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Uncertainty of the Post-Covid Future: How will Humanity Solve this Puzzle?

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Uncertainty of the Post-Covid Future: How will Humanity Solve this Puzzle?

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Abstract- The post-pandemic future is "shrouded" in complete uncertainty. Humanity is faced with COVID-19 in a situation where many economic and social problems have already accumulated, approaches to solving which have not been developed. At the same time, technological progress has brought humanity closer to fantastic prospects associated with the implementation of the achievements of the technological revolution 4.0. However, in this context, there has emerged and is growing the lack of professionals with relevant skills and competencies. In addition, the waves of the coronavirus pandemic, the emergence of more and more aggressive and deadly strains of it have dispelled the myth of humanity's ability to subordinate the eco-natural system to its interests without harming it. In a pandemic, the very organization of human society was under the threat of destabilization due to the violation of the dialectic of the relationship between individuals and society, citizens and the state, etc. The precariat, NEETs, generation Z with their specific preferences and value orientations became the result of a violation of the social integrity of national communities. Naturally, it is difficult to solve the puzzle of uncertain post-covid future without understanding the specifics of modern reality. This publication is the authors' attempt to structure modern problems in their dialectical connection and subordination on the basis of dialectical logic within the framework of a systematic approach. It makes possible to understand the patterns of structuring future reality, to determine the role of a human in the systemic formation of a new economy and society and the creation of a new technological base for them. This will make it possible to understand the patterns of structuring the future reality, to determine the role of a human in the systems' organization of a new economy and society and to create a new technological base for them. This is the only way to minimize the uncertainty of the post-coronavirus future.

I. Introduction

According to the World Health Organization as of July 14 2021, the number of COVID-19 infected people on the planet reached 188.3 million, of which the number of deaths was estimated at 4.06 million. A real shock for the countries all over the world became the phenomenally rapid spread of coronavirus across the Globe and the failure of nation states to instantly identify and isolate patient zero and prevent the pandemic to cross national borders. A year after the start of the COVID-19 pandemic, it became clear that new strains of coronavirus are infecting people even faster and the number of deaths is growing. In these conditions, in addition to the priority task of preventing a humanitarian catastrophe today, the importance of the problem of minimizing the absolute uncertainty of post-covid reality in the future has increased. Thus, over the millennia since the separation of mankind from the natural environment, the humans managed to make a tremendous leap in technological progress, in labor productivity, in the generation of various forms of organizing economic activity and social interaction. On this basis, people became convinced that they are able to completely subordinate nature to their goals. However, the COVID-19 pandemic in the blink of an eye shattered this illusion of mankind, demonstrating its absolute vulnerability to natural disasters such as deadly viruses, large-scale fires, powerful floods, etc.

As a result, in the 2020s, humanity is forced to repeat the experience of technological progress, the acceleration of which was due to the transition from empirical developments of practitioners to a theoretical understanding of the laws of technological change. However, the difference between the mechanisms of system formation in technology, on the one hand, and in the economy and society, (Romer, 1988; Arthur, 1999, 2014; Nordhaus, 1994) on the other, is that economic and social systems are not just dialectically interconnected, and subordinate to each other, but each of them is capable of self-movement. (Pilipenko, et al., 2021b; Chardin, 1955; North, 1981, 1997, 2003). At the same time, a person or, more precisely, individuals, who, in turn, are complex self-sufficient systems capable of self-organization and self-development, acts as a mediator in this dialectical connection between economic and social integrities. At the same time, the pandemic made it obvious that the dialectic of the educational and social component of the self-organization of a modern personality turned out to be destroyed. This manifested itself both in the crisis of modern education and in the societal crisis as a result of the pandemic, which further exacerbated the problem of uncertainty about the future reality (Baker, et al., 2015). Many such negative phenomena are investigated in the publications of the following modern authors: Jonathan Haskel and Stian Westlake (2017); Eric Lonergan, and Mark Blyth (2020); experts of McKinsey Global Institute (2021); Martin Sandbu (2020); Branko Milanovic (2019); etc.

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Thus, the COVID-19 pandemic has become the X hour for humanity, which must say goodbye to its "childhood" and enter the uncertain future of its "youth". And the latter will be determined by how quickly the human community will be able to solve the puzzle of the accumulated fundamental problems, to understand their interconnection and subordination, and to construct its own vision of post-covid reality. In fact, we are talking about a radical rethinking of theoretical generalizations of representatives of specialized branches of knowledge and about the creation of the latest methodological platform. On its basis, it will be possible to understand the patterns of self-movement of systemic formations created by people in the economy and society, to reveal the dialectics of their self-organization in a static state and self-development at the stage of dynamic changes. The complexity of their modeling is aggravated by the fact that eventually a certain virtual "universe" should emerge, the central element of which should be the person himself. Moreover, the latter is formed as a self-sufficient system that mediates all the processes of system formation in the economy and society, harmonizes their dialectical transformations, coordinates interactions and mediates their dialectical "leaps".

This article is focused on demonstrating the effectiveness of dialectical logic and systemic ideas about the patterns of formation and endless self-movement of human-created systemic integrities in the economy and society, about their interactions, subordination and mutual influence. Their center of rotation is a person (more precisely, an individual), who is himself a self-sufficient systemic integrity, capable of both self-organization and self-development. Moreover, the socialization of individuals into the economic system and into society mediates the interaction of the latter with each other, predetermining both their dialectical unity and social "order", and their opposites and accompanying "fault lines" (Rajan, 2010).

In other words, the COVID-19 pandemic has exposed numerous problems of the human community: inefficiency of the state, loss of livelihoods and poverty of a large mass of households as a result of pandemic, growing unemployment and an increasing mismatch between the supply and demand of a labor force with skills and competencies that meet the requirements of the technological revolution 4.0, the emergence of the precariat, NEETs, the lost young generation as a result of the pandemic, a shrinking middle class and an increase in the number of billionaires, social inequality, corruption in government institutions, the inability of national healthcare systems to effectively protect their citizens from unknown infections, destruction of the eco-natural system, etc. In fact, all the above is only a form of manifestation of the lack of understanding of the laws of self-organization and self-development of human-made systems and, therefore, of violation of the dialectical principles of their self-movement and interaction. And the latter, in turn, are predetermined by the failure to understand the phenomenon of a human, which remains a “thing-in- itself” according to I. Kant (1781).

In this context, the key area of national states' activities, faced with the fundamental problem of an uncertain post-covid future, is to provide conditions for the self-organization of the human, subject to the dialectics of the educational and social components of this process, as well as for his self-development as an intellectually autonomous person. Only such an approach to understanding the role of a person in the context of the dialectics of interaction of the systems created by him in the economy and society makes it possible to determine his paramount importance as a moderator of all processes of system formation in the future post-covid reality.

All of the above predetermines the following logic for the presentation of the article material. In the methodological section, the authors substantiate a new theoretical platform for studying the problems of the formation of post-covid reality using dialectical logic and a systematic approach. The first paragraph of the article demonstrates the possibilities of this theoretical approach when describing the dialectics of self-movement of human-created systemic integrities, while treating the dialectic pair of phenomena of self-organization and self-development of systemic integrity in the economy and society, who have reached the point of no return under COVID-19 conditions and are ready for dialectical jumping from static to dynamic. The second paragraph is devoted to substantiating the role of a person as a complex systemic integrity, capable of both self-organization and self-development, and harmonizing the processes of self-movement of the economy, society and technology. At the same time, the main conclusions are based on the fact that all the problems of the current reality and of the construction of the post-COVID-19 future will be solved, in fact, in the sphere of human self-movement. This is due to the fact that without a person there is no economy, no society, no technology. And all the contradictions in these systemic organizations are due to unresolved problems in the self-organization and self-development of the person himself. With this approach, the economic and societal crises caused by the pandemic are a form of manifestation of the essential problem associated with the violation of dialectics in the self-organization and self-development of the human personality. In this regard, the third paragraph is logical, which provides an in-depth understanding of the processes of system formation in the context of the generation of an intellectually autonomous personality. Post-covid reality will be structured by such individuals who are able to mediate system formation both in the post-pandemic economy and in the future society, as well as to form a new technological base for them. Empirical evidence of

this study is based on modeling the specifics of the knowledge component of the student's self-organization process. As a result, the student must acquire the ability to independently overcome psychological and cognitive barriers in learning. In addition, using the example of Russia, the authors structured statistical data illustrating the mechanism of socialization of students in the process of their self-organization and calculated the economic effect. In the results and discussion, the authors describe the second component of the dialectic of personality self-organization - its socialization, highlighting the skills group from those proposed by the World Economic Forum (2015) and the World Bank (2018) experts, which characterize it. In fact, having learned to overcome all possible barriers in the process of education and socialization at the stage of his self-organization, an individual is able to achieve a state of success not only in professional activity, but also in organizing his life in society. These qualities are typical for intellectually autonomous individuals capable of unlimited self-development. A critical mass of such persons, capable of creativity in the profession and in life, happy in the society due to the coincidence of their individual values and socially accepted norms, will become the main participants of the processes of system formation of post-pandemic reality.

II. Methodology

In order to establish the connection and interdependence of the fundamental problems that became apparent thanks to the COVID-19 pandemic, the authors had to form their own logic of theoretical research, which allowed them to ultimately solve the puzzle of disparate, incoherent parts of human-created systemic integrities. First of all, the authors have adopted the dialectical method of research, which allowed the classics (Hegel, 1892; Marx, and Engels, 1955-1974) to obtain important results in their scientific work. The choice turned out to be successful, since the authors got a completely unique chance to substantiate static reversible changes in system integrity at the stage of their self-organization, and to link the dynamics of systems with irreversible cardinal (fundamental) transformations of their elements and the formation of new structures. As a result, it became possible to understand the predetermination of changes in systems at the stage of their self-organization under the influence of the dialectical laws of unity and struggle of opposites and the one of the transition of quantitative changes into qualitative ones, , and at the stage of self-development – of the law of double negation.

Deepening into the problem of self-movement of human-made systemic integrities, the authors developed a hypothesis about dialectical connection and conditioning not only of elements, a system and its structure, but also of all systems among themselves. To prove it, there were involved philosophical principles of knowledge (B.M. Kedrov, 1963; A.P. Sheptulin, 1957; A.A. Zinoviev, 1960) and the logic of materialist dialectics, which is associated with the names of prominent representatives of the German philosophy - Immanuel Kant (1781); Friedrich Wilhelm Joseph von Schelling (1993), and Georg Wilhelm Friedrich Hegel (1892, 1967) as well as the findings of such brilliant thinkers as к. Marx (1995); Vladimir I. Vernadsky (1967), Ludwig Heinrich Edler von Mises (1998), Friedrich August von Hayek (1991), Fernand Braudel (1981), and etc. As a result, the use of dialectical logic in the study of the economy and society made it possible to discover in them the identity of the processes of self-organization and self-development, predetermined by the above mentioned dialectical laws (Pilipenko, et al., 2021a, 2021b).

