Z.Gaibnazarova – Tashkent State Technical University,
PhD, Associate Professor

HUMAN CAPITAL AS AN INTENSE FACTOR OF THE DEVELOPMENT OF INDUSTRY AND DRIVER OF INNOVATIVE WAVES

The article discusses the role of human capital in the processes of industrial development of the economy, the correlation of the cycles of development of human capital and cycles of development of the world economy, innovation and their role in the processes of development of the economy and society, technological structures of the industrial economy from the standpoint of the theory and practice of human capital, as well as considered as, human capital is the main factor in the formation of the knowledge economy. Based on the analysis and results, conclusions and recommendations are given on the need to create a comprehensive and systematic concept and strategy for the development of national human capital in Uzbekistan and improve its quality, which should become the core of the new paradigm and development strategy of Uzbekistan. For this, it is necessary to increase in the shortest possible time at least twice the investment in culture, upbringing, education, science, healthcare and public safety. To improve the quality, cost and productivity of the national human capital of Uzbekistan, it is necessary to reduce corruption of the country to international levels and develop a strategy for the development of national human capital, making it the core of general and private documents on the development of the country and regions.

Key words: human capital, national human capital, innovation, intellectual potential, science, education, innovation product, innovator, investment, production, industrial economy, technological structures.

ЧЕЛОВЕЧЕСКИЙ КАПИТАЛ КАК ИНТЕНСИВНЫЙ ФАКТОР РАЗВИТИЯ ПРОМЫШЛЕННОСТИ И ДРАЙВЕР ИННОВАЦИОННЫХ ВОЛН

В статье рассмотрены вопросы о роли человеческого капитала в процессах развития промышленности экономики, корреляция циклов развития человеческого капитала и циклов развития мировой экономики, инновации и их роль в процессах развития экономики и общества, технологические уклады промышленной экономики с позиций теории и практики человеческого капитала, а также рассмотрен человеческий капитал, как главный фактор формирования экономики знаний. Исходя, из анализов и результатов даны выводы и рекомендации по необходимости создания комплексной и системной концепции и стратегии развития национального человеческого капитала в Узбекистане и повышения его качества, которая и должна стать ядром новой парадигмы и стратегии развития Узбекистана.

Ключевые слова: человеческий капитал, национальный человеческий капитал, инновации, интеллектуальный потенциал, наука, образование, инновационный продукт, инноватор, инвестиции, производство, индустриальная экономика, технологические уклады.

ИНСОН КАПИТАЛИ САНОАТ РИВОЖЛАНИШИНИНГ ИНТЕНСИВ ОМИЛИ ВА ИННОВАЦИОН ТЎЛҚИНЛАРНИНГ ҲАРАКАТЛАНТИРУВЧИСИ

Мақолада иқтисодиётнинг саноат ривожланиши жараёнларида инсон капиталининг роли, инсон капитали ривожланишининг цикллари ва жаҳон иқтисодиётининг ривожланиш цикллари, инновациялар ва уларнинг иқтисодиёт ва жамиятни ривожлантириш жараёнларидаги роли, инсон капитали назарияси ва амалиёти нуқтаи назаридан саноат иқтисодиётининг технологик укладлари, шунингдек, инсон капитали билимлар иқтисодиётини шакллантиришнинг асосий омили ҳисобланиши ҳақидаги йўналишлар кўриб чиқилган. Таҳлил ва натижалар асосида Ўзбекистонда миллий инсон капитални ривожлантириш бўйича комплекс ва тизимли концепция ва стратегияни яратиш ҳамда унинг сифатини ошириш зарурлиги, бу эса Ўзбекистоннинг ривожланиш стратегиясининг ядроси бўлиши мумкинлиги, бунинг учун қисқа вақт ичида маданият, таълим, таълим, фан, соғлиқни сақлаш ва жамоат ҳавфсизлигига инвестицияларни камида икки баравар кўпайтириш кераклигини англатади. Ўзбекистон миллий инсон капиталининг сифати, харажати ва унумдорлигини ошириш учун коррупция даражасини халқаро миқёс даражасигача камайтириш ва миллий инсон капиталини ривожлантириш стратегиясини ишлаб чиқиши зарур, бу эса мамлакатни ва минтақаларни ривожлантириш бўйича умумий ва хусусий ҳужжатларнинг ўзагига айлантиришга туртки бўлиши тўғрисида хулоса ва тавсиялар берилган.

