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FORMATION OF INNOVATIVE APPROACHES TO THE DESIGNING OF A THREE-PRONGED CONCEPT OF SUSTAINABLE DEVELOPMENT OF ECONOMIC SYSTEMS IN THE AGE OF GLOBALIZATION

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Abstract

The main aim of the research in the present scientific article is oriented on the improvement of the modern theory of the sustainable economic development. The methodology of the scientific research was based upon the study of the scientific views of the scientists on such notions as sustainability and development of the economic system and its contradictions taking into account the factors of influence of the internal and external environment. During the scientific research, the opinions of the international society and the United Nations Organization regarding the modern concept of the sustainable development where the main concept is concentrated on the ecological element were taken into account. Determination of the indicative factors directly influencing the sustainability and development of the economic systems, and the evidence of its direct interaction with the existing classic three-pronged concept of the sustainable development allowed to reach the new scientific effective provisions

such as modeling of the balances of sustainability of the economic systems, development of the modern classification of the types of sustainability, formation of the model of sustainable economic development as the continuous and dynamic process of the development of human potential. The research performed at the modern stage allows to develop a new policy of the sustainability of economic systems in some developing countries.

Keywords: Sustainability, Development, Economic System, Social System, Ecological System, Human Potential, Investments, Innovations

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INTRODUCTION

In the modern economic theory, science and practice, the term “sustainable development” has a global, international origin and has a complicated and many-sided character taking into account the different points of views of authors and market factors. The sustainable development in the conditions of globalization, the growth of the tendency of the world competitiveness, scientific and technological progress, war conflicts and international migration are of great importance not only for the developing countries but also for the countries with a high level of progressiveness of economy.

In the developing countries with a market economy, for example, in the Republic of Kazakhstan, the complex of strategic program documents was developed and is realized to provide the sustainable development: the Strategies “Kazakhstan-2030” and “Kazakhstan-2050”, the Strategy “Twenty Steps to the Society of Universal Labour”, the State Program of the Infrastructural Development “Nurly Zhol”, the Strategic Plan of the Development of the Republic of Kazakhstan [1]. The industry department programs of the development were also adopted, such as the State Programs of Forcing Industrial Development in the time frame, the State Program of the Development of Education of the Republic of Kazakhstan, the State Program of Public Health Development of the Republic of Kazakhstan “Salamatty Kazakhstan”, the State program “Informational Kazakhstan-2020” and many others [1]. Together with these aspects, the necessary institutions of the development were formed at the macro- and micro-level aiming at the dynamic development of the entrepreneurship and business, implementation of the innovations and new technologies taking into account the increase in the employment of the population and social and economic development. In complex, the set vector of the development of the market economy of the country is focused upon the provision of its perspective sustainability.

The modern practice of the functioning of the existing economic system of Kazakhstan shows that after the expiry of the significant period of its independence there is a long list of unsolved fundamental economic problems, i.e. the problems of economic growth and slump, employment and economic activity of the population, inflation and devaluation of the national currency. These problems are connected to the particular

economic problems such as resource trend of the economy and the high level of its extensification, low level of innovative activity in the system of business-entrepreneurship, negative balance of the migration processes, comparatively low parameters of the living standards and the public health.

Some other developing countries and developed countries of the world have similar and other problems. As a result, the further dynamic growth and intensification of the economic systems require the scientific search for the provision of their progressive sustainability taking into account the improvement of the theoretical apparatus and methodologies, its perspective practical application.

Methodology and Theoretical and Fundamental Analysis of the Modeling of Sustainability and Development of Economic Systems

From the philosophic point of view, the sustainable economic development is based upon two fundamental theoretical trends – economic development and economic sustainability. As a result, the theory of the sustainable development is determined by the complicated internal character which is based on the contradiction of two notions – development and sustainability.

Thus, for example, in the opinion of the scientist and economist Professor Melnik [2], “sustainability”, according to its detailed definition, means the balance, and the process of development takes place when an economic system is out of balance [2].

To solve the above-mentioned contradiction, in our opinion, it is necessary to specify and analyze the notion of “economic development” and “economic sustainability” from the point of view of the process approach.

The economic development is an extended reproduction and gradual qualitative and structural positive changes of economy, production forces, education, science, culture, standard and quality of life of population, human potential. The economic development includes the development of the social relations; therefore, it develops differently in particular historically formed conditions of the technological principles of economy and distribution of the material values. This is the process of improvement of the quality of all human lives and possibilities to improve the standard of living, self-respect and freedom.

The economic development is not equal to the notion of the economic growth to the full extent. The gradation of the specification of the notions of economic development and economic growth were introduced by Joseph Schumpeter in his scientific work “Theory of Economic Development”. In his opinion, the economic growth includes the positive quantitative changes and the economic development includes the quantitative changes at the economic growth [3].