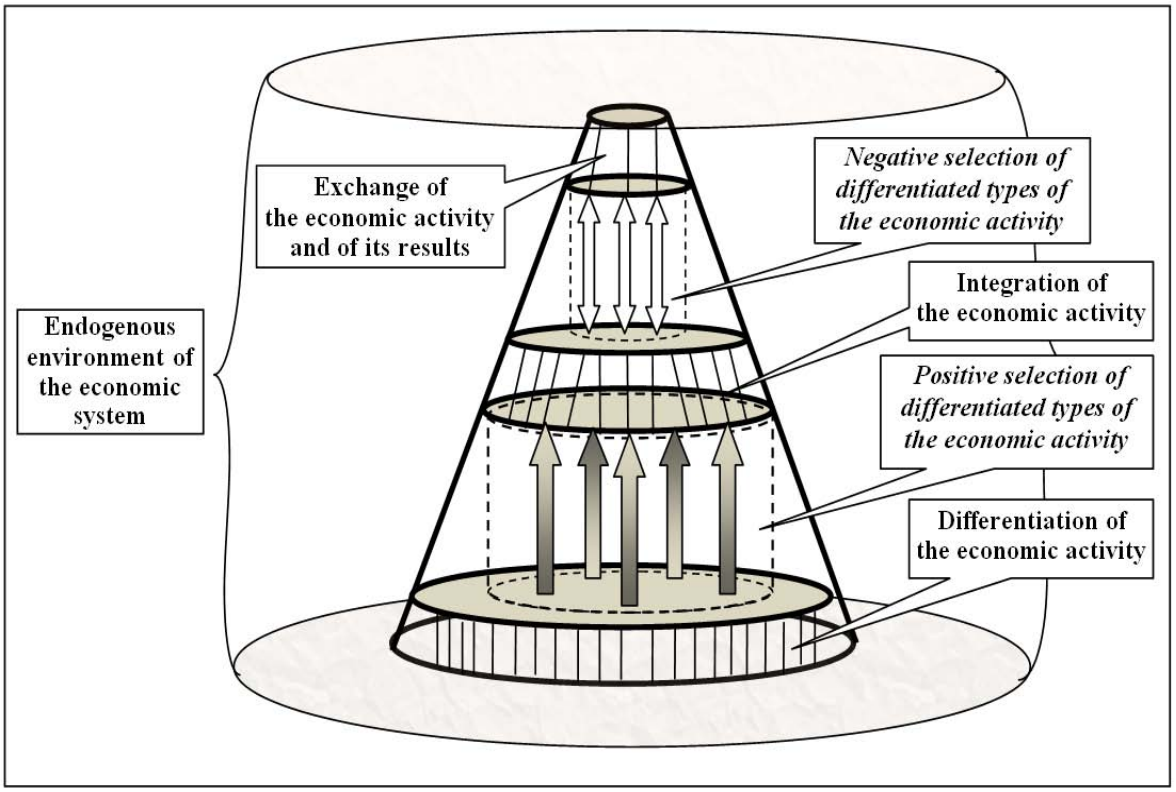
From a philosophical point of view, the repetition of certain phenomena makes it possible to assume that they are associated with objectively operating mechanisms within the framework of systemic integrity. To prove the validity of these conclusions and to identify the essence and forms of systemic integrities, it became necessary to take into account the provisions substantiated by the creators and developers of such theoretical concepts as general systems theory (H. Hacken, 1977), synergetics (Ludwig von Bertalanffy, 1968), tectology (A.A. Bogdanov, 1934), the catastrophe theory (V.I. Arnold, 1975, 1979; J. Guckenheimer, 1973; E.C. Zeeman, 1977; R. Thom, 1969; 1974; and etc.), theory of large cycles of economic conjuncture (N.D. Kondratiev, 1984), as well as the modern theory of complexity economics (W. Brian Arthur, 1999; Arthur, et al., 1997; Anderson, et al., 1988; Hausmann, et al., 1996), etc.

The search for an integrating principle, dialectically mediating the interaction of economic and social systems, led the authors to the idea that it is a person who is the centre around which the human-created systemic organizations revolve in the economy, society, and technology. The approach to man as a self-sufficient system made it possible to dialectically link education and socialization as a specific feature of the individual's self-organization. As for the phenomenon of intellectually autonomous personality, it is associated with the beginning of human self-development. On this difficult path, the works of outstanding humanist thinkers of the present and the past became a huge help, which allowed the authors to build the general outlines of the model of human-created system organizations that unite differentiated types of economic activity and separate individuals in society. It is about V.I. Vernadsky (1960, 2018); L.N. Gumilev (2012a; Gumilev, 2012b), Gary Stanley Becker, (1985, 1993); Theodore W. Schultz (1960); Jacob Mincer, and Solomon Polachek (1995). To understand the deep psychological patterns of changes in the essence of education, the authors were forced to

delve into the theoretical aspects of human psychology and the psychology of education [Vygotsky, L.S. (1960); Elkonin, D.B. (1989); Davydov, V.V. (1996); Slobodchicov, et al., (1995); Slobodchicov, et al., (2000); Slobodchicov, et al., (2013)]. As a result the authors concluded that technological and socio-economic transformations in an uncertain post-covid future are undoubtedly fundamental, which can only be achieved by intellectually autonomous self-developing personalities. And it is these constructions that will become the foundation of the human-centric socio-economic systems in the future. Dialectical application of the tectological principles of A.A. Bogdanov (1934) to the organization of human-created systems in the economy, and society led the authors to the opportunity to see the simple in the complex and in the very complex (Pilipenko, et al., 2021b). This confirms the truth that the great A. Einstein expressed with the following words: “For, in reality, things happen in exactly the opposite way. It is only the theory which decides what can be observed”!

Dialectics of self-organization and self-development of human-created systemic integrities

A systematic approach to the interpretation of organizations of economic activity and social communities created by humans made it possible to identify in them all the components typical of self-sufficient systems. It is about the elements, the system as integrity and structural connections of the elements of the system. The processes of system formation are based on A.A. Bogdanov tectological principles of ‘unification – separation’ (‘cooperation – differentiation’) of objects, subjects and processes. The specificity of these opposite phenomena and processes lies in the fact that they are typical dialectically related pairs of phenomena, in fact, with which the creation of systems by a person begins, which acquire the ability to both self-organization and self-development. Dialectical logic and systems approach allowed the authors to offer a model idea of the processes of systemic formation in human activity (Fig.1).



Source: Pilipenko, et al., 2021b

Figure 1: Model representation of the interaction of differentiation and integration as forms of economic activities’ organization and of their essence, represented by the exchange of economic activity and of its results

A.A. Bogdanov compared the processes of differentiation and integration with a universal regulatory mechanism in all spheres of human activity. From his point of view, positive selection (the differentiation of human activity), "by complicating the forms, increases the heterogeneity of being, delivers material for it that is ever increasing". As for the negative selection (its integration), it, "simplifying this material, eliminating from it all fragile, discordant, contradictory, introducing homogeneity and consistency in its connections, orders the latter. Complementing each other, both processes spontaneously organize the world" (Bogdanov, 1934).

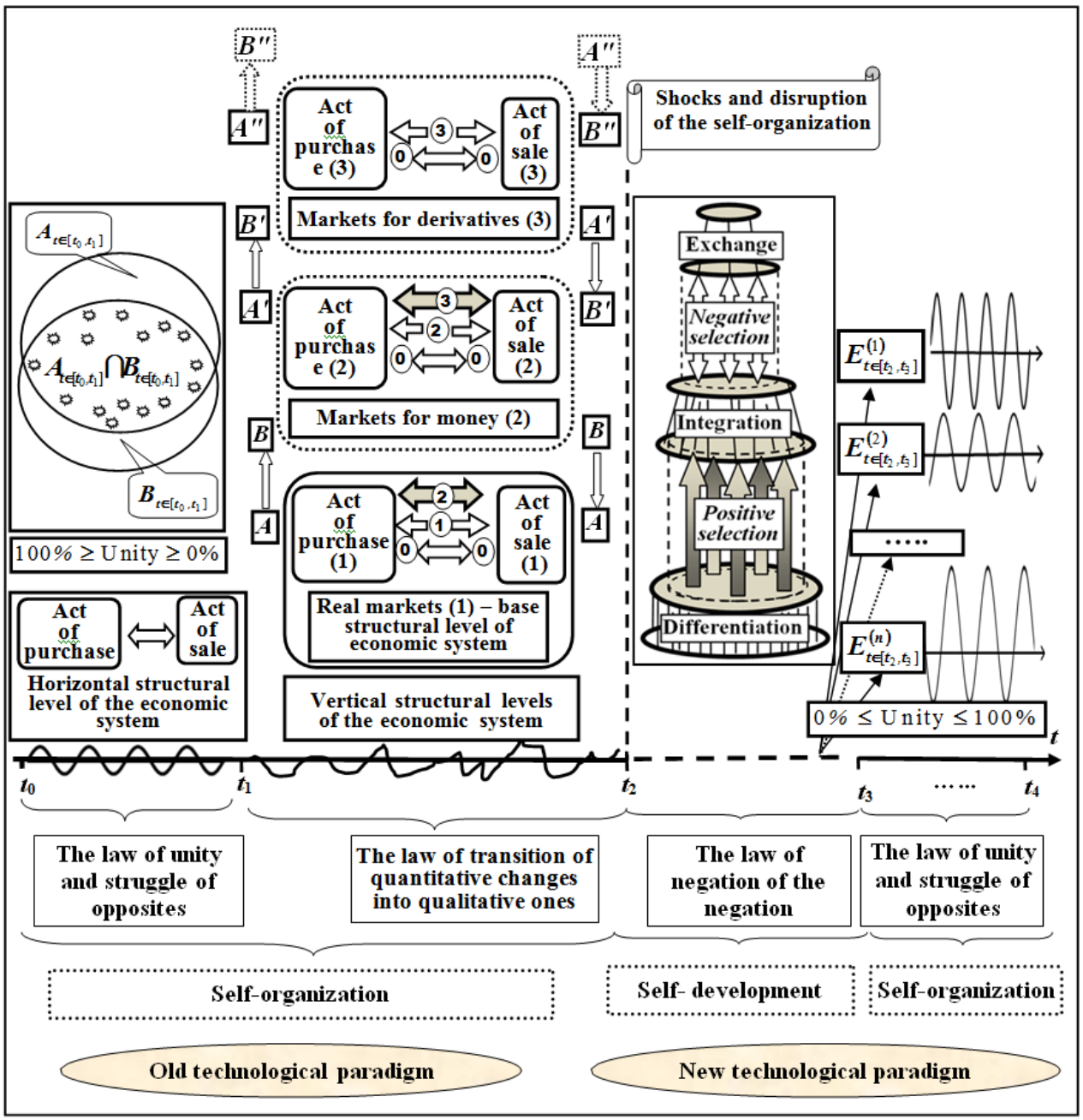
From a theoretical point of view, the narrow "neck" of exchange (Fig. 1), which arose as a result of negative selection, represents the emergence of a systemic integrity created by people with the help of dialectically connected economic or any other relations. Dialectical logic made it possible to link the exchange of the results of economic activity between dialectical pairs of participants with a structure-forming principle or with a system formation. From this moment, the arisen system integrity acquires the ability both for self-organization and for self-development. In other words, human organizations as systemic entities become self-sufficient due to the fact that dialectically related elements are mediated by structural connections that are constantly renewed, stable and unchanged. From a philosophical point of view, the structure of the system embodies "the principle, method, law of the connection of elements within the systemic whole" (Sheptulin, 1975, 1978). In other words, the dialectical laws are implemented through structural connections of exchange participants, regulating their changes.