Калит сўзлар: инсон капитали, миллий инсон капитали, инновация, интеллектуал салоҳият, илм, таълим, инновацион маҳсулот, инноватор, инвестиция, ишлаб чиқариш, саноат иқтисодиёти, технологик укладлар.

INTRODUCTION

An analysis of the processes shows that human capital and the cycles of its growth and development are the main factors in exciting innovative waves of development and cyclical development of the world economy and society.

Revolutionary changes in the economy and society, major innovations were carried out on the basis of accumulated human capital in each historical period of development of the people, country and civilization.

Human society gradually accumulated knowledge. On their basis, education and science developed. A layer of highly professional scientific, technical, managerial and, as a whole, intellectual elite was formed, under which another breakthrough in the development of mankind took place.

Under the growth of human capital is understood, as usual, an increase in its value, under the development of human capital-an increase in its quality.

Let us draw parallels between the types of economy, technological structures and the level and quality of human capital.

The first industrial revolution (Table 1) and the first technological mode (1770-1830), introduced by Sergei Glazyev on the basis of Kondratyev’s long waves,

coincide in time. This breakthrough in the development of the world economy occurred on the basis of the rapid growth of productive forces and the formation of capitalism. The emergence of machines, technologies, equipment and capitalism itself must, first of all, be determined by the stage of development of human capital and its main components-culture, upbringing, education, knowledge, medicine, economic science, improvement of religions, economic development, social relations and statehood.

Table 1

Periods of Technical Revolution [1]

Elements of technological progress	Periods of greatest concentration qualitative shifts		
	Late 18th - early 19th centuries (first industrial revolution)	The last third of the 19th - the beginning of the 20th century (second industrial Revolution)	Mid 20 century (third industrial revolution-scientific and technological revolution)
Tools and means of labor	The emergence of machine production	Machine coverage of key workers processes mass production of machines	Formation of machine systems, integrated mechanization, automation of production
Motor force and energy	Steam engine	Electricity production, electric motor, internal combustion engine	Electrification of production, nuclear reactor, jet engine
Subjects of labor	Mass production of iron and cast iron	Mass production of steel	Quality metallurgy, mass production aluminum and plastics
Transport	Rail transport on a steam train draft, steamboat	Diesel ships, automobile and aviation transport	Development of transport systems, jet transport and rocketry
Communication and management	Postal communication	Telecommunications (telegraph, telephone)	Radio communication and electronics
Agriculture	The emergence of scientific systems of agriculture, plant and animal breeding	Agricultural mechanization, mineral fertilizers	Complex mechanization and chemicalization, microbiology, the beginning of the regulation of biological processes
Construction and building materials	The dominance of manual labor, brick and wood	The first building mechanisms; cement and reinforced concrete	Industrial construction methods, the use of new building materials and lightweight structures
Forms of organization of science	Individual scientific activity	The emergence of specialized scientific work	The transformation of science into an industry of knowledge, into a branch of the economy
Education	Literacy and the emergence of vocational training	Mass general and special education	A significant increase in secondary education, the rapid development of higher education

Capitalism, with its urbanization, with the first machines and equipment, with a corresponding increase in labor productivity, became the material embodiment of the accelerated development of human capital, increasing its productivity due to the new quality of human capital-intellectual power and new knowledge.

It was creative, cultural and educated people, professionals in their fields and industries who made the industrial revolution. And they allowed them to do this, or rather, pushed them to scientific, innovative, industrial and technological innovations accumulated by previous generations and by themselves, knowledge and competition.

Competition-the desire to make big profits, the desire to get rich-made the capitalists take risks, use innovations (innovations). Apply new devices, machines, equipment, technologies in industrial production.

The competitive «competition» of civilizations and countries of that era was

decided by the accumulated human capital, its level and quality. In Western civilization, it turned out to be higher in value and quality and more productive. But first of all, by the quality of culture, education and science, determined by higher investments in them and the process of accumulating and using knowledge in practice.

At the end of the 18th century, Western Europe surpassed China by one and a half times in literacy. And twice as per GDP per capita.

The industrial revolution was scientifically based on the development and achievements of mathematics, mechanics, physics, chemistry, and economic science. On the basis of major innovations, the textile industry and mechanical engineering were created and developed.

The increase in the size and quality of human capital (the quality of culture, education, health, science, entrepreneurial resources, the quality of the elite and management, the quality of life and state institutions, etc.) made it possible to create machines and machines that became the largest innovative products of the time.