Economic development of the society is a multi-polar process which includes the following at the different stages of the functioning of the economic system:

- Economic growth;
- Formation (creation) of the sector of innovative economy;
- Structural changes in the economy;
- Growth of labor productivity and living standards of the population.

The efficiency of the processes of the development is determined by the efficient state regulation of the economy, the efficiency of the state itself and its institutions.

Modern conceptual theory of control of changes was developed by the scientist Norbert [4]. This theory covers such aspects as:

- Regulation and control of economic changes (general and particular types of economic policy);
- Regulation and control of technological changes (reconstruction, modernization, extended reproduction, use of high technologies);
- Regulation and control of political and legal aspects (changes in the constitution, legislation, normative legal acts);
- Regulation and control of social and cultural changes (morality, culture, changes in the value system, selective social support);
- Regulation and control of physical and ecological changes (natural and climatic conditions, ecology and ecological situation).

In his scientific works, Simon Kuznets pays special attention to the fact that human capital assets play a significant role in the processes of the economic development. In his opinion, the lack of accumulated human capital assets, its low quality do not allow the country to create the following competitive technological mode of economy [5].

According to some scientists-economists, the modern category “economic sustainability” originates from the Latin word “stabilis” that means stability and potential possibility of the system, organizational mechanisms to maintain its workable condition and preserve this state taking into account the changes of internal and external circumstances (factors) [6].

Taking into account the above mentioned, the economic sustainability is a capacity of the economic system to function continuously and stably subject to the external and internal competitive environment, factors of macro and micro media.

Functioning of the economic system shall be considered as a continuous process of the behavior of human and society, in the process of production, distribution and consumption of the material values, in the conditions of the limited resources. Thus, sustainability (stability) of the economic system can be determined by the following variables:

- Behavior of human and society;
- Production process at the macro level;
- Process of distribution and consumption;
- Consumption of natural resources (rate and consequences of the consumption).

In the modern scientific works, it is mentioned that the leading theoretical foundation of the theory of stability of systems was based on the works of the Russian scientists Lyapunov A.M. and Markov A.A. with regard to the mechanical systems. Stability of mechanical systems is considered by the scientists as its capacity to be in balance and stability under the impact of the external forces. If the external force impacts the mechanism, it shall return to the balance at the particular conditions [7].

The stability of the mechanical systems can be directly identified with the notion "sustainability of the economic system". Such identification has a complicated philosophical meaning but the same nature of origin. So, the base of the stability of the mechanical systems is saving the properties of the system at the various disturbances, and the corresponding correctness of the behavior of human and society performs as the sustainability of the social and economic systems [7].

In modern research, the authors consider the problems of sustainability more at the micro level than at the macro level. At the same time, the sustainability of production, bank, consulting, financial and many other business systems are considered [7].

Modern scientific research reveals the wide range of applied significance of "sustainability" and its used types. In our opinion and taking into account the points of view of other researchers, the economic sustainability at the macro and micro level can be divided factor by factor into the following types:

- Financial sustainability;
- Social sustainability;
- Ecological sustainability;
- Market reliability;
- Competitive sustainability;
- Manufacturing and technological sustainability;
- Innovative sustainability;
- Strategic sustainability.

Sustainability of the economic systems can also be classified according to the degree of extension:

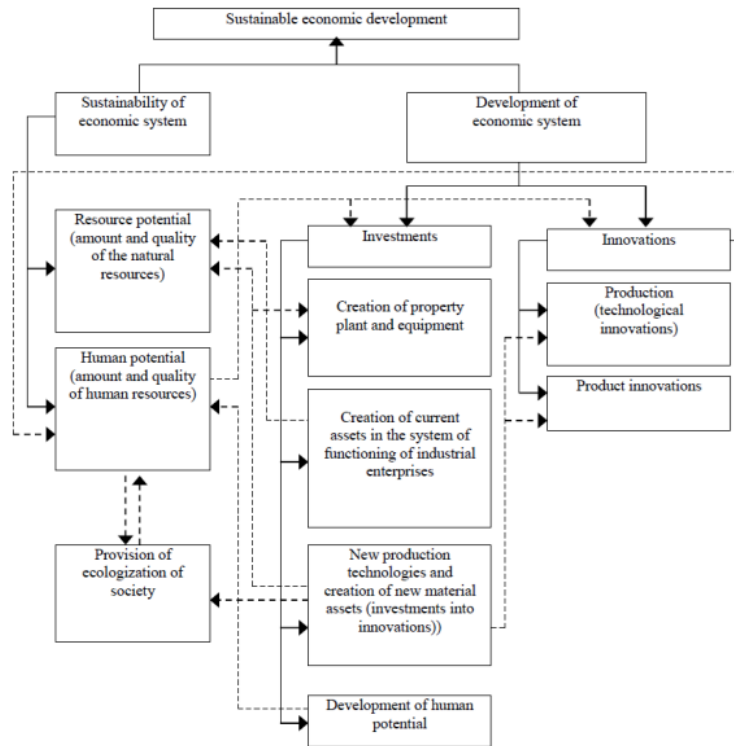
- Sustainable economic systems;
- Unsustainable economic systems.

