



## PATTERNS OF HUMAN CAPITAL FORMATION

*Aliaksandr Hrydziushka*

Belarussian State Agricultural Academy  
ORCID: <https://orcid.org/0000-0002-7825-169X>  
e-mail: [angridyushko@yandex.by](mailto:angridyushko@yandex.by)

*Andrei Hrybau*

Grodno State Agrarian University  
ORCID: <https://orcid.org/0000-0001-6459-5806>  
e-mail: [mr.andrey.gribov@yandex.ru](mailto:mr.andrey.gribov@yandex.ru)

*Vasili Kulakou*

Jan Kochanowski University of Kielce, NAWA  
ORCID: <https://orcid.org/0000-0003-1513-5170>  
e-mail: [vasili-kulakov@yandex.ru](mailto:vasili-kulakov@yandex.ru)

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### Abstract

The main goal of the article is to identify the basic patterns of the formation of human capital (HC). An especially valuable and scarce resource of the modern economy is becoming a creative skilled worker capable of generating ideas, as well as creating and implementing new technological solutions and products.

The development of the economy leads to significant transformations in the generation of resource potential, and changes in the role of individual resources. Human capital begins to play a dominant role in the resource hierarchy. It is the HC that sets in motion the production processes and determines the efficiency of using the entire resource potential.

The methods of aspect analysis and of apperception used in this study made it possible to identify modern patterns peculiar to the formation of human capital in the economy, and to emphasize its objective importance and ability to significantly influence the development of society.

During the research, the authors proved that human capital acquires the status of the main resource in the economy, the quantitative characteristics of the workforce capacity give way to the role of qualitative characteristics, and the development of STP requires a new employee formation to dominate the intellectual component.

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**WZORY TWORZENIA KAPITAŁU LUDZKIEGO***Aliaksandr Hrydziushka*

Białoruska Państwowa Akademia Rolnicza

*Andrei Hrybau*

Grodzieński Państwowy Uniwersytet Rolniczy

*Vasili Kulakou*

Uniwersytet Jana Kochanowskiego w Kielcach, NAWA

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Słowa kluczowe: kapitał ludzki, potencjał zasobowy, nauka, edukacja, rozwój gospodarczy, inwestycje, rynek pracy.

**Abstrakt**

Głównym celem artykułu jest identyfikacja podstawowych wzorców kształtowania się kapitału ludzkiego. Szczególnie cennym i rzadkim zasobem współczesnej gospodarki staje się twórca, wykwalifikowany pracownik, zdolny do generowania pomysłów, tworzenia i wdrażania nowych rozwiązań technologicznych i produktów.

Rozwój gospodarki prowadzi do znaczących przeobrażeń w generowaniu potencjału zasobowego, zmian roli poszczególnych zasobów. Dominującą rolę w hierarchii zasobów zaczyna odgrywać kapitał ludzki, który uruchamia procesy reprodukcji i w największym stopniu decyduje o efektywności wykorzystania potencjału zasobów.

Zastosowane w badaniu metody analizy aspektowej i apercpekcji pozwoliły na zidentyfikowanie nowoczesnych wzorców charakterystycznych w kształtowaniu się kapitału ludzkiego w gospodarce oraz podkreślenie jego obiektywnego znaczenia i zdolności do istotnego wpływania na rozwój społeczeństwa.

W trakcie badań autorzy wykazali, że kapitał ludzki zyskuje status głównego zasobu w gospodarce, ilościowe charakterystyki zdolności siły roboczej ustępują roli jakościowych, rozwój STP wymaga pracowników nowej formacji z przewagą składnika intelektualnego.

**Introduction**

In an industrial type of economy, the main elements of the resource potential are material and financial resources. Primarily these are long-term assets, such as buildings and structures, machinery and equipment, etc. For this reason, investments in long-term assets have served as the basis for increasing the resource potential, but subsequently their growth has slowed and their volumes have decreased. The industrial development of the economy exhausts itself as there are objective limits (obsolescence, depreciation, diminishing of soil fertility etc.) to the use of the potential of material resources. These resources are limited and rare, but human capital continues to grow, primarily by means of new knowledge.