Further research of systemic integrities in the sphere of human activity led the authors to the conclusion that the change in the structure of the system under the influence of the dialectical laws of its self-movement makes it possible to distinguish two qualitatively different states of it. In the process of self-organization, the system becomes more complex by generating a hierarchy of structural levels that are vertically linked by cause-and-effect relationships (Pilipenko, 2020). While the higher levels in the structural hierarchy solve the problems of lower structural levels of the system, the latter remains stable, although its fragility as the integrity increases. The specificity of the self-organization of the system due to the generation of new levels by the structure is associated with the reproduction of direct and feedback connections by them, i.e. the system becomes more complex due to additional structural levels (Arthur, 2013), repeating and not changing qualitatively. It is about the stage of self-organization, a system that is in a static state, changing only organizationally, becoming more complex through the generation of new dialectically interacting structural links (levels). At the same time, the dialectical law of unity and struggle of opposites operates at the horizontal level of the structure, and the generation of new structural levels occurs under the influence of the law of the transition of quantitative changes into qualitative changes (Fig. 2, time intervals t0 – t1 and t1 – t2).

However, everything has its limits. This is also true for the self-organization of the system in its static state. As for its transformation into a dynamic system, this dialectical leap is realized through the dialectical negation of its own static state. It becomes possible because the system in statics and the system in dynamics represent two forms of its self-movement which are dialectically interconnected: the dynamics of the system cannot be without statics, and statics is intended to form conditions for its dynamic state. This is because the structural complication of a static system objectively leads to an increase in its fragility (Taleb, 2007, 2012). The shock transformation of the hierarchical structure is associated with a change in the cause-and-effect relationships of structural levels from upwards to downwards causation process (Hodgson, 2002). Then, instead of strengthening the integrity of the system, it is destroyed. This is the result of the operation of the law of negation of negation, which consistently destroys both the structural levels of the effect and the structural levels of the causes that generated them in the previous static system. This is the limit of a self-organizing system. With the destruction of the structure, the point of no return is left behind, the direct and reverse structural interdependencies have been destroyed, and the system acquires the qualities of a dynamic one. The content of such a state of the system is due to the fact that only dialectically complex elements remain from the previous system, which will rebuild structural connections and dialectical interdependencies (Fig. 2, time interval t2 – t3). Actually, this theoretical fragment describes the essence of the future post-covid reality, the specificity of which today is complete uncertainty.

According to G.W.F. Hegel (1892, 1967) self-organization and self-development of systems could be treated as characteristics of the objective world. They are inherent in all systemic integrities. With this approach, self-development should be understood as endless changes in the system as a whole, including certain stages (of self-organization) of structural complication of an unchanging system. In other words, it is only about changes in the "left to itself" systemic integrity in the economy, society or technology.

The complexity of the above construction is due to the fact that it deals with such dialectically interrelated categories as static economics and dynamic one, as well as self-organization of static economy and self-development of dynamic economy. This list should be continued by including two dialectical laws (of unity and struggle of opposites and of transition of quantitative changes into qualitative ones), which are related to each other as dialectical pairs of phenomena. Likewise, the dialectic of the law of double negation is manifested in its unity with the laws operating in a self-organizing system and in their complete negation in a dynamic system. As a result, the economy appears as the integrity in its two forms of manifestation - in statics and in dynamics.



Source: Pilipenko, et al., 2021

Figure 2: General model of interaction of self-organization and of self-development mechanisms of economic systems and of implementation of dialectical laws

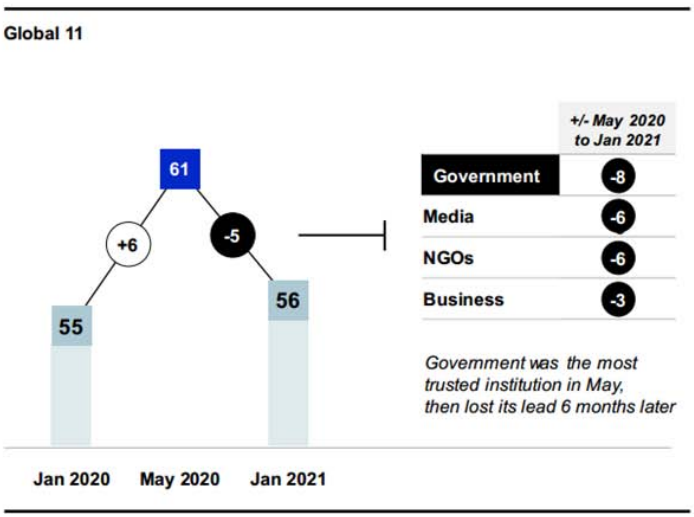
The theoretical structure formed above is complicated due to the fact that it must additionally take into account not only the intersystem connections of the economic and social systems, but also the technological foundation on which they are formed. Fig. 2 integrates the technological base when characterizing economic system in statics and in dynamics. If the structural basis of reversible phenomena in technology has not exhausted its potential, then economic systems subordinate to it and cannot count on the implementation of self-development. In fact, it is about the fact that interconnected dialectically systems have not yet exhausted the potential of structural complication in the process of self-organization. Only upon reaching the threshold of complexity by technological systems, all the systemic integrities in the economy and other spheres predetermined by them, can realize their own self-development. In any case the process of self-movement of economic systems in connection with self-organization and self-development should be interpreted as the dialectically interrelated processes, which represent the unity of discontinuous and continuous, relative rest and constant change (Fig. 2).

So, the COVID-19 pandemic immediately revealed problems in understanding the patterns of change in each of the human-created systems in the economy, society and technology, not to mention their dialectical interaction at different stages of systems complication. As a result, all crises that have manifested themselves as a result of the coronavirus pandemic must be interpreted in the context of the dialectical laws of self-movement of all the systems mentioned above in the economy, society and technology.

At the same time, it should be emphasized that for each country the limiting states of self-organizing systems will have its own specifics due to the peculiarities of the economy, society and technological basis. Therefore, even if their states coincide in the context of reaching the limits of self-organization, a dialectical leap or discontinuity in the movement of system integrity will have a huge variety of options for different countries and national communities It is possible to concretize these options in modern reality only conditionally, and this largely predetermines the uncertainty of the future post-covid reality. In the authors' model (Fig. 2), the alternative of self-development of dynamic systems is conditionally reduced to three scenarios – $E^{(1)}$, $E^{(2)}$,…, $E^{(n)}$, in the time intervals $t_2 - t_3$ and $t_3 - t_4$.

The above theoretical construction allows the authors to draw certain conclusions. First, the COVID-19 pandemic has exposed the ultimate state of static economies in the most developed countries. Moreover, other countries that are inferior to them in economic parameters can see their more or less distant future by their example. The authors associate the exhaustion of the self-development potential of economic systems with a steady downward trend in the growth rate of global GDP in recent decades, especially in the group of developed countries of the world (Summers, 2020; Summers, 2014).

Second, the phenomenon of a fall or minimization of citizens' confidence in their state testifies to the limiting state of national societies (Fig. 3).



Government	+/- Jan 2020 to May 2020	+/- May 2020 to Jan 2021
S. Korea	+16	-17
UK	+24	-15
China	+5	-13
Mexico	+12	-12
Canada	+20	-11
India	+6	-8
U.S.	+9	-6
Germany	+19	-5
Japan	-5	-1
Saudi Arabia	+5	-1
France	+13	+2

Notes: The Trust Index is the average present trust in NGOs, business, government and media, included 11 countries in the 2020 Trust Barometer Spring Update.

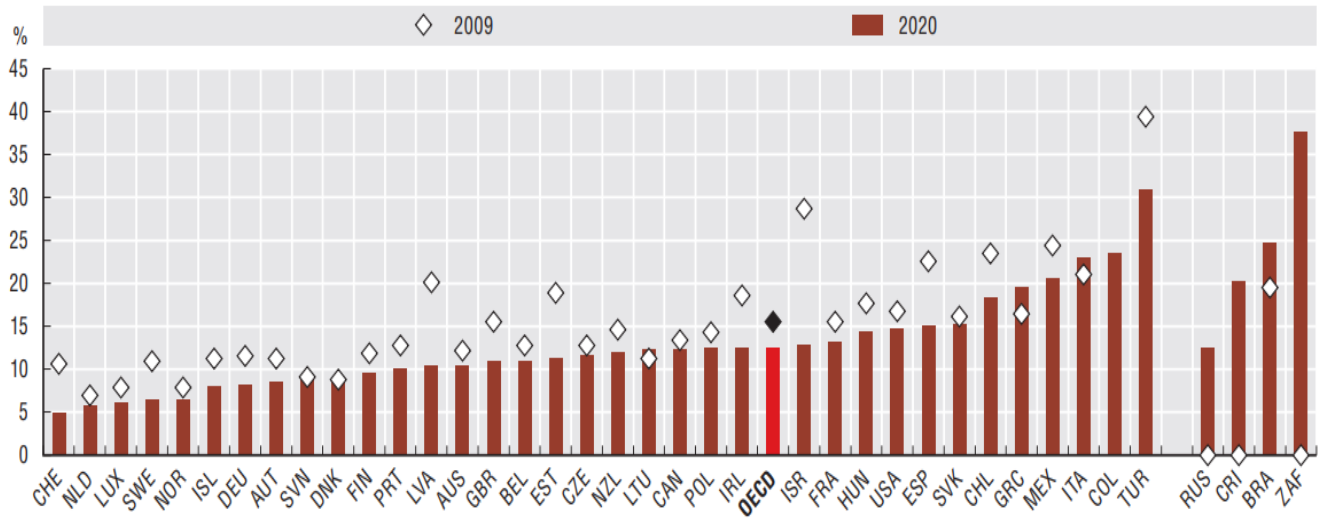
Source: Edelman (2021). Edelman Trust Barometer 2021: Global Report. https://www.edelman.com/sites/g/files/aatuss191/files/2021-01/2021-edelman-trust-barometer.pdf.