In its turn, when considering the sustainable economic systems their subtypes can be determined as:

- Economic systems with progressing sustainability;
- Economic systems with high sustainability;
- Economic systems with normal sustainability;
- Economic systems with low sustainability;
- Economic systems with critical sustainability.

A general view of the classification of the types of sustainability with regard to the economic systems at the macro level is shown in Figure 1.

Figure 1: Classification of the types of sustainability with regard to the economic systems at macro level.



Studying the theory of development and the theory of sustainability of economic systems, as a result, in our opinion, there is a fact that there is no such principal theoretical and practical contradiction between the notions “economic development” and “economic sustainability”. It is explained by the fact that any economic system according to the law of economic cycles comes to the unsustainable position at the particular stage and that it should be compensated by the factors (instruments) of the development of economic system. As a result, there shall be a particular balance between the sustainability and development – any instrument or factor of the development shall promote the economic system to be in a sustainable state and at the

same time the following mathematical functional equation will become logical.

$$\int_{i=1}^j F_i^U = \int_{i=1}^j F_i^R \quad (1)$$

Where F_i^U is a set of interacting factors characterizing (forming) the sustainable functioning of economy;

F_i^R is a set of interacting factors characterizing (forming) the development of economic system.

If the instruments of the development continue to influence the sustainable economic system, from the theoretical and practical point of view it can achieve the level of high and progressing sustainability. At the same time, the above-mentioned mathematical functional equation will be the following

$$\int_{i=1}^j F_i^{UR} \leq \int_{i=1}^j F_i^R \quad (2)$$

Where F_i^{UR} is a set of interacting factors characterizing (forming) the sustainable development of economy (high or progressing sustainability).

The leading factors of the sustainable functioning of economic system are the following:

- Resource potential (amount and quality of natural resources);
- Human potential (amount and quality of human resources).
- The leading factors of the development of economic system are the following:
- Investments;
- Innovations.

To provide the sustainability of economic system and perspective sustainable economic development the investments can have the following target tendency:

- Investments in the creation of property plant and equipment;
- Investments in the creation of current assets in the system of functioning of industrial enterprises;
- Investments in new production technologies and the creation of new material assets (investments in innovations);
- Investments in the development of human potential.

Taking into account the investments for the sustainable development of the economy, two significant types of innovations can be distinguished:

- Production (technological innovations);
- Product innovations.

Taking into account the interconnection and interdependence of the sustainability and development, the integration of the factors of influence will transform according to Figure 2.

Studying of the interconnection of the leading factors providing the sustainable development of the economic system shows that the main instruments of the development of an economic system, for example, investments in the new production technologies and investments in the development of human potential promote the intensification of the use of resource potential. And this in its turn creates a base for providing a high level of the ecologization of the society. The ecologization of the society influences favorably the conditions of the formation and development of the human potential.

Also, some instruments of the development of economic system form the innovations, for example, product innovations, and that leads directly or indirectly to the improvement of the human potential of economic system.

Aspects of the ecologization of the society in the modern theory were included into the basic approaches of the determination of the notion of sustainable development of economy.

Often used definitions of the sustainable development are expressed in the following forms:

- Sustainable development is a “model of usage of resources that is directed to the satisfaction of the needs of a human while preserving the environment so that these needs can be satisfied not only for the present but for the future generations as well”;
- Sustainable development is a process of “satisfaction of the needs of the present generation without the damage for the future generation to satisfy their own needs”;
- Sustainable development is a situation when the satisfaction of needs in present does not break the capacity of the future generations to satisfy their own needs [8].