The main reason for the industrial revolution was the growth of knowledge and the emergence of professionals able to invent machines and generate innovations. Machines themselves are a consequence of human capital reaching a new height, a new level of quality in its development.

Of particular importance in the development processes were the mentality and culture of the people-the basis for the formation of the ethics of labor, entrepreneurship, the basis of the quality of work. Mentality and culture are one of the most important components of the national human capital accumulated by the people.

New and rapidly developing components of human capital-general education and emerging professional education, science, entrepreneurial resources, and competition-have allowed innovations to be introduced (loom, steam machine, pumps, and others). In turn, innovations in vocational education, in the economy, in public administration, in public life initiated and ensured a sharp increase in labor productivity.

As a result, in the first half of the 19th century, an industrial economy and society were formed. At this stage, the following qualitative changes took place in human society:

- there was an accumulation and implementation in practice of a qualitatively new human capital, knowledge and innovation (in industry);
- there was industrialization-mechanization of production, the transition from manual labor to machine, from manufactory to factory;
- in the economy and in other spheres of life, competitive relations and markets arose, democracy and civil society gradually formed;
- the quality of life of the population has improved; culture, education, science developed and the basis for the next round of accelerated economic growth, the development of industry and technology was gradually being prepared;
- there was an accelerated development of human capital due to an increase in investments in it, an increase in knowledge, an improvement in professional

education, specialization of scientific research and an increase in the quantity and quality of scientific organizations, an increase in life expectancy, an increase in economic and political freedom, an increase in the quality and effectiveness of elites, due to processes urbanization-positive changes in culture, in the family and politics.

From the point of view of the development of human capital, the following stages of the industrial revolution can be distinguished:

- the development and improvement of the effectiveness of education, science, the managerial elite and the creation of the ideology of capitalism, which allowed to collectively generate innovations and create machines demanded by the economy;
- the emergence of vocational education and professional scientific organizations;
- the emergence and development of an entrepreneurial resource and free competition, that is, capitalist relations in the economy.

At this and subsequent stages of the industrial and scientific-technical revolutions, the triad of drivers of growth and development of the economy, society and quality of life increased: the accumulation of knowledge, the growth of intelligence (professionalism), and the generation of innovations.

The second industrial revolution (the last third of the 20th and beginning of the 20th centuries) was completed on the basis of a new round of growth in the quality and level of accumulated human capital. Vocational education deepened and became widespread, science developed and specialized, and the culture of peoples developed and improved. The second industrial revolution, on the basis of the development of human capital, formed the 2nd-4th technological modes of the economy, and created a developed industrial society with high labor productivity. Spawned a massive generation of innovations that continuously increased labor productivity. Based on scientific research, the knowledge industry was gradually emerging in advanced countries.

The third scientific and technological revolution began in the middle of the twentieth century and continues to this day. She continued the formation of the 4th way, formed the 5th technological structure of the economy in the developed countries of the world and the beginning of the 6th, and made the transition of developed countries to a post-industrial economy. The formation in advanced countries of the knowledge economy and the information society has begun. The globalization of the global economy. A knowledge industry has been created in developed countries, which has become a leading industry.

Sergey Glazyev gave in his work a classification of technological structures of the economy, given in the Table 2.

Table 2.

Technological structures (macrocycles, long waves) Kondratiev [1]

№	1	2	3	4	5
Technological dominance period	1770-1830	1830-1880	1880-1930	1930-1980	1980-2040 (?)
Technological leaders	Holland, UK, France, Belgium	Holland, Great Britain, France, Belgium, Germany	Holland, UK, France, Belgium	Holland, UK, France, Belgium, EU, Canada, USSR, Japan,	Holland, UK, France, Belgium, EU, Singapore, China, Korea,

		and the USA		Australia	India, Brazil, Mexico
The core of the technological structure	Textiles, construction of water channels and wind turbines, cast iron	Steam engine, railway, machine and shipbuilding, machine tool industry, ferrous metallurgy, coal	Electrical engineering, heavy engineering, power transmission lines, inorganic chemistry, aircraft and automotive industry, steel	Aircraft, auto, tractor manufacturing, non-ferrous metallurgy, organic chemistry, synthetic rubber, oil	Electronics, robotics, biotechnology, laser and other optics, photographic equipment, remote control, space, gas
Key development factor	Textile engineering	Steam engines, machine tools	Electric motor, steel	Internal combustion engine, oil	Biotechnology, microelectronics, nuclear physics, computer engineering

Each successive economy was associated with the corresponding stage in the development of human capital and its new high quality. First of all, in education, in science and in innovation.