Figure 3: Dynamics of trust in government, media, NGOs, business in 2020

According to Fig. 3, the Trust Index as the average present trust in NGOs, business, government and media of 11 countries was 55% in January 2020 and grew to 61% by May 2020. But already in January 2021 the Trust Index decreased to 56%. In other words, for 6 months - from May 2020 to January 2020, the Trust Index fell by 5%. Moreover spring trust bubble burst and the biggest loss became for government (-8% in January 2021). Really government was the most trusted institution in May 2020, and 6 months later it lost its lead. The greatest loss of confidence was characteristic of such states as South Korea (-17), UK (-15), China (-13), U.S. (-6), Germany (-5), Japan (-1) (Edelman, 2021). And this, undoubtedly, turns into the main obstacle to an effective strategy of the state aimed at the timely re-opening of the economy. Against this backdrop, rising unemployment and economic lockdown have become extremely expensive public strategy in the fighting COVID-19 pandemic. As a result, all these costs should be attributed to the losses of society due to the fact that the state was unable to build a public healthcare system capable of functioning in anticipation of the huge human and economic losses caused by COVID-19.

In fact, they can be interpreted as the price of the fallacy of all the previous practice of national governments that provided rapid growth and optimizing economic output at the expense of underestimating the priority of creating a sustainable public health system. Such misunderstanding of the subordination of the goals of ensuring the health and well-being of citizens and economic growth rates at any cost largely predetermined the transcendental inefficiency of the state in the context of the COVID-19 pandemic, as well as of the societal crisis. In practice, this turned into a catastrophic collapse of the global economy and the destruction of the societal integrity of national communities.

In the context of the coronavirus pandemic, distrust of the state takes the form of citizens deliberately violating the emergency regimes imposed by states to fight infection; unwillingness to get vaccinated against coronavirus, etc. However, the most destructive for a self-developing society is the phenomenon of the formation of a social stratum among young people, which is structured as a new social class called "precariat" (Standing, 2011). And in the last decade, an extreme form of its manifestation has arisen in a new specific social community – NEET (Not in Employment, Education or Training) (Fig. 4). If the share of these young citizens (from 15 to 29 years old) reaches a quarter of all youth (as in Italy), then the integrity of society has every reason for destruction, since they do not have a permanent place of study or work, they shy away from professional training (IPSOS, 2021). In other words, these young people ignore society and try to minimize their contacts with it.



Source: OECD (2021), Government at a Glance 2021, OECD Publishing, Paris, https://doi.org/10.1787/1c25 8f55-en

Figure 4: Percentage of young people (aged 15-29) years not in education, employment or training (2009 and 2020)

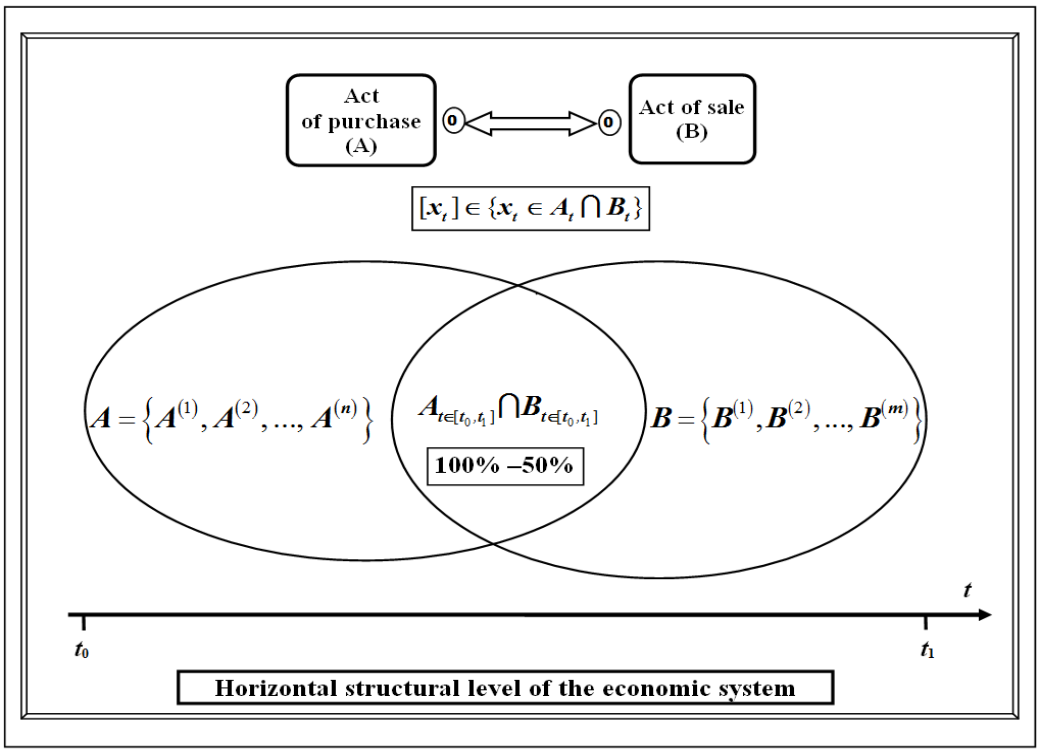
Third, the COVID-19 pandemic has exposed such a paradoxical situation as the growing surplus of the labor force of obsolete qualifications and the catastrophic widening of the gap between the demand for workers meeting the requirements of the technological revolution 4.0 and their supply. In a pandemic, this gap threatens with missed opportunities for countries of the world, whose human capital, in terms of education parameters, is not ready to form a new technological base for the dynamic economy and society ex post pandemic. In other words, the essential problem that predetermines all crises that have manifested themselves as a result of the COVID-19 pandemic is associated with a person who played a subordinate role in self-organizing systems before the pandemic, but without whom it is impossible to realize their dialectical leap into the future post-covid reality.

Socialization of humans and synchronization of self-movement processes in the economy, society and technology

The authors assigned such a significant place to the socialization of citizens in modern self-organizing systems since their study of the peculiarities of the implementation of dialectical laws in the economy (Pilipenko, et al., 2021b) made it possible to single out the object's, process and subject's components of system formation. The object component is represented by material and non-material objects of market exchange, and the process component is manifested in the self-organization and self-development of systemic integrities. But the subjective component turns out to be the most complex, unpredictable and most important in mediating the interaction of all human-created system integrities – in the economy, society and technology. In

fact, the subjective component mediates the coincidence / non-coincidence of the value ideas of individuals with socially accepted values that are institutionalized by the state.

The authors used the model of dynamical sets are self-affiliated within the framework of the theory of sets with self-affiliation (Mirimanoff, 1917; Chechulin, 2012). If the dynamic sets A and B represent the values of the individual and the values (social norms) of society, then their intersection allows us to describe the mechanism of strengthening / destroying the system integrity both in the economy and in society (Fig. 4).



Source: The authors' development

Figure 4: A model representation of the interaction of individuals and systemic wholes on the example of the economy, taking into account the segments of the intersection of the value concepts of subjects and social norms that dominate in society

In this example, the change in the segments of the intersection of dynamic sets illustrates how the structural connections of dialectically related subjects and systemic integrities change. As long as the subjects are satisfied with the "social behavioural norms" in economic and social systems, their interests vary from 100% coincidence to 50% (Fig. 4). Under this condition, the stability of the self-organizing systems is strengthened. It is described with the help of interests of sellers and buyers in the economic system. In Fig. 4 such a state is described by a white arrow with parameters 0. Otherwise, the divergence of interests of subjects and society, the integrity of systemic formations becomes more and more fragile. As a result, the authors linked the system formation in the economy and society with the subjectivization of their structural ties. This means that the value parameters of individuals and their agreement / disagreement with society as a whole play a cardinal role in strengthening the integrity of self-organizing systems and in their destruction. Moreover dialectical logic forced the authors to consider a person as a polysyllabic phenomenon, since by participating in market transactions, a person realizes the values, norms of behavior and principles of attitude towards his partners that he acquired in society. It is in this context that the subjective component of the processes of self-movement of systemic integrity in the economy, society and technology performs the function of synchronization of the processes of their self-movement. Actually the same idea was brilliantly formulated by E. Durkheim (1895) in the sense that Homo Sapiens is always and to the same extent also Homo Socius.

As a result, the authors made the assumption that the societal and economic crises accelerated by the coronavirus pandemic have causes being matured for the long period and led to a violation of the coordination (synchronization) of changes in the economic and social systems due to inadequate socialization of subjects. Thus, it is about an essential fundamental problem of our time - inadequate socialization of subjects within the

framework of the economic and social systems, which destroys the dialectic of their interaction.

If this is a legitimate conclusion, then the subject as the center of self-movement of systemic integrities in the economy and society should also be dialectically interpreted as a self-organizing and self-developing system. Moreover the processes of self-organization and self-development of a person predetermine the mechanism of his self-creation, when the goals, intentions and inclinations of individuals influence on the structural ties of the society as well as of the economic system. At the same time, social institutions also have a reverse effect on individuals, adjusting their goals and preferences. According to A. Giddens, a structure is "recursively organized rules and resources" (Giddens, 1982. P. 35). Commenting on the theory of A. Giddens, I. Craib argued that structure and individual activity are thought of as "two sides of the same coin" (Craib, 1992; Hodgson, 1988). According to these scientists, considering social practices it becomes possible to see actors and their actions or it is about the structures they create". In other words, the constant interactions of individuals form the structure of society, which structures the behavior of individuals through social institutions. The quality of the integrity of the society in which individuals are socialized influences on its stability.

The situation was aggravated by the fact that on the eve of the COVID-19 pandemic i.e. at the very end of the period of self-organization of economic systems the disrupted dialectic of economics and society manifested itself in numerous social problems. It is about catastrophic polarization of the population in terms of income and wealth, a growing number of working poor, a shrinking middle class, social inequality in access to education and the health care system, gender inequality, etc. In such conditions, the socialization of subjects definitely ceases to serve as a mechanism for restoring the dialectic of the relationship between the economy and society at the national level.