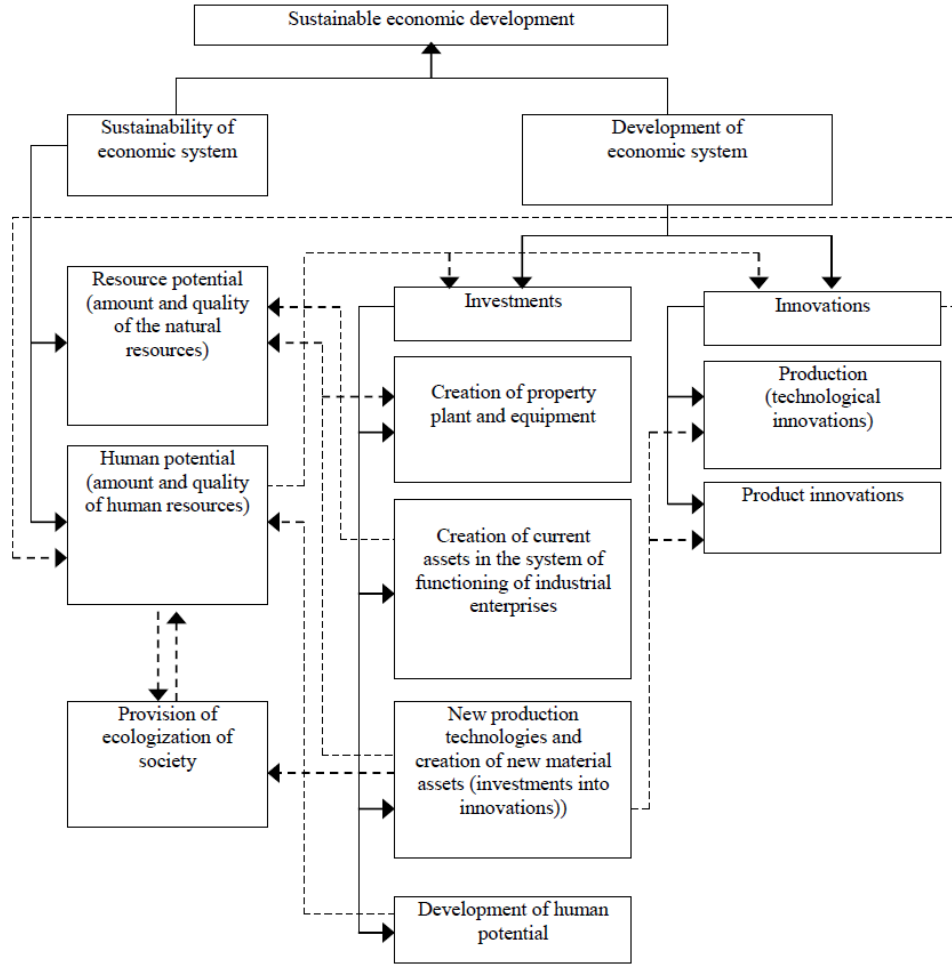
Often mentioned definitions of the sustainable development are expressed in the following forms:

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present generation without the damage for the future generation to satisfy their own needs”;

- Sustainable development is a situation when the satisfaction of needs in present does not break the capacity of the future generations to satisfy their own needs.

Figure 2: Interconnection of leading factors providing the sustainable development of economic system.



The above-stated definitions of the sustainable development were first formulated by the World Commission on Environment and Development (WCED). The Commission was created according to the initiative of UN, and its main objects of activities were:

- Deterioration of environment;
- Problems of interaction of human and natural resources;
- Deterioration of economic and social development;
- Globalization of ecological problems;

- Policy formulation for solving of considered problems.

Within the framework of the evolution of the theory, the understanding of the term “sustainable economic development” had three large stages:

- 1970-1980s;
- 1980-2015;
- 2015-up to present.

In 2002, the theory of the sustainable development became global; meanwhile, in 2014-2016 a united model of the sustainable development was not formed (created).

Modern trends of the theory of sustainable economic development are based upon the necessity and importance of the prevention of irrational growth of the use of natural resources (environment) taking into account the growing world competitiveness in the entrepreneurship, growth of profit of transnational companies, corporations.

The idea of the necessity of the acceleration of the development of “informational society” can be considered as one of the new variants of the concept of the theory of sustainable economic development– economic system based upon the domination (predominance) of non-material logistic flows (knowledge, intellectual property, non-material high-tech services, financial and informational flows).

A new approach to the sustainable economic development was also offered by the experts of the World Bank who consider that the sustainable economic development is a process of control of the set (portfolio) of assets directed to the preservation and extension of the possibilities possessed by people (society). The assets in this definition are understood not only as total physical capital itself but also as natural, human capital [9].

According to the World Bank, to provide the sustainability of the economic system it is necessary to maintain the set level of permanency (non-decreasing) of total assets and to have a sustainable economic development it is necessary to provide the rational growth of total assets.

Taking into account the above said, the main indicator of the sustainability is “true rates of savings”, and the leading indicator of the sustainable development is “clear rates of investments”. Thus, the model of sustainability of economic system will look as follows:

$$\left\{ \begin{array}{l} \sum_{i=1}^j A_i = \sum_{i=1}^j A_i^K - \sum_{i=1}^j A_i^{NR} \\ \sum_{i=1}^j A_i - const \end{array} \right\}$$

Where A_i is a set of macroeconomic assets providing the functioning of the economy and wealth of human and society

A_i^K is a set of macroeconomic assets, expressed in the form of physical capital;

A_i^{NR} is a set of assets characterizing the loss (degradation, decrease) of natural resources.