The essence of the transformation of the processes of resource potential generation in the modern economy lies in the fact that land and capital only create conditions for the implementation of economic activity. Economic development becomes possible as a result of the formation and effective use of human capital, which determines the appropriate directions of economic activity, forms the structure of the resource potential and ensures its rational use.

The goal of this research was to identify the main patterns of human potential formation. As a result of the research, the following patterns of human capital formation were revealed:

- significant enhancement of the role of human capital in the structure of resource potential;
- the structure of the labor market is changing: the share of executive and reproductive labor activity is decreasing and the share of intellectual and innovative labor activity is increasing;
- scientific and technical progress requires improving the quality of professional training of employees, accumulating the educational potential of the workforce;
- the processes of human capital formation require increased investment in the systematic development of scientific knowledge, and in both fundamental and applied research.

## **Analysis and interpretation of results**

### **Pattern 1. The role of human capital in the structure of resource potential is significantly increasing**

Changes in the types of economic development of society lead to significant transformations in the structure of resource potential and changes in the value of individual resources. Human capital begins to play a leading role in the resource hierarchy.

Human capital is a complex multifaceted economic category. The analysis of the research has made it possible to identify the structural elements of human capital inherent in an individual (Konstantinov, 2003; Lutokhina, 2008; Vankevich, 2000):

- natural and biological potential (age, state of health, mental endowments, performance level);
- educational potential (educational background, skill level, knowledge of foreign languages, propensity to self-education and self-development);
- sociocultural potential (focus and degree of work motivation, culture of relationships with colleagues, cooperativeness, social and industrial adaptability, ability to cope with stress, specific traits of mentality, professional and geographic mobility);

- moral and ethical potential (responsible attitude to work, degree of discipline, sense of justice, honesty and integrity, moral values, insistence and selflessness);
- creative potential (observancy, analytical abilities, independence of judgment, critical thinking, intellectual curiosity, ability to hypothesize, striving for innovation).

In recent years, among the factors that characterize the labor potential of the population, the national mentality has been emphasized, in particular since the labor mentality reflects the results of the socio-economic, cultural and spiritual development of the people and the country. This also involves the national and religious traditions of the population of a particular country in the field of labor. In this regard, the labor mentality is an important factor in the formation and development of labor potential and its quality (Pashkevich & Lyovkina, 2020).

The generation of human capital, like the accumulation of traditional capital, requires the diversion of funds from current consumption in order to obtain additional income in the future. The most important types of investments in HC include expenses for childbirth and childcare, education, training at work, migration, and acquiring information (Chuiko, 2007).

In a contemporary society, the person, as a bearer of human capital, cannot be an object of market purchase and sale. As a result, the labor market only sets prices for the “rent” of human capital (in the form of wages). Human capital is capable of functioning in both market and non-market sectors, and income from it can take both monetary and non-monetary forms.

However, it should be clarified that there are only a few idea generators, individuals who have the makings of leadership and talent, and are able to organize teams for success. The process of training highly qualified personnel is long and costly. It is easier to lure ready-made talent from countries and regions that do not have adequate employment opportunities, support and employee retention (Gusakov, 2018).

In the industrial economy, the main element of the resource potential is primarily long-term assets. The basis for increasing the resource potential is investment in this type of asset. The development of the economy at this stage is exhausting itself due to the restrictions on the use of the potential of material resources.

The formation of a new post-industrial type of economy was marked by the information revolution of the late twentieth century. This has led to the widespread use of information technology in the real sector. It has been calculated that the dissemination of information using Internet resources is 720 times faster and 330 times cheaper than by the typical postal and telegraph method (Lutokhina, 2008, p. 24).

The essence of the transformation of the processes of resource potential generation in the modern economy is that land and capital only create conditions for the implementation of economic activity. Social and economic development occurs due to the formation and effective use of HC, which determines

the appropriate directions of economic activity, forms the structure of the resource potential and ensures its rational use.

Human capital is reproduced on the basis of the development of science and education in order to produce certain types of goods and services, generate income, improve living standards, and solve the problem of uneven development of industries and regions.