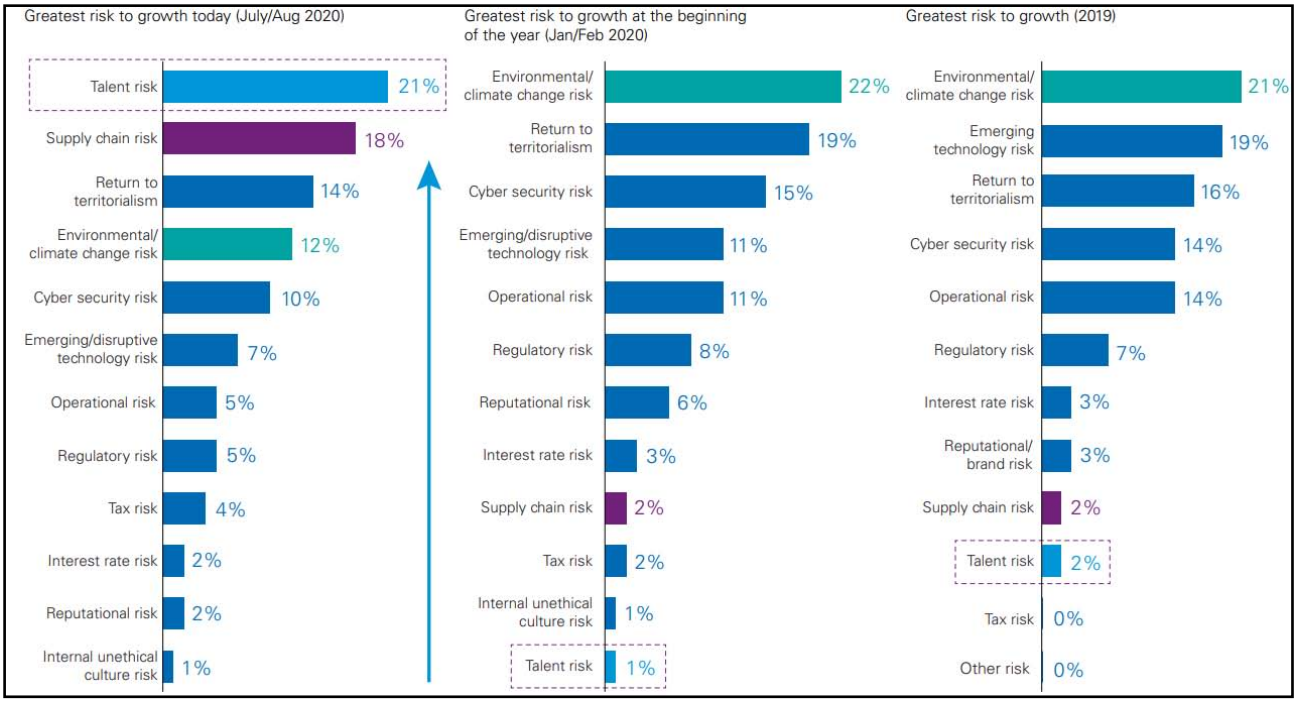
Post-covid reality and the dialectics of self-organization of a human: between the Scylla of education and the Charybdis of socialization

Summing up all of the above, it is necessary to highlight the main essential problem of our time, the solution of which should be based on the paramount importance of the subjects with the qualities of intellectual autonomousness. A critical mass of such talented individuals is able to form a new technological base for a self-developing economy and society, restoring, first of all, the dialectical relationships between them. However, the complexity of the formation of such a subject is associated not only with the fact that it must be adequately socialized, embodying the goals and objectives of social progress. This person must first of all be self-organized. And this means the optimal combination (dialectic) of adequate socialization and high-quality education. In other words, education and socialization are dialectically related mechanisms of self-organization of the individuals. Only the optimization of these processes will allow a person to make a dialectical leap towards self-development as an intellectually autonomous person. Only with such a personality is the post-covid future associated.

On the eve of the coronavirus pandemic, the quality of socialization of people left much to be desired, but with education the situation was even more deplorable. According to the World Bank (World Bank, 2020) the learning crisis due to the COVID-19 pandemic manifests itself in the following: (1) 258 million children and youth of primary- and secondary-school age are out of school; (2) ... the learning poverty rate in low- and middle-income countries was 53 percent; (3) … the crisis was not equally distributed: the most disadvantaged children and youth had the worst access to schooling, highest dropout rates, and the largest learning deficits; (4) the world was already far off track for meeting Sustainable Development Goal 4 (UNESCO, 2016a, 2016b; UNESCO, UNICEF, the World Bank and OECD, 2021).

And at the same time trends in the Global labor market is as follows: (a) 85% of the global workforce are low- and mid-skilled workers; (b) 13% global population growth by 2030 will be accompanied by professions' changes due to automation and digitalization by 1/3; (c) 27% of new activities will emerge by 2022; (d) the share of Gen Z'ers will be 26% of the total workforce by 2025 (Boston Consulting Group, 2019). In such a situation, education with optimal socialization will play a decisive role in self-organization of a person in order to get the qualities of intellectual autonomy. Only self-developing individual will ensure the formation of a new technological paradigm as the basis for the dynamics of the socio-economic system after COVID-19.

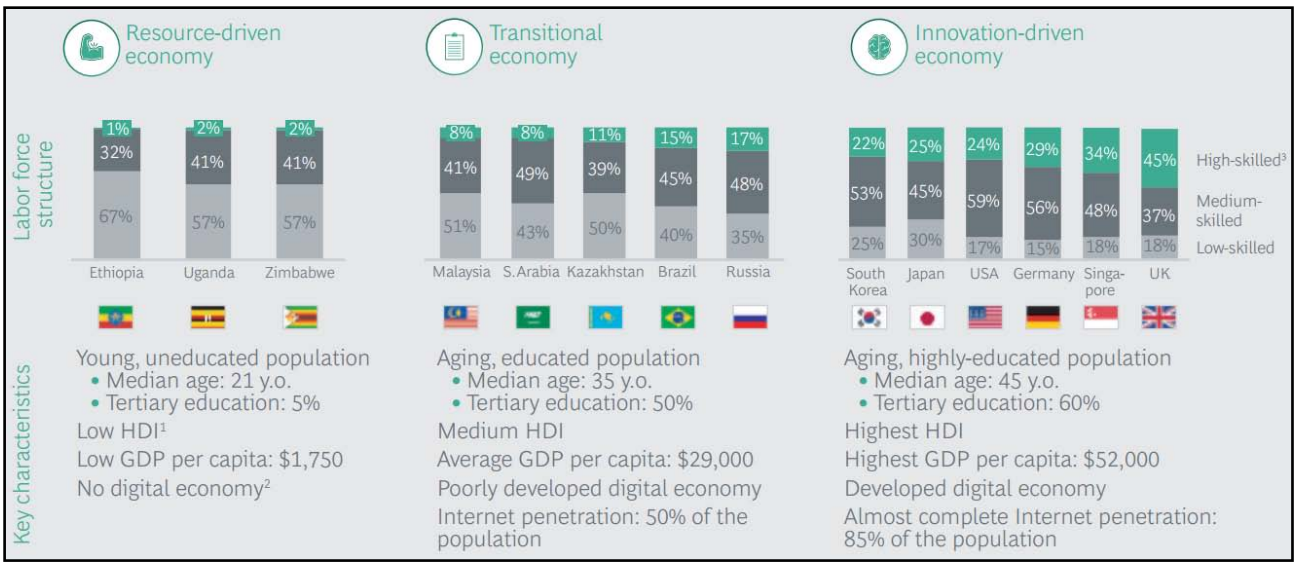
In January 2020, CEOs ranked talent risk behind 11 other risks to growth. However, since the start of the pandemic, talent risk has risen to be named as the most significant threat to their businesses ahead of supply chain, the threat of a return to territorialism and environmental risk (Fig. 5).



Source: KPMG (2020). CEO Outlook COVID-19 Special Edition

Figure 5: CEOs: Changing threats to growth

It is no coincidence that in 2019 BCG experts published the concept of human centricity in connection with the necessity of overcoming the skills mismatch (Boston Consulting Group, 2019). According to the BCG estimates, the growth of the world population from the current 7.6 billion to 8.6 billion by 2030 will be accompanied by changes in the age structure: by 2025, the world's workforce will consist of 26% Generation Z'ers, 37% millennials (Generation Y'ers), 28% Generation X'ers, and 9% baby-boomers. With the rapid development of the newest technological paradigm and the humanitarian catastrophe caused by COVID-19, economic and societal crises, a lost generation due to socio-economic problems and the transition to distance education, a human and the factors that predetermine his self-development in terms of becoming a person with the quality of intellectual autonomousness, become a priority in the construction of reality after COVID-19. Before the coronavirus pandemic the share of highly-skilled employees is highest in countries with high GDP per capita and in an innovative economy – 22% to 45% vs. the world average of 15% (Fig. 6). Already these data indicate that without the self-organization of a person, taking into account the quality of ensuring his health and the level of education, further technical progress, solving socio-demographic problems, and associated cultural transformations will be impossible.



Notes: 1 Human development index, UNDP 2016; 2 E-Intensity digitalization index, BCG; 3 Based on Rasmussen's methodology: High-skilled – "knowledge" labor force that performs analytical, creative tasks under uncertainty. Medium-skilled – "rule" labor force that performs routine cognitive tasks. Low-skilled – "skill" labor force that performs repetitive primarily physical tasks.

Source: Boston Consulting Group (2019). Mission Talent: Mass uniqueness: A global challenge for one billion workers. BCG August

Figure 6: The increasing complexity of the economy is changing the requirements for human capital development

Trends on the eve of COVID-19, characterizing the labor force structure in Fig. 6, are impressive: high-skilled or "knowledge" labor force varies from 22% in innovative-driven economy in South Korea to 45% in the UK. Moreover aging of highly-educated population is 45 (median age) as well as tertiary education is 60%.

Wherein according to the BCG estimates, the skills mismatch in 2019 affects 1.3 billion people, and every year the global economy pays a 6% tax in the form of lost labor productivity (BCG estimate based on OECD data, 2016). And in connection with the COVID-19 pandemic and the accelerated processes of digitalization of the activities of companies, consumers, workers, etc. one can only agree with the opinion of practitioners that without the introduction of human-centric principles of organization in all spheres of human life in the foreseeable future it will be difficult to approach at least 50% of the share of talented employees in teams. That is why the authors insist that the problem of adequate education, necessary for the formation of the qualities of intellectual autonomousness in a graduate, is much more complicated than associating it with a simple accumulation of individual human capital.