The model of sustainable development of the economic system will look as follows:

$$\left\{ \begin{array}{l} \sum_{i=1}^j A_i = \sum_{i=1}^j A_i^K - \sum_{i=1}^j A_i^{NR} + \sum_{i=1}^j A_i^{HR} \\ \uparrow \sum_{i=1}^j A_i^{HR} > \downarrow \sum_{i=1}^j A_i^{NR} \end{array} \right\}$$

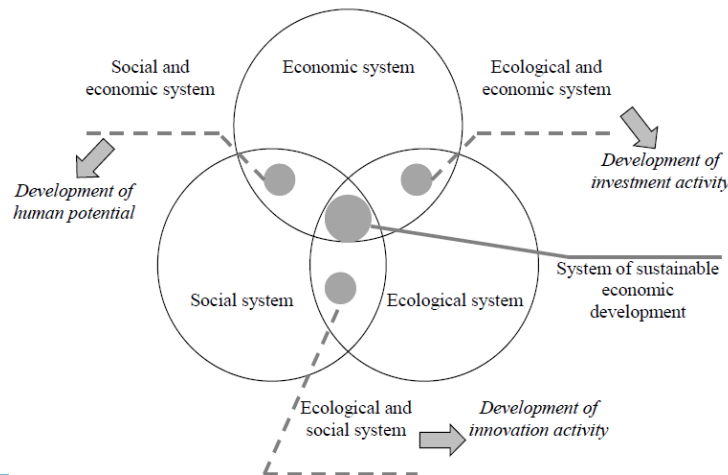
Where A_i^{HR} is the total asset, investments into the development of the human resources (human capital, potential).

At the modern stage, one of the modern theoretical concepts of sustainable economic development is the three-pronged concept in which the sustainable development is a process of integrated interaction of economic, social and ecological systems. On the base of this concept, the fundamental elements of the sustainable development are the following:

- Economic element (economic system);
- Social element (social system);
- Ecological element (ecological system) [10].

A general view of the three-pronged concept of sustainable economic development is shown in Figure 3.

Figure 3: Three-pronged concept of sustainable economic development.



At the modern stage, taking into account the developed three-pronged concept of the sustainable development, the latter is considered as a systematic process of the growing positive economic and social changes in the society, with regard to the degree of coordination of use of natural resources, investment activity, scientific and technical development, development of culture and institutional environment that promote the provision, increase of living standards of existing and future generations [11].

Results of the research and new scientific provisions of the theoretical and methodological provision of sustainability of economic systems

In our opinion, it should be understood that the functioning and development of the economic system is only the consequence of the functioning and development of human potential. The functioning of the ecological and economic system, in our opinion, shall be interpreted as the consequence of the efficient investment activity and use of investment resources. The functioning of the ecological and social system is a derivative of the living standard of human and society, processes of creation and development of all types of novelties and innovations.

Studying the three-pronged concept of the sustainable economic development, its derivative can be formulated and at the same time the sustainable development, according to Figure 4, will be understood as a balanced interaction of the human potential, innovation and investment systems of the functioning of the economy of the country.

We suppose that the optimal interaction of the human potential and investment system (investment potential) forms the economic system. The optimal interaction of the human potential and innovative system (innovation potential) forms social system. The optimal interaction of the investment potential (investment potential) and innovation system (innovation potential) forms ecological system. Thus, the statement of the new three-pronged concept of the sustainable development can be confirmed scientifically.

As the fundamental consequence taking into account the target reference points of economic, social and ecological system, the economic development is a continuous process of the development and evolution of human potential.

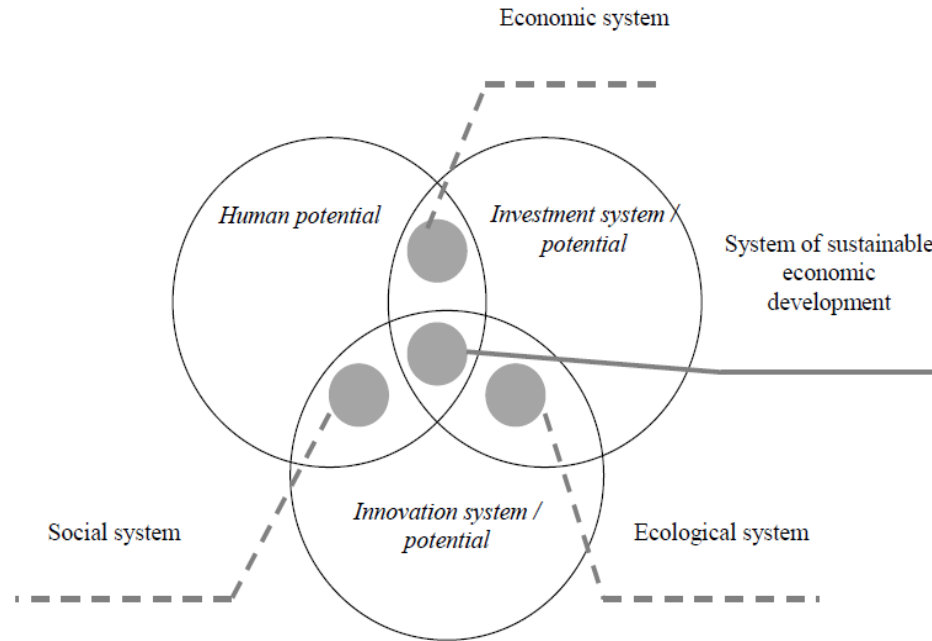
The human potential becomes a base of the sustainable development of economy. The behavior of a human stipulates all existing economic processes in the theory and practice, and on the other hand, the quality of the economic mechanisms forms the favorable or less favorable possibilities for the development of the society, existing and future generations.