Schumpeter called the reason for the appearance of the classification according to the technological structure (Table 2) the features inherent in the productive forces in different eras of capitalism. The addition of human capital to the number of these productive forces, including accumulated knowledge and professionals who own it, not only does not violate this concept of development, on the contrary, gives it harmony and fundamentality.

LITERATURE REVIEW

The foundations of the theory of modern innovative development were laid back in the early twentieth century by the outstanding Austrian economist Joseph Schumpeter. He introduced the term «innovation» itself. In his youth, Schumpeter dreamed of becoming a great economist. And by his own order, he became his own labors.

Schumpeter’s main scientific work, The Theory of Economic Development, was published in 1911 in German. In 1926, Schumpeter published a substantially revised second edition in Germany, and in 1934 in England. In his works, he defined economic growth as an increase in the production and consumption of traditional goods. Economic development - as an increase in the level and quality of life, changing its image due to major innovations - innovations, as well as the accompanying medium and small useful innovations, which, as a rule, are supported by patents and inventions [5].

According to Schumpeter, innovations include:

- a new product or product with a new useful quality.

- a new production method, which may be of a production nature, managerial, marketing or commercial type, associated with the sale of the product. This definition includes all new technologies that increase the efficiency of the movement of goods from the manufacturer to the buyer. And in a broad definition - from an idea to a product and its customers.

- a new markets (for example, the derivatives market, created in the second half

of the twentieth century).

- a new source of factors of production.
- a new type of organization.

Schumpeter, as noted above, defined economic growth as an increase in the scale of output of goods and products by traditional industries. Under economic development, qualitative changes in the economy and life that are caused by major innovations.

With a growing economy, goods and money are moving towards each other in traditional ways and ways. Schumpeter called this movement a circular stream of economic life. The jump in the quality of human capital based on accumulated knowledge and economic development under the influence of the growth and development of human capital (knowledge, level of competence and professionalism, quality of life and productivity of intellectual activity, etc.) violate this monotony, generate major innovations and, through them, new industries . And reduces or even ceases the existence of obsolete industries. So the car as an innovation reduced the role of railway transport, destroyed the horse «transport» and almost destroyed the horse factories [13].

At the same time, innovations existed, of course, even before the advent of Schumpeter's theory. He summarized the experience of a certain stage of development and created the theory of innovation. Innovation arose with intelligent man. And one of the first major innovations was a stone ax. Somewhere further, copper, bronze, iron, tools and weapons from them, a hoe, a simple plow, etc. in increasing complexity as knowledge accumulates and the quality of accumulated human capital grows.

Large and very large innovations did not appear often. With the accumulation of knowledge and the growth of competence of craftsmen to the level when the next breakthrough discovery was made. Therefore, economic development was and is discontinuous or revolutionary in nature, as it has been established as a definition for industrial and scientific-technical revolutions [6].

It was the intermittent nature of the advent of innovation that Schumpeter explained the economic cycle. He introduced entrepreneurial ability as the fourth factor of production, including taking into account the innovative nature of the essence of entrepreneurial activity. At the same time, he highlighted the objective desire of entrepreneurs to introduce innovations in order to outstrip competitors in the markets and increase profits.

Entrepreneurial ability is the most important component of human capital as an intensive development factor. And in the modern economy, human capital has replaced as the fourth factor of production, or rather, growth and development, entrepreneurial ability, absorbing it as its important component.

Innovation, creativity and productive capacity of human capital are constantly growing due to the improvement of education, the development of science, the generation of innovations, due to the growth and development of the knowledge industry.

ANALYSIS AND RESULTS

In the framework of the theory of growth and development of human capital, the waves or cycles organically proposed by the Russian scientist Nikolai Kondratiev and developed by Schumpeter organically look like an intensive development factor [7].

The change in technological patterns coincides with the change in Schumpeter’s innovative waves. The source of innovative waves from the standpoint of the theory of human capital is accumulated knowledge or a complex of components of human capital in the form of culture, education, science, innovation, intelligence, and scientific search tools. But in general, human capital accumulated by mankind in its broad definition.

Leading industries, corporations, and activities - the locomotives of development (with maximum growth) - are the core of the technological structure, and the innovations around which the core has formed are called key factors in this classification.

Each technological structure has its own leading countries, economic structures, statehood, social life, social sphere, and promising scientific areas.