This problem is not only of theoretical importance. Today, in the process of exponential growth of the possibilities of the 4th technological revolution, mankind may enter a strip of accelerated progress in all spheres of human life, and may miss this chance as well. The conditions under which a chain reaction of techno-evolution, self-development of the economy and social progress will begin, depends on the state of society, or rather on the position of a person in it. Klaus Schwab (2016) associated this phenomenon with the capability of the technological revolution 4.0 to return the "human capabilities to a man".

Proof of the replacement of tangible assets by intangible ones as drivers of systems formation processes in the economy becomes the following trends. According the McKinsey Global Institute experts, over the past quarter of XX century the scope of intangible assets represented by the knowledge economy with its intellectual property, research, technology, software, etc., has risen inexorably. For this period, in the United States and ten European economies (Austria, Denmark, Finland, France, Germany, Italy, the Netherlands, Spain, Sweden, and the United Kingdom) the investment into the intangibles has increased by 29 percent. But the COVID 19 pandemic has accelerated greatly this shift toward a dematerialized economy (McKinsey Global Institute, 2021).

Experts are paying more and more attention to the potential of effective mechanisms for the restoration of the economy and society in the post-covid future. And the above data suggests that the structuring of future reality will increasingly be based on skills, knowledge, digital and other technologies, and, in particular, on investments in intangible assets. Thus, the future reality becomes more and more dematerialized (Haskel, et al.,

2017). This means that the intellectually autonomous person becomes its main architect. But if conditionally estimating the period of study in the secondary education system at 9-12 years, then the loss of at least one young generation (X, Y, Z) turns into a 30-year period of socio-economic stagnation or regression. So, the waste of time on realizing this truth is the loss of young generations, which could begin to form the general contours of the future world in a dozen years.

III. Results and Discussion

The problem of education is eternal. The experts usually describe it, highlighting the main reasons for the decline in the quality of knowledge, and justifying new and the newest technologies (Romer, 1986; UNESCO, 2016a, 2016b). In 2018 г. in its World Development Report World Bank (World Bank, 2018), and subsequently other analytical institutions (World Bank, 2020; The Economist, 2020) came to the disappointing conclusion that the modern education system is in crisis. Following dialectical logic and considering all of the above, the authors tried to highlight the essence of the problem of the ineffectiveness of the educational process, taking into account more and more advanced methods of presenting material, more and more skillful teaching technologies, etc. In this context, it should be emphasized that the authors first discuss the educational component of the process of self-organization of the individual.

The starting point in the study was the basic methodological principles of teaching, which were brought together by the famous Soviet educator A.A. Pinsky (1978) to the following three: «what to teach», «how to teach» and «how to learn» (Fig. 7). As for the first two – «what to teach», «how to teach», they are quite skillfully implemented in the educational process. As for the 3rd component of the Pinsky triad – «how to learn», then it has turned out to be the weakest element of the modern education system. This is largely due to the fact that the problem of implementing this principle turned out to be the most difficult. Meanwhile, the current state of the education system has made the principle of "how to learn" the most demanded, especially in connection with the massive transition to distance learning during the COVID-19 pandemic.

Indeed, not having taught the student to learn, the teacher makes the first two components – “what to teach” and “how to teach” meaningless. The main reason for the unresolved problem of "how to learn" (or rather "to teach how to learn") lies in the fact that the modern education system simply ignores it. And, meanwhile, from a philosophical point of view, this problem can be presented structurally. If the learner and the teacher are a dialectical pair, then their connection can be represented using the methodological principles of teaching: then the teacher is associated with “how to teach”, and the learner is associated with “how to learn”. Their dialectical unity is determined by the quality of mastering the subject - "what to teach" (and at the same time "what to learn"). If the degree of the student's mastery of the academic discipline is high, then the difference between “what to teach” (on the part of the teacher) and “what to learn” (on the part of the student) is reduced. Otherwise, this gap increases. It follows that the degree of mismatch between “what to teach” and “what to learn” predetermines the quality of education in all disciplines in general. What underlies the inhibition of the gap between "what to teach" and "what to learn", provided that both the student and the teacher strive to increase the level of mastery of the subject? According to the authors, the psychological and cognitive barriers (PCB) predetermine such a brake (Pilipenko, 1997). PCBs function both in the educational consciousness of students and in the professional consciousness of teachers.

Hence it follows that the main reason for the low level of education lies in the presence of PCBs, or rather, in the fact that they have not been overcome both in the educational consciousness of students and in the professional consciousness of teachers (Pilipenko, at al., 2015). The PCB theory structures the problem of the difficulties of mastering scientific knowledge, typical mistakes and misconceptions in the most general form, serving explanatory, diagnostic and predictive tools. It is aimed at identifying the sources of many students' difficulties in the process of mastering an education subject, at developing general approaches to prevent and overcome the PCBs.

The methodological approaches of the PCB theory in teaching represent the new basis for the creation of innovative educational technologies and aim at generating the intellectually autonomous personalities for post-pandemic reality (Maor, et al., 2017). At the same time, the model of real cognitive consciousness of students could become a new pedagogical tool designed to identify cognitive difficulties, their diagnostics, and to organize their reflection (self-reflection) to students (in the minds of students).

Application of the Pilipenko theory of PCB (Pilipenko, 1997; 2015; 2020) and the generalized model of the real cognitive consciousness of students in education act as a new multifunctional pedagogical tool that allows:1) to carry out a causal diagnosis of students' cognitive difficulties; 2) to organize reflection and self-reflection of the students for the identifying unproductive cognitive strategies; 3) to design innovative educational technologies focused on the development of human capital as an important factor of the formation and development of the knowledge (intangible) economy of the future; 4) to solve effectively the third problem of the Pinsky triad - how to learn or, somewhat broader, how to teach to learn. The psycho-

pedagogical activity organized in this way could significantly increase the effectiveness of studying.

The PCB theory allowed revealing the phenomenon of risk behaviour of students, predetermined with the presence of many irresistible PCBs in their educational consciousness. It is this phenomenon that is manifested in the students' stress, in the formation of their image of complete uncertainty and, naturally, in their weak current educational results, which today are defined as school (educational) failure (Pilipenko, et al., 2021a, 2021b). And, meanwhile, the ability to overcome the PCBs in the learning process is the most important quality of an intellectually autonomous personality. A high level of education allows an individual to adapt to any uncertain environment, identify problems in professional activity, understand the reasons for their occurrence and make a non-trivial decision from the set for their successful solution (The Economist, 2020a; Dam, 2019).

Based on the developments of Russian scientists in the field of human psychology (Slobodchicov, et al., 1995; 2020; 2013), human development psychology (Slobodchicov, et al., 2020] and educational psychology (Slobodchicov, et al., 2013), the authors highlighted the fundamental changes associated with education in the context of the conditions for constructing a human-centric system on the technological basis of the 4th industrial revolution. For the purposes of constructing post-covid reality, education should be aimed at the formation of an intellectually autonomous personality capable of self-development on the basis of the qualities of reflection (self-reflection) and transcending acquired in the educational process (Ananiev, 1977; Ushinsky, 2005; Vygotsky, 1960; Slobodchicov, et al., 2013; Piaget, 2008; Elkonin, 1989). This is preceded by the minimization of the gap between “what to teach” (from the side of the teacher) and “what to learn” (from the side of the student) in the learning process, which indicates the formation of the ability to overcome the PCBs of the participants in the educational process. Then, upon completion of training, individuals capable of self-development objectively need socialization (integration, inclusion into the various structures of society), since it mediates their self-development.

It is necessary to emphasize here that the educational component of personality self-organization is only one side of the dialectical pair of phenomena. Its second side is the socialization of the student. Only the provision of the dialectic of education and socialization of the individual will allow to complete its self-organization and, at the "exit", to obtain an intellectually autonomous personality for capable of self-development. Thus, it is only as a result of education that a person develops dialectically interconnected abilities for reflection and for transcending, which predetermine his socialization. In this process, a self-developing personality structures his inner subjectivity in the process of his self-organization, and objectifies it outwardly by transcending. From a theoretical point of view, a self-developing intellectually autonomous individual is distinguished by the ability to reflect or to realize the boundaries of his own subjectivity and the ability to transcend these boundaries, which opens up new opportunities for the realization of the individual self outside of him (in society). The latter is the content of the process of socialization (inclusion) of the individual into various structures in society.

It is in this sense that the essence of the technological revolution 4.0 is realized under the condition of in-depth knowledge of mankind about what is actually human in a human. The dialectic of the interaction of reflection as a result of learning of an individual and transcending as the basis of his socialization predetermines the essence of the mechanism of human self-development. If a person in the process of education was unable to form the ability to transcend, then this means that in the process of self-reflection he did not learn to overcome the PCBs. As a result, his level of education and ability for self-reflection are insufficient to become an intellectually autonomous person in an uncertain reality, and to fully realize himself through transcending. This makes him helpless in overcoming the diverse PCBs that he may face in an uncertain future.

It is logical to assume in this regard that the crisis of modern education is caused by the growing gap between a person's ability to self-reflection and his ability to transcend, i.e. between the self-organization of his inner subjectivity and self-development as a manifestation of his individuality (self) outside in the form of intellectual autonomousness. This is essentially. In practice, it is about breaking the dialectic of self-organization of a person, which must harmonize the ability to learn (self-education) and to transcend (to socialize himself or to integrate into society). Moreover, the authors insist that the ability to overcome PCB both in education and in socialization is the main distinguishing feature of an intellectually autonomous personality. Then the crisis of modern education (for some reason they forget about socialization) is, first of all, the failure of a person to overcome PCBs. And, meanwhile, the role of PCBs in self-organization and self-development of a person, the ability to overcome them play a fundamental role in self-movement of the human. In addition, in this case, overcoming the PCBs mediates a turning point in the operation of the dialectical laws of unity and struggle of opposites, the transition of quantitative changes into qualitative and double negation. Something similar is described by the authors in relation to the embeddedness of shocks in the mechanism for the implementation of the above laws (Pilipenko, 2021b).

From a philosophical point of view, the crisis of modern education can be assessed in context of its impact on the integrity of society and the individual as dialectic of unity in diversity. If an individual in education has not acquired the ability to transcend, then socializing him into the structure of society does not strengthen the latter (at best, it does not change). In this state, society is ready for a quick breakdown of structural ties in extreme conditions, since only a self-developing personality with a high ability to transcend is able to quickly solve extraordinary problems. Yet another demonstration of the ultimate state of modern systems is the unprecedented decision of the governments to sever structural ties in the fight against the COVID-19 pandemic. Moreover, in a new quality, they will be restored only in the process of constructing a new reality. In other words, the societal crisis, as well as the economic crisis itself, were objectively predetermined by the state of structural ties, which gradually lost their integrity as a person lost (or limited) his abilities for self-reflection and transcending at the end of the learning process.