From the position of the internal structuring, the human potential represents the set of the following components:

- Human capital;
- Labor potential;

- Human resources [12-14].

Figure 4: Three-pronged concept of the sustainable economic development from the point of view of the development of human potential, investment and innovation systems.



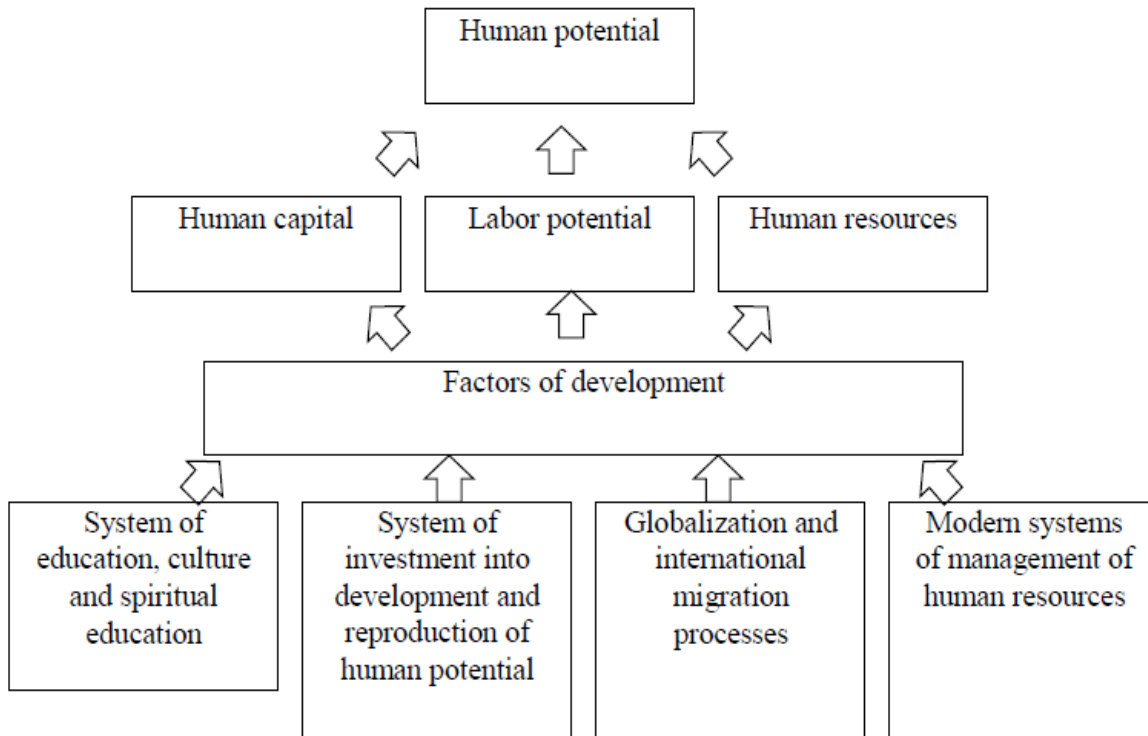
The components of the human potential are considered taking into account the leading system factors of the development of human capital, labor capital and human potential that forms the potential of human development directly. The main elements of the human potential of the modern economic system are shown in Figure 5.

According to Figure 5, it should be mentioned that all main components of the human potential are an integral element of the social and economic system.

In the system of the offered three-pronged concept, the human potential is integrated directly into the investment system (potential).

The investment system is understood as the process of accumulation of investment resources oriented under the influence of the human potential on the creation of the intensive processes of production and distributions of goods and services, means of production in the economic system taking into account the limited resources [15].

Figure 5: Components of human potential.



The extended and generalized model of investment system is shown in Figure 6.

Considering the investment system, it is evident that its elements, in particular, the “ground” (all types of natural resources) and the level of the development of production technologies form the ecological and economic system. “Labor” (labor potential) and human capital become the integral components of the human potential.

As a general result, the investment system and human potential correlate directly with the innovation system.

Taking into account the modern scientific opinions, the innovation system is understood as the process of the development of an economic system based upon the principles of new knowledge, intellectual capital, scientific achievements in the techniques and technologies achieving the high level of economic transformation of production processes [16,17]. An extended mode of innovation system of the leading logistic elements is shown in Figure 7.

The main target guideline of the functioning of innovation system is the achieving of the higher economic transformation by productions, and that will create the conditions for the optimal use of resources, improvement of the ecological and economic situation, an increase in the living standards of the population.

Figure 6: Components of the investment system.