The future technological order is emerging in the bowels of the current technological order. And for a long time coexists with him and with other predecessors. In each new temporary technological order, the old ones continue to function, supplementing (if there is demand) the new technological order with the variety of goods offered [8].

The time period for the existence of the technological structure is the period of its dominance in world GDP or in the country’s GDP.

In Uzbekistan, technological structures from the first to the fifth are currently represented. But the third and fourth technological modes dominate, contributing more than 90% to GDP [3].

The key factors in the development of the fifth technological structure are biotechnologies, microelectronics, nuclear physics, and computer technology.

The key factors for the development of 4 technological structures are the internal combustion engine, oil. The core of the 4th technological structure is made up of the following industries: aviation, auto, tractor manufacturing, non-ferrous metallurgy, organic chemistry, cotton, oil.

According to this concept, the world is now at the beginning of an attempt to form the sixth technological mode (it includes nanotechnology, cell technology, genetic engineering methods, artificial intelligence systems, global information networks, etc.) in the leading countries of the world in scientific and technological development.

There are no backlogs in these areas in Uzbekistan. Due to the low quality of human capital and the state system, they could not create competitive microelectronics [2].

Innovative waves and cycles are complex. In fact, these are waves of accumulated knowledge. And their temporal classification is relative. The development of human society was carried out through the development of the main subject of development processes - educated people, professionals, and the elite. And

through the formation, improvement, growth and development of intellectual development objects embodied in the form of books, patents, licenses, methods, methods, technologies, including information technology, as well as scientific schools, laboratories, institutes, universities and other custodians and carriers of accumulated knowledge [14].

CONCLUSIONS AND RECOMMENDATIONS

The knowledge economy is the highest stage of development of the post-industrial economy and innovative economy and the next stage of development of the economy and society of the advanced countries of the world. Often the term «knowledge economy» is used as a synonym for an innovative economy [9].

The main factor in the formation and development of the knowledge economy is creative, innovative human capital. The process of developing the knowledge economy consists in improving the quality of human capital, the quality of life and in the production of knowledge, high technology, innovation and high-quality services [10].

Developed countries make most of their investments in human capital. This gives them a decisive advantage in scientific, innovative and intellectual development, as well as in the outstripping growth of the quality of life of the population.

The leading countries of the world have created close to optimal conditions for the quick and effective implementation of the ideas of scientists into specific goods and products. It is fundamental research, increased investment in human capital and the new breakthrough technologies generated by them that provide the leading countries of the world with their leadership.

Uzbekistan has yet to gradually create an effective industrial economy with competitive markets. The process of industrialization of Uzbekistan, the process of creating an effective economy in Uzbekistan has not been completed.

A comprehensive and systematic concept and strategy for developing national human capital in Uzbekistan and improving its quality is needed, which should become the core of the new paradigm and development strategy of Uzbekistan. And first of all, the reduce corruption of the economy should be carried out. In the prevalence of corruption, knowledge is losing its value.

The population of Uzbekistan needs not only understandable, scientifically substantiated and real strategies for the development of human capital, development of the economy and improving the quality of life, but also concrete and visible affairs on a weekly, monthly basis in each village, district, city for the construction of roads and pedestrian sidewalks, improving the quality of water and water supply, to improve the situation with kindergartens, schools, clinics, hospitals, etc. [11]

The main mechanism for improving the quality and productivity of human capital is competition, and investment in the components of human capital is the necessary material support for this process. In the absence of competition, the return on investment becomes low or very low. Most of the investments are used for other purposes, inefficiently and even to create negative human capital that impedes the

normal functioning of creative (innovative) human capital [12].

Modernization of Uzbekistan must begin with the modernization of national human capital. For this, it is necessary to increase in the shortest possible time at least twice the investment in culture, upbringing, education, science, healthcare and public safety. To improve the quality, cost and productivity of the national human capital of Uzbekistan, it is necessary to reduce corruption of the country to international levels and develop a strategy for the development of national human capital, making it the core of general and private documents on the development of the country and regions.

For the high development of human capital in Uzbekistan, it is necessary to improve the following areas:

1. Reduce corruption of the economy, state institutions, all spheres of life.
2. Improving the quality and effectiveness of national human capital and all its components.
3. Modernization of infrastructure and arrangement of the country and regions.
4. Modernization and development of the industrial economy with the outstripping growth of its innovative sector.
5. Creating an effective innovation system.

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