economies of countries, attracting foreign investment, expanding existing and developing additional markets, and accelerating European integration.

Improving the education quality as one of the key factors in the formation of human capital with a high level of value in conditions of a more negative natural and climatic environment in countries of Eastern Europe is associated with the need to find ways to intensify the training processes. One of the most effective approaches is to improve modern computerized information systems and technologies of training. In this regard, an information prototype model is proposed, aimed at improving the quality for the selection and integration of compound components for the above systems and technologies, as well as appropriate approaches to its practical implementation. The introduction of this model into the practice of the educational process at the Department of Information Technology (Faculty of Information Technology and Design of the Kherson National Technical University) made it possible to increase its efficiency by 10 percent.

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ЛЮДСЬКИЙ КАПІТАЛ І ЗАДАЧІ РОЗВИТКУ В СВІТЛІ ПІДВИЩЕННЯ ЯКОСТІ ОСВІТИ ТА ВДОСКОНАЛЕННЯ КОМП'ЮТЕРИЗОВАНИХ ІНФОРМАЦІЙНИХ СИСТЕМ І ТЕХНОЛОГІЙ НАВЧАННЯ

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Анотація. Мета статті полягає в системологічному аналізі поняття людського капіталу, а також у виявленні найважливіших факторів формування поняття людського капіталу та його взаємозв'язків із ключовими проблемами соціально-економічного розвитку, в межах вирішення актуальної задачі щодо пошуку шляхів підвищення якості освіти та вдосконалення комп'ютеризованих інформаційних систем і технологій навчання. Методи дослідження. В основу дослідження було покладено концепції й інструментарій теорії системології, інформації, баз даних, інформаційних систем, інформаційних технологій, комп'ютерних систем, технічних засобів навчання. Основні результати дослідження. Виявлено ключові особливості та складові поняття людського капіталу як основи безперервного вдосконалення кожної людської особистості та виробничого колективу, а також суспільства й економіки в цілому, в умовах впливу негативних природно-кліматичних факторів. Виокремлено прогресивні взаємні зв'язки та взаємні впливи, що мають місце в системі взаємно обумовлених понять, представлених наступною термінологію: «людський капітал»; «людина (особистість)»; «працівник (службовець)»; «інвестор»; «розвиток соціально-економічних процесів»; «якість освіти»; «комп'ютеризовані інформаційні системи та технології навчання». Розроблена інформаційна модель-прототип та концепції її практичної реалізації, спрямовані на підвищення якості вибору та інтеграції складових компонентів комп'ютеризованих інформаційних систем та технологій навчання. Наукова новизна. Напрацьовано нові концепції, що виявляють та узагальнюють фактори, що чинять потужну прискорювальну дію на прогресивний розвиток і взаємовплив людського капіталу, соціально-економічних систем, освіти. Створено нову інформаційна модель для раціоналізації компонентного складу комп'ютеризованих інформаційних систем і технологій навчання. Практична значимість. Впровадження запропонованих концепцій та інформаційної моделі до практичної діяльності дозволяє істотно підвищити ефективність комп'ютеризованих інформаційних систем і технологій навчання завдяки їх вдосконаленню за критеріями доцільності й оптимальності вибору складу та технологій інтеграції компонентів.

***Ключові слова*:** *людський капітал, навчання, комп'ютеризація, інформаційні системи, інформаційні технології.*

ЧЕЛОВЕЧЕСКИЙ КАПИТАЛ И ЗАДАЧИ РАЗВИТИЯ В СВЕТЕ ПОВЫШЕНИЯ КАЧЕСТВА ОБРАЗОВАНИЯ И СОВЕРШЕНСТВОВАНИЯ КОМПЬЮТЕРИЗИРОВАННЫХ ИНФОРМАЦИОННЫХ СИСТЕМ И ТЕХНОЛОГИЙ ОБУЧЕНИЯ

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Аннотация. Цель статьи заключается в системологическом анализе понятия человеческого капитала, а также в выявлении важнейших факторов формирования понятия человеческого капитала и его взаимосвязей с ключевыми проблемами социально-экономического развития, в рамках решения актуальной задачи по поиску путей повышения качества образования и совершенствования компьютеризированных информационных систем и технологий обучения. Методы исследования. В основу исследования были положены концепции и инструментарий теории системологии, информации, баз данных, информационных систем, информационных технологий, компьютерных систем, технических средств обучения. Основные результаты исследования. Выявлены ключевые особенности и составляющие понятия человеческого капитала как основы непрерывного совершенствования каждой человеческой личности и производственного коллектива, а также общества и экономики в целом, в условиях влияния негативных природно-климатических факторов. Выделены прогрессивные взаимные связи и взаимные влияния, которые имеют место в системе взаимно обусловленных понятий, представленных следующей терминологией: «человеческий капитал»; «человек (личность)»; «работник (служащий)»; «инвестор»; «развитие социально-экономических процессов»; «качество образования»; «компьютеризированные информационные системы и технологии обучения». Разработана информационная модель-прототип и концепции ее практической реализации, направленные на повышение качества выбора и интеграции составных компонентов компьютеризированных информационных систем и технологий обучения. Научная новизна. Наработаны новые концепции, выявляющие и обобщающие факторы, которые оказывают мощное катализирующее воздействие на прогрессивное развитие и взаимовлияние человеческого капитала, социально-экономических систем, образования. Создана новая информационная модель для рационализации компонентного состава компьютеризированных информационных систем и технологий обучения. Практическая значимость. Внедрение предлагаемых концепций и информационной модели в практическую деятельность позволяет существенно повысить эффективность компьютеризированных информационных систем и технологий обучения благодаря их совершенствованию по критериям целесообразности и оптимальности выбора состава и технологий интеграции компонентов.

***Ключевые слова*:** *человеческий капитал, обучение, компьютеризация, информационные системы, информационные технологии.*

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