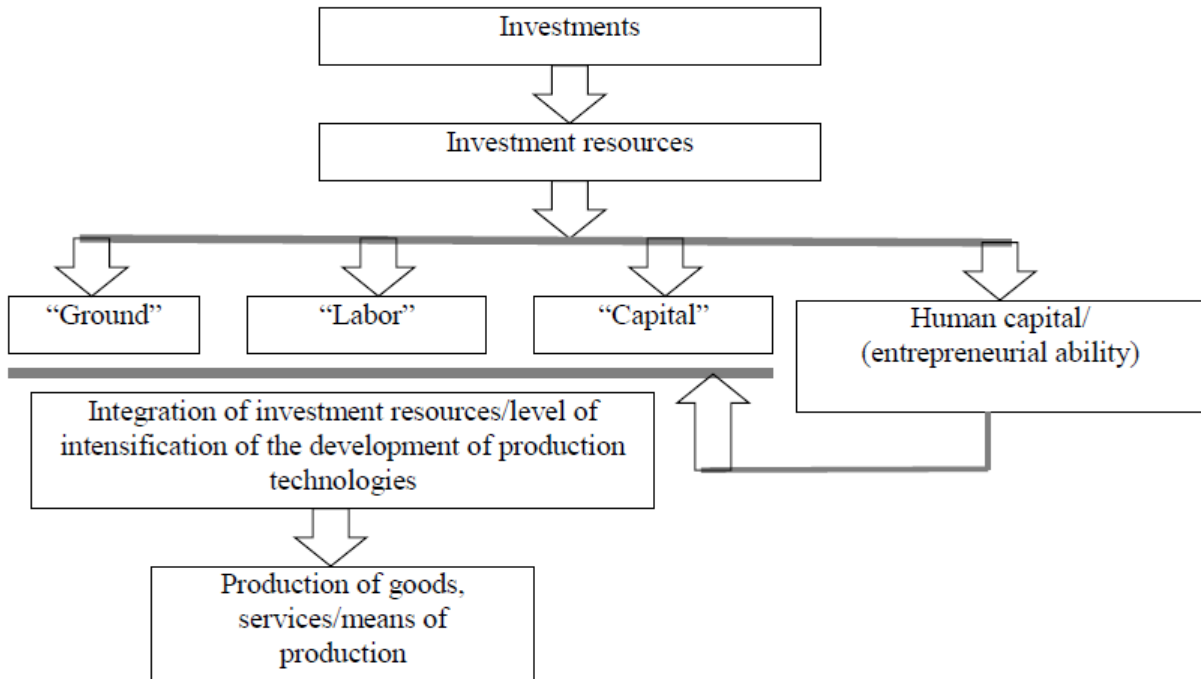
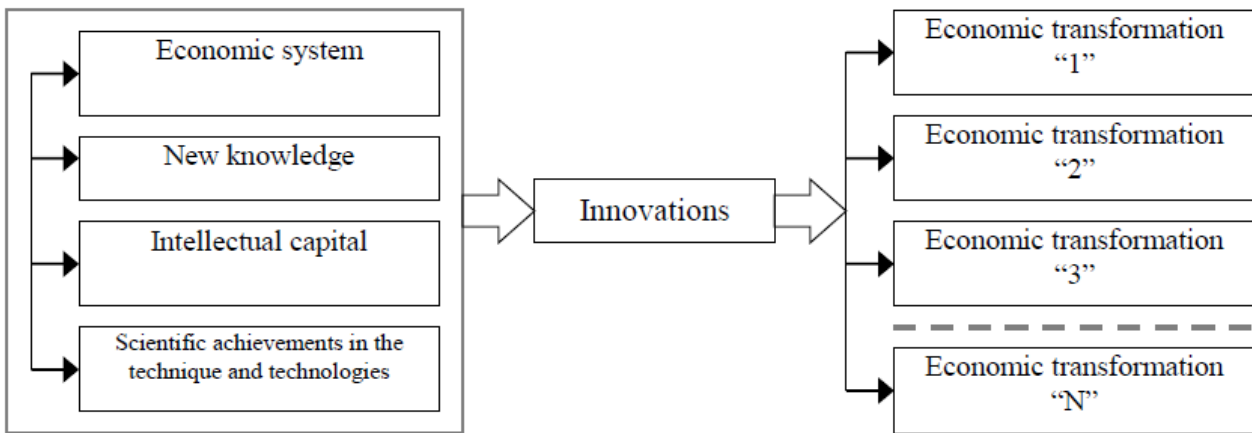


Figure 7: Compound conceptual elements of the innovation system.



Studying the modern scientific approaches to the understanding of the essence and conceptual definitions of the sustainable development of the economic system taking into account the factors of the economic growth, the main definitions of the sustainable economic development can be presented in Table 1.

Table 1: Modern scientific approaches to the understanding of the essence and conceptual definitions of the sustainable development of economic system.