Under modern conditions, human capital as the main resource for creating economic goods is understood as the power of a thoughtful and creative mind, the amount of knowledge, information, experience, qualifications and number of employees.

The basis of human capital is the intellectual constituent. The increasing role and importance of the intellectual component is determined by the following circumstances:

- widespread implementation of knowledge intensive and information technologies in economic processes, which requires expanding the boundaries and deepening the knowledge and skills acquired in the educational process;
- predominance of the importance of qualitative characteristics of the staff over quantitative attributes, which is reflected in the priority of building up mental and creative abilities that require education and initiative;
- transformation of the educational process from the assimilation and memorization of existing knowledge to a deep analysis with creative solutions with regards to socio-economic problems.

The traditional formula of the production function includes three production resources:

$$Q = f(K, L, N) \quad (1)$$

where:

- $K$  – capital,
- $L$  – labor,
- $N$  – land.

In the industrial economy, about 90% of its results were determined by the factors “capital” and “labor”. In modern conditions, in this formula, intellectual capital ( $IK$ ) should be put in the first place as a factor that creates knowledge and information, and determines the efficiency of using the resource potential. Afterwards, the formula for the production function in the post-industrial economy takes the form:

$$Q = f(IK, K, L, N) \quad (2)$$

According to American economists, in the second half of the 1990s new knowledge and information generated 75% of the industrial value added to the US economy (Lutokhina, 2008, p. 26). Consequently, in the modern economy, the efficiency of resource potential employment is determined by the level of development of human and, above all, intellectual capital.

Currently, it is not usually the products that ensure the success of the commodity producer, but the processes and technologies for creating these goods that provide the best conditions for the creation and use of resource potential.

In view of this, the world economy is undergoing a transition from its industrial type to a new post-industrial or scientific-informational form. Intellectual labor and innovation are changing the structure of resource potential. Traditional capital (buildings, machines, financial resources, etc.) is giving way to a new form – human capital.

The formation and effective use of resource potential relies on knowledge. Bulk production is ceasing to be the primary source of wealth. The new primary sources of wealth are the industries that produce new knowledge: science, education, and culture. Therefore, the concept of capital, inherent in the industrial paradigm, acquires a new meaning. Human capital, introduced by neoclassical economic theory, comes to the fore. The main elements of HC are competence, qualifications, and the ability to use knowledge and skills. The main factor of economic development is not knowledge itself, but the way in which it is used (Vorobieva, 2008, p. 37; Coleman, 2001; Radaev, 2002; Solodovnikov, 2009, p. 33).

### **Pattern 2. The structure of the labor market is changing: the share of executive and reproductive labor activity is decreasing and the share of intellectual and innovative labor activity is increasing**

The widespread use of knowledge-intensive and information technologies in production changes the qualification requirements for an employee. The qualitative characteristics of personnel come to the fore in comparison to quantitative attributes due to the intellectual component, which requires a high level of education and ongoing professional development.

According to the calculations of American economists, the share of people working with information in the United States from 1990 to 2000 increased from 17% to 59%, and the share of people working with raw materials decreased from 83% to 41%. In the labor market, there is a cheapening of physical labor and an increase in the cost of intellectual labor. Since the 1970s, education wage surcharges have become widespread. Experts have calculated that each additional year of worker-related education gives an increase in labor productivity by 2-3% (Lutokhina, 2008, p. 30, 31). The implementation of additional payments for education has changed the labor market and the educational system. In order to increase the chances of finding a job and to get a higher salary, people tend to rely on education. Recruiting firms have been developed. They have taken on the function of selecting highly qualified specialists for employers, including those from other countries.

The processes of development in the post-industrial economy has caused deep shifts in the structure of the resource potential. They are set in motion primarily

by changes in the needs of people, the goals of their activities, and the economic and technological basis of society. Fundamental in this context is a paradigm shift in growth priorities, which is that the production of tangible goods is increasing at a slower rate than the production of intangible services. Thus, it can be argued that there has recently been “a cardinal shift towards the production of intangible services and information, with a relative reduction in material production; a transformation of scientific knowledge into a direct production resource, which underlies all significant social innovations; a sharp increase in the importance of professions related to the use of knowledge” (Katsuk, 2004).