What are the problems with modern educational researches? They manifest itself in the following:

The absence of a dialectical view of a human as a complex system, self-sufficient and capable of endless self-movement;

The failure to investigate a human phenomenon taking into account the dialectics of self-organization and self-development of a person;

The gap of the dialectical interrelation of education and socialization as a dialectical pair of phenomena that predetermine the essence of human self-organization. As an illustration, the authors cite the already established professional judgment about the trends in the education of the future, formed by the WEF experts (Table 1) (World Economic Forum, 2015; 2021).

Table 1: Definitions of the 21st-century skills

	Skill	Definition
Foundational Literacies	Literacy	Ability to read, understand and use written language
	Numeracy	Ability to use numbers and other symbols to understand and express quantitative relationships
	Scientific literacy	Ability to use scientific knowledge and principles to understand one's environment and test hypotheses
	ICT literacy	Ability to use and create technology-based content, including finding and sharing information, answering questions, interacting with other people and computer programming
	Financial literacy	Ability to understand and apply conceptual and numerical aspects of finance in practice
	Cultural and civic literacy	Ability to understand, appreciate, analyse and apply knowledge of the humanities
Competencies	Critical thinking/ problem-solving	Ability to identify, analyse and evaluate situations, ideas and information to formulate responses and solutions
	Creativity	Ability to image and devise new, innovative ways of addressing problems, answering questions or expressing meaning through the application, synthesis or repurposing of knowledge
	Communication	Ability to listen to, understand, convey and contextualize information through verbal, nonverbal, visual and written means
	Collaboration	Ability to work in a team towards a common goal, including the ability to prevent and manage conflict
Character Qualities	Curiosity	Ability and desire to ask questions and to demonstrate open-mindedness and inquisitiveness
	Initiative	Ability and desire to proactively undertake a new task or goal
	Persistence/ grit	Ability to sustain interest and effort and to persevere to accomplish a task or goal
	Adaptability	Ability to change plans, methods, opinions or goals in light of new information
	Leadership	Ability to effectively direct, guide and inspire others to accomplish a common goal
	Social and cultural awareness	Ability to interact with other people in socially, culturally and ethically appropriate way

Source: World Economic Forum. (2015) New Vision for Education Unlocking the Potential of Technology, WEF Report, Geneva, Switzerland, p.23

Table 1 does not even highlight the results that education, on the one hand, and socialization, on the other, should provide. And without such a division, it is difficult to identify ways to bridge the gap between what is and what one would like to have, through education and with the help of socialization;

Misunderstanding of the importance of a person's ability to overcome PCBs both in professional activity and in life in general;

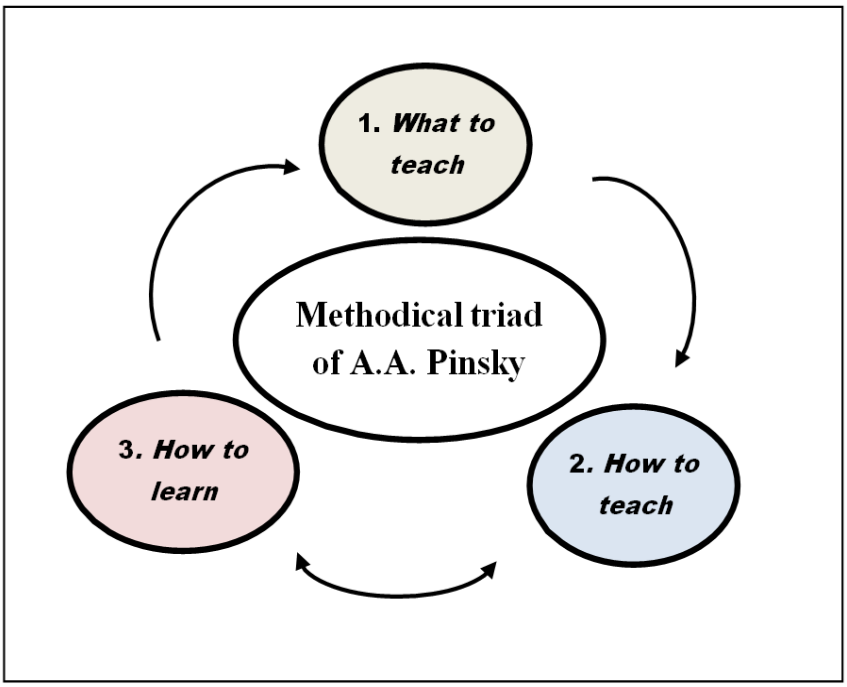
Underestimation of the role of intellectually autonomous individuals in the structuring of future reality, etc.

Thus, education in dialectical unity with the socialization of the individual has a priority role in the construction of the future post-covid reality. In this context, it becomes clear why the future intangible economy is the result of the professional activity of individuals with the qualities of intellectual autonomousness and of adequate socialization, capable of overcoming all barriers in their life path.

IV. Empirical Evidence

The authors propose analytical models that make it possible to concretize two dialectical components of a human self-organization. First, it is about education, and then the assessment of socialization is given.

Considering the problem of constructing an educational process focused on the formation of an intellectually autonomous personality, the authors proceed from the following provisions (considerations). First, we offer the following, more modern, interpretation of the triad of the methodological system proposed in the 50s of the XX century by A.A. Pinsky (Pinsky, 1978) (Fig.7):



Source: the authors' development

Figure 7: Methodical triad of A.A. Pinsky

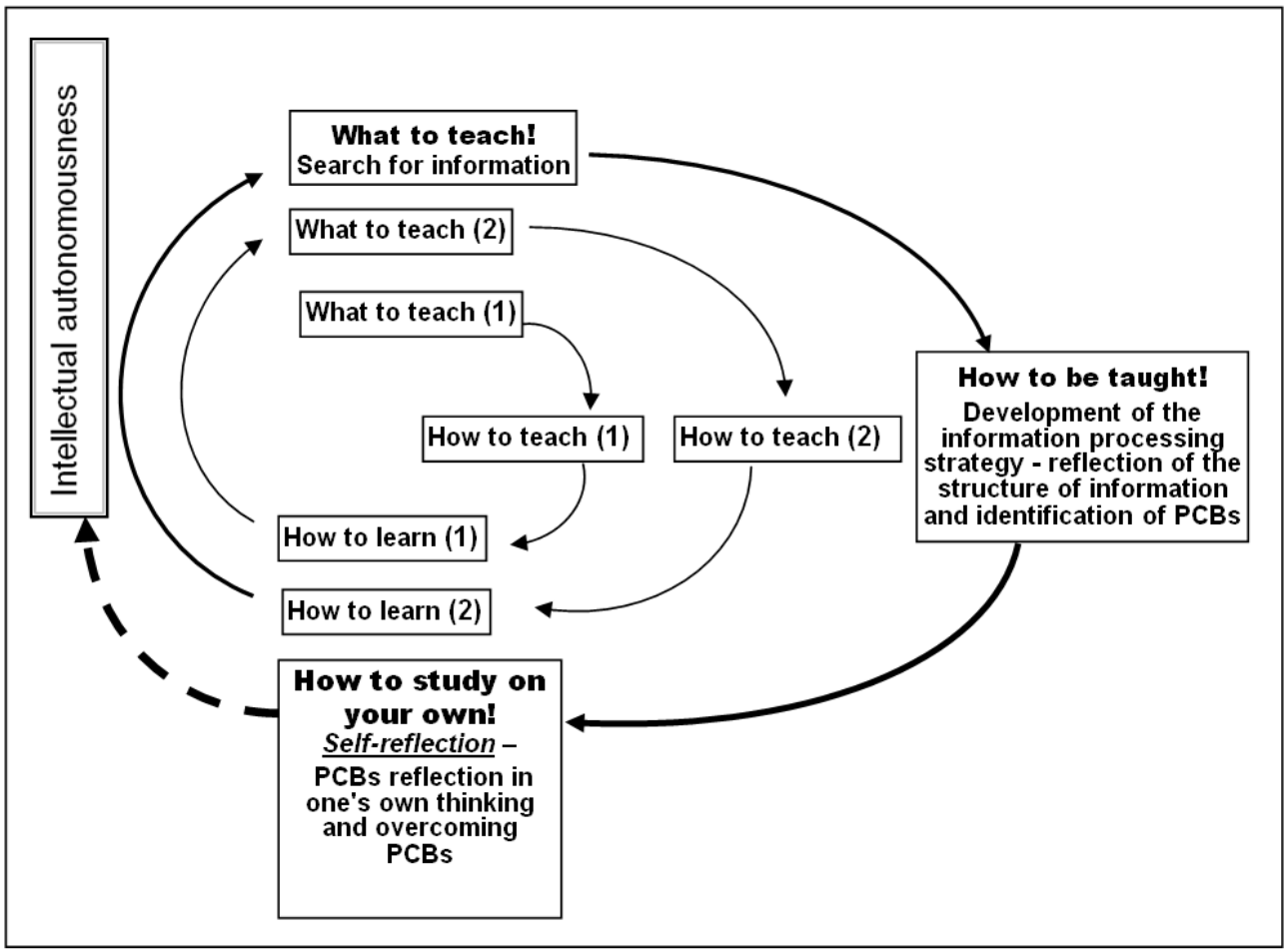
1. "What to teach" should be considered as an object component of the process of self-organization of the intellectual and cognitive sphere of a person-learner;
2. "How to teach" should be considered as a subjective component of the process of self-organization of the intellectual and cognitive consciousness of a person-learner, which is based on reflection when processing information structured by the teacher;
3. "How to learn" should be considered as a process component of the self-organization of the intellectual sphere of a person-learner, based on self-reflection.

In the opinion of the authors, the active role of students in the creation or construction and structuring of knowledge is based on their own cognitive activity through reflection of the methods (samples) of structuring educational and scientific information by the teacher. Through self-reflection of their own mental strategies students form the basis of the content of the element of the triad "how to learn". Moreover, self-reflection should be understood as a formula: "I know not only what I know, but I also know why I know it and how I know it." (How I think about my thinking).