Time periods of formation of the concept of sustainable economic development	Definition of the term “sustainable economic development”
1970-1980	Model of use of resources that is directed to the satisfaction of needs of human while preserving the environment so that these needs can be satisfied not only for the present but also for the future generations
	Process of the satisfaction of needs of the present generation without damage for the possibility for the future generations to satisfy their own needs
	Situation when the satisfaction of needs of the present generation does not destruct the ability of the future generations to satisfy their own needs
1980-2014	Process of integrated interaction of economic, social and ecological systems
	Process of management of the set (portfolio) of assets directed to the saving and extension of the possibilities that people (society) possess. In this definition, the total physical capital but also the natural, human capital are understood as the assets
Modern period	System process of the growing positive economic and social changes in the society, taking into account the high level of coordination of the use of natural resources, investment activity, scientific and technological development, development of culture and institutional environment that promote to provide the improvement of the living standards of the existing and future generations.
Modern period (the author’s approach)	Balanced interaction of the human potential, innovation and investment systems of functioning of the state economy
	Continuous process of development and evolution of human potential

Discussion of Practical Aspects of Application of Innovative Three-Pronged Concept of the Sustainable Economic Development

The practical application of the three-pronged concept of the provision of sustainable development shall provide the corresponding effect that is confirmed by the world scientific views to this aspect. Thus, for example, McConnell C.R. and Brue S.L. in the scientific work “Economics” mentioned that between the human capital and economic development there is a direct connection that is expressed by the Arthur Okun’s law. This law represents the empiric dependence between the rate of growth of the unemployed population (inactive population) and the rate of growth of GDP in the

countries with the market economy. For the countries with the market economy, it is presupposed that the exceeding of the unemployment rate by 1% above the level of natural unemployment decreases the real GDP of the country in comparison with the potential GDP by 2.5% [18]. For different countries and periods, the value of the change of GDP can be different.

Within the frames of the research and generalization of the foreign experience,- it should be mentioned that in the world economics a new type of qualitative economic growth was formed on the base of use of knowledge, human capital and innovations such as natural resources. National wealth of the developed countries consists of 5% of natural resources only, 18% of the physical capital and the rest 77% of the knowledge, skills and theirs application [19].

Modern scientists consider the human capital as a long-term economic resource, the profitability of the use of which is growing in time (while accumulating the knowledge, experience). It was calculated that the investments into the education provide from 30% and more of the increase of national profit. The calculations proved that the investments into the education at the macroeconomic level and at the level of an individual are much more profitable than the investments into the fixed assets.

Human capital is created, first of all, by means of long-term investments into the educational system. Western countries and, first of all, the USA has already created the favorable conditions for the achievement of the high level of the training of human resources during last several decades due to the significant volumes of investments into the educational system. In particular, investments in the educational system in the USA are much higher in comparison with the similar investments in other countries of the world [20].

At the same time, the developing countries of the world do not pay enough attention to the training of its human resources.

At the same time, the developing countries do not pay enough attention to the training of their human resources, and that becomes the main reason of its technical, technological and economic backwardness. It is no coincidence that Theodor Shultz as a laureate of 1979 Nobel Prize in Economics proved in his calculations that the developing countries should invest, of all, in public health, education and science that is more profitable for the construction of new enterprises.

In economically developed countries, due to the implementation of the considered long-term social and economic state policy, even by now they created the conditions for the introduction of the concept of human capital into good practice [21]. Therefore, in the Western countries the main attention was paid to the practice of management of human resources at the level of corporations. According to the theory of human capital, a company can reach the sustainable competitive advantage in the market only when it has a reserve of human resources that cannot be reproduced by its competitors.

CONCLUSION

The research showed that the modern developed concepts and scientific views in regard of the relatively sustainable development, to a large extent, are focused directly on the ecological component and traditional three-pronged concept. The developed approach, in our opinion, reflects the final consequence of the sustainability of the economic system but it does not reveal the cause-effect relationships.

The innovation approach to the consideration of the three-pronged concept of the sustainable development reveals the basic instrumentation of the provision of not only the sustainability of economic systems but also their progressive development on the base of human potential, investments and innovations [22]. The human potential, investment and innovation systems become a starting point of the economic development. Some developing countries of the world shall correct and optimize the policy directed to the formation of human capital taking into account the corresponding infrastructure transformations to achieve the sustainable trajectory of the economic development. Accumulation of the human capital in the perspective will allow reinforcing the generation of the investment and innovation activity that, all other things being equal will provide the set level of development of social and economic, ecological and economic and ecological and social systems. The innovative three-pronged concept of the sustainable economic development can find a wide fundamental application when developing the state strategic program documents.

In perspective, within the frames of the present scientific research, the conduction of applied works on designing of organizational and economic models of the sustainable economic development of the state is supposed on the base of the human potential and investments into education and also on the base of the intensification of innovations in the industrial sectors of economy.

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