Previously, agriculture was one of the main industries in terms of the number of labor resources. Its intensification has led to the fact that the number of people employed in the agricultural sector in developed countries is 1-3% of the total number of employed. According to experts, in the near future the share of people employed in industry will also significantly decrease and will drop to 15% (Chuiko, 2007).

Analysis of the above information allows us to conclude that at present there is a significant reduction in employment in the branches of material production. This is because the level of technology and labor efficiency in the sphere of material production allows a rapid increase in the volume of labor efficiency and allows the creation of a product necessary for consumption by the entire society (Bazyleva, 2006).

Some authors (Makovskaya, 2020) have analyzed modern Belarusian institutions that form the conditions for the behavior of participants in the Belarusian labor market; presented the characteristics of the peculiarities of the functioning of the Belarusian labor sphere through the mechanisms of job search and the spread of employment channels; have studied low-paid employment and the formation of the institution of reserved wages and social risks. However, it is advisable to supplement these studies by including the classification of the labor market by spheres of labor activity (executive-reproductive and intellectual-innovative), which will emphasize significant structural changes towards an increase in the intellectual component.

### **Pattern 3. Scientific and technical progress (STP) requires improving the quality of professional training of employees, accumulating the educational potential of the workforce**

N.G. Nikitenko notes, the main economic resource of the modern economy is knowledge and information that ensure the development of the potential of a person's personality on the basis of the continuity of education and the growth of its scientific intensity. This resource provides an increase in the quality of labor force and the possibility of long-term growth of the organic structure of production, and, consequently, an increase in its intensification

and efficiency on the basis of STP. In a 1963 report to the President of the United States, a special committee of the Office of Science and Technology noted: “The welfare and defensive capacity of the country is now determined not by raw materials, not by mineral and other natural resources, and not even by capital. Knowledge is increasingly becoming a decisive source of economic growth. A country that does not have an education system, the ability to train highly qualified personnel, inevitably lags behind in engineering and technology” (Nikitenko, 2006, p. 107-110).

According to foreign experts, in modern conditions, there have been noticeable changes in the structure of factors that traditionally determine the competitiveness and position of countries in the world market. In the first instance, this refers to a decrease in the importance of cheap raw materials and cheap labor factors and a strengthening of educational inputs.

Improvement in the quality of the labor force determined 14% of the growth in real national income in the United States, and since the most obvious indicator of the quality of the labor force is the level of education, education itself is one of the sources of economic growth in any society. The difference between the average incomes of people of the same age is 3/5 determined by the level of education, and the rest by personal abilities and other circumstances (Dorofeev, 2006).

Transition to a new economy in the late XX and early XXI centuries has caused significant changes in the education system, especially higher education. Such trends are primarily stipulated by the fact that the rate of knowledge renewal has significantly increased. If in the mid-twentieth century knowledge was updated after 7-10 years, now knowledge is updated every 2 years.

A. Marshall noted that the expediency of spending public and private funds on education should not be measured only by its immediate practical results. Such investments pay off by the fact that it opens up much greater opportunities for the masses of people than they usually can provide for themselves. Education provides many people with an opportunity to develop their potential abilities, and the economic benefit from using one major industrial discovery is quite sufficient to cover the costs of education for an entire city, because one such new idea may provide a very significant increase in production capacity (Marshall, 2008, p. 246).

#### **Pattern 4. The key aspect of a qualitatively new process of resource potential formation is investment in the development of a system of scientific knowledge, in fundamental and applied research**

Scientific knowledge becomes generally accessible and is mastered with much less effort and resources than those that were spent in their production. They can serve the society for a long period of time. Science is a producer of new knowledge as a specific resource. The level of development of countries



is determined not so much by the availability of natural resources, but by the level of scientific and technical potential, and the efficiency of its use. The basis for the formation of resource potential lies in the level of development of science, in the quality of structures of machines and equipment, in the qualifications of the labor force, and in the adaptability of the management system. Hence, the increase in resource potential depends on the degree of development of human capital, which is the ability to invent, namely via science, the ability to turn scientific knowledge into innovation, specifically via technology, and the ability to competently manage resources.

The efficiency of using the resource potential is decisively determined by the pace and scale of development of priority areas of science and technology, the level of training and qualifications of personnel, the degree of progressiveness of the scientific and production labor equipment, and the volume of investments allocated for these purposes.

The following are highlights of the features characteristic of investments in science and education, and in human capital formation:

- investments in the field of education go both to the reproduction of the intellectual and spiritual potential of society, and to the development of creative abilities, professionalism of each individual, specifically the accumulation of human capital;

- investments in education are spent at a certain time, and pay off within several cycles of the production process, until retraining of workers is needed again in connection with the increased demands of the economy. Consequently, these investments take the form of a turnover similar to the turnover of long-term assets;

- a duration of the period during which investments in human capital are transferred to newly manufactured products should be determined by the period of moral aging of the acquired professional knowledge;

- an educational process presupposes the acquisition of a constantly updated system of knowledge by students, which determines the expanded reproduction of human capital.

Science, like any field of human activity, requires funding. However, as V.G. Gusakov notes, there is a fundamental difference between investments in the development of science and the financing of any production branches. In the latter case, there is a redistribution of resources between industries, which is not related to the growth of the economy as a whole and its efficiency. The development of science leads to a qualitative change in the productive forces (Gusakov, 1998). The total volume of goods may increase in the case of growing production capabilities, which depends on the development of science and the degree of its application.

With this in mind, S.A. Konstantinov (2003) reckons that it is advisable for the state to invest budgetary funds not directly in production, but in the

development of science, since it is the essential factor in increasing production capabilities and determines the growth of not only the volume of production, but also its efficiency.

STP is a breaker of the static equilibrium in the economy, and acts as a source of profit. It creates opportunities for improving the quality of products, and can create different types of products with new consumer properties. Industries where the return on capital is higher attract STP. As a result, there is a redistribution of production resources, and the structure of social production changes.

Scientific and technological progress counteracts the law of diminishing returns, and weakens the dependence of production on the natural factor. The use of new means of production with higher productivity leads to an increase in the volume of production per unit of additional capital spent. The creation of new varieties of plants, animal breeds, and the use of new technology makes it possible to obtain higher agricultural yields and produce animals under natural conditions that were previously considered unfavorable. The use of more productive equipment makes it possible to perform the necessary technological operations in the shortest possible time, which reduces the dependence of agriculture on adverse weather conditions (Konstantinov, 2003, p. 48, 49).

The output of competitive products is ensured through the practical application of the achievements of scientific and technological progress, specifically the innovation activities of human capital.

## **Conclusion**

The conducted research allows us to conclude that human capital has acquired the status of the fundamental resource of the economy.

In the modern economy, the processes of the formation of resource potential are being transformed. Land and capital are the basic conditions for economic activity. Progressive socio-economic development is possible with the generation and effective use of human capital, which determines the appropriate directions of economic activity, forms the structure of the resource potential and ensures its rational use.

In business processes, knowledge-intensive and information technologies are widely used, which increases the qualification requirements for an employee. The qualitative characteristics of the staff come to the fore in comparison with the number of employees due to the intellectual component, which requires a high level of education and regular professional development.

The fundamental difference between investments in the development of science and financing of any production facilities is that they lead to qualitative changes in the productive forces and, above all, to the growth of human capital, as the basis for building up and efficiently using the resource potential of the economy.

On the basis of the studied material, the authors have identified the main patterns of the formation of human capital in the economy:

- there is a significant enhancement of the role of human capital in the structure of resource potential;
- the structure of the labor market is changing: the share of executive and reproductive labor activity is decreasing and the share of intellectual and innovative labor activity is increasing;
- objective requirements for the quality of the labor force imposed by scientific and technological progress are practically embodied by improving the quality of professional training of workers, and accumulating the educational potential of the labor force;
- the key aspect of a qualitatively new process of resource potential formation is investment in the development of a system of scientific knowledge, and in fundamental and applied research.

It should also be noted that it is advisable to continue research in this area, taking into account the informatization of certain spheres of the economy, the mental diversity of people in different countries, the increase in human life expectancy and the formation of new value orientations after the COVID-19 pandemic.

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