Second, in the process of self-movement of a student, ultimately, his transition from self-organization

to self-development takes place. The main role in this process is played by the timely organization of overcoming numerous PCBs, objectively functioning in the educational consciousness of the student / the learning person and in the professional consciousness of the teacher. Therefore, the next mandatory point is the application of the theory of PCB in teaching (Pilipenko, 1997, 2015, 2020). It should be noted that it is the self-reflection formula that opens up the opportunity to independently overcome psychological and cognitive barriers. It is characteristic that PCBs, on the one hand, are the point of discrepancy between the planned and actual level of knowledge assimilation. And on the other hand, their successful overcoming mediates the action of the above mentioned dialectical laws of development.

Application of the technology of overcoming the PCBs in the cycles of the triad of A.A. Pinsky provides the transition of the learning personality from the cycles of the triad to the spirals of the expanding cognitive consciousness. This model is presented in Fig 8. It contains the principles responsible for the processes of self-organization in the consciousness of the student / the learner.

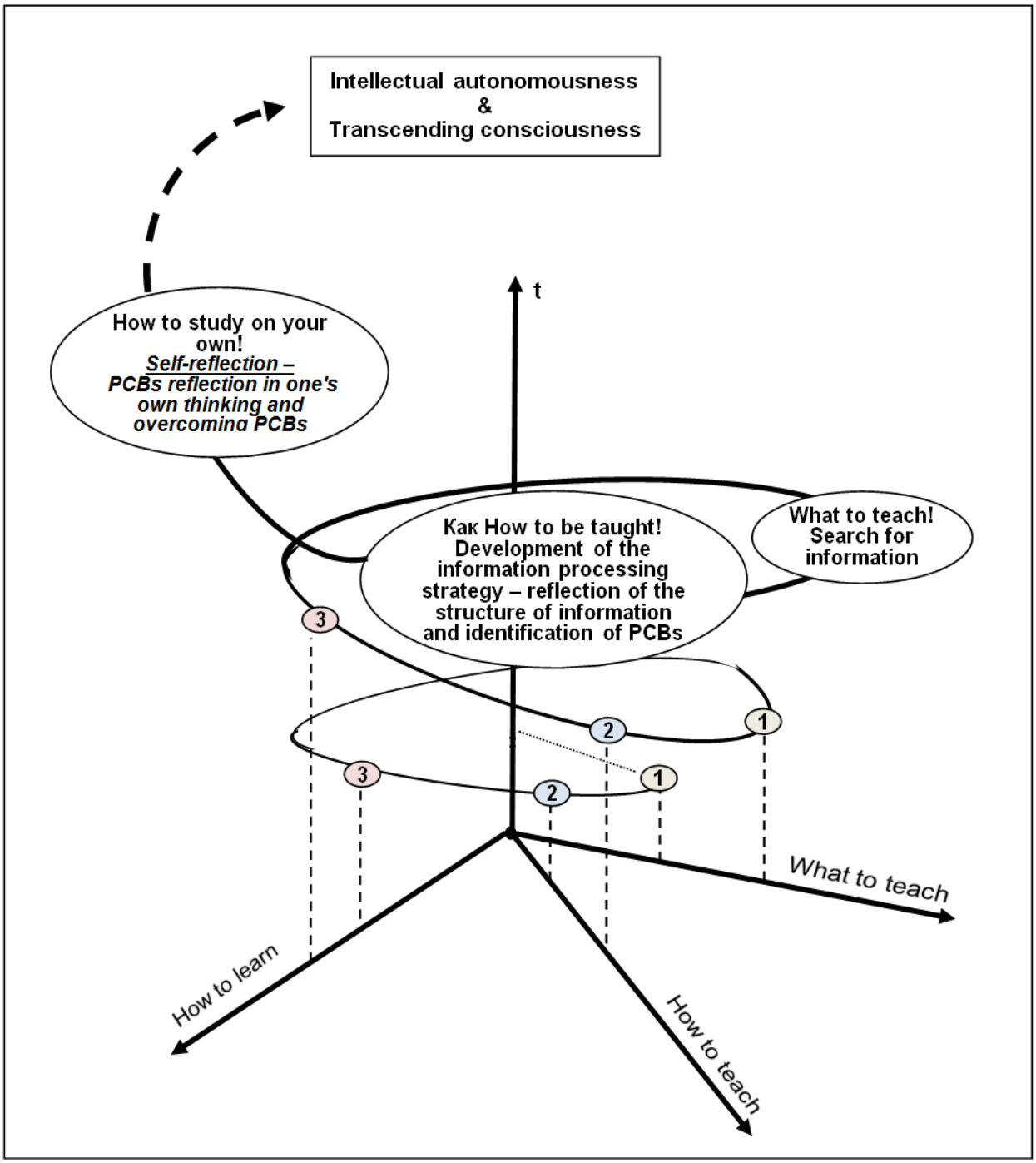


Source: the authors' development

Figure 8: The spiral of self-organization inherent in the methodological triad of A.A. Pinsky, taking into account the functioning of psychological and cognitive barriers in the expanding educational consciousness of the student (view from above)

The logic result of the educational activity described in Fig. 8 is the formation of an intellectually autonomous personality, capable of independently overcoming PCBs both in professional activity and in the field of social communication.

Figure 8 corresponds to the temporal interpretation (Fig. 9) of the development of the "spiral galaxy" of the reflective consciousness of the student in the direction of the intellectually autonomous personality.



Source: the authors' development

Figure 9: Time scan of the development of the "spiral galaxy" of the reflective consciousness of a student in the direction of the intellectually autonomous personality

Below the authors represent a differential model of the student's educational trajectory

Let the variable *x(t)* characterize the level of the student's ability to independently process scientific and educational information that comes from the teacher. It is necessary to characterize its focus on the student's effective perception of the variable *y(t)*.

Under these assumptions, it is possible to construct a system of differential equations (1), which, in the first approximation, would satisfactorily reflect the rates of supply and processing of information by the teacher and student, respectively.

$$\begin{cases} \frac{dy(t)}{dt} = x(t) + y(t)\left(x^2 + y^2 - 1\right) \\ \frac{dx(t)}{dt} = -y(t) + x(t)\left(x^2 + y^2 - 1\right) \end{cases} \quad (1)$$

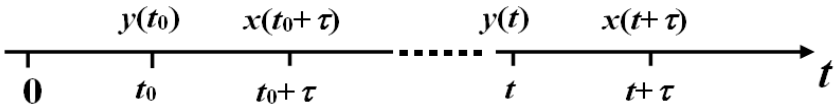
At the same time, it should be noted that the speed of educational information delivery by the teacher is focused on the student's capabilities (displayed by the term $x(t)$) and contains a certain author's core $y(t)(x^2+y^2-1)$, characterizing the cyclic trajectory of the educational process.

As for the speed of processing the educational material by the student, then, first, there is a distortion of the information received (displayed by the variable $y(t)$ taken with a minus - the term $-y(t)$), and second, the core of information is also partially blurred - $x(t)(x^2+y^2-1)$.

In other words, the student's real cognitive representations are far from the cognitive (ideal!) models formed by the teacher. The phase portrait of the simulated educational trajectory is shown in Fig. 10. It should be noted that the system of differential equations (1) can be modified taking into account the lag time (τ) of the process of generating the knowledge structure in the student's educational consciousness (see system (2)).

$$\begin{cases} \dfrac{dy(t)}{dt} = x(t+\tau) + y(t)\left[\left(x(t+\tau)\right)^2 + y^2 - 1\right] \\ \dfrac{dx(t)}{dt} = -y(t) + x(t+\tau)\left[\left(x(t+\tau)\right)^2 + y^2 - 1\right] \end{cases} \quad (2)$$

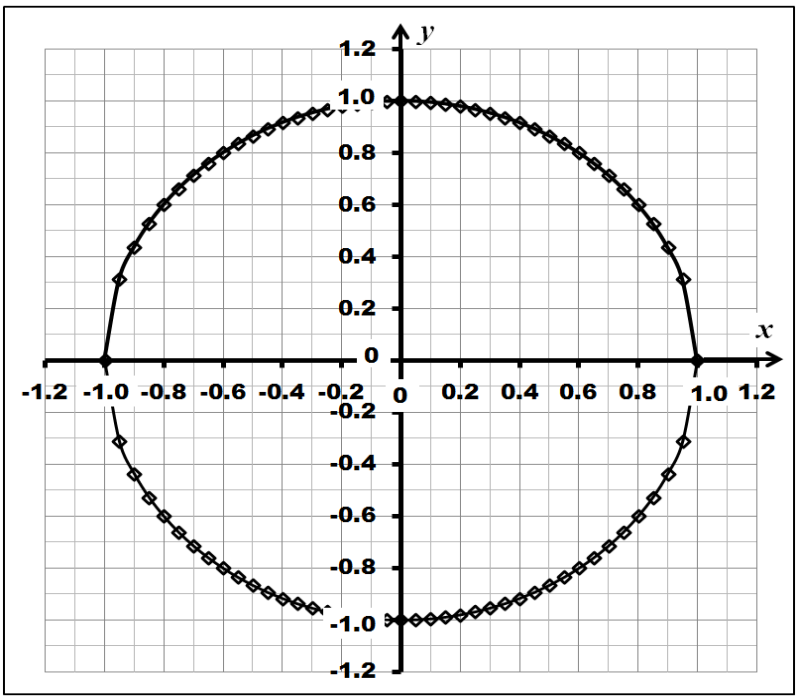
The phenomenon of delay in students' processing educational information received from a teacher, noted in system (2), is explained by Fig. 10 and 11.



Source: the authors' development

Figure 10: Graphical interpretation of the "actuation" of the lag time τ when the student processes the information received at the initial t_0 and arbitrary t moments of time

Thus, in education, as one of the components of human self-organization, there is a problem of dialectical interaction between a teacher and a student, which is associated with the degree of assimilation by the student of the information received from the teacher. This is what makes it possible to understand the importance of psychological and cognitive barriers in the interaction of participants in the educational process. Their incorporation into the vertical structuring of the educational trajectory allows the student, provided that PCBs are successfully overcome, to move from one structural level of his self-organization to another, and then to make a dialectical leap from the stage of their self-organization to the stage of self-development.



Source: the authors' development

Figure 11: Trajectory of system (1) in Cartesian coordinates XOY (phase portrait of a model educational trajectory)

As for the second component of the student's self-organization dialectic, the authors will demonstrate the features of socialization using the example of Russian schoolchildren before the COVID-19 pandemic. As to the dialectical interrelation between the education and socialization in the process of the human self-organization, several generalizations could be made:

1. According to J. Rasmussen (1983), the structure of the labor market can be divided depending on the categories "Skill", "Rule" and "Knowledge" into three segments. Structuring after the pandemic of the future knowledge economy/ intangible economy will occur mainly due to the third segment of "Knowledge". And in this context of the great importance becomes education, since its result should be the formation of intellectually autonomous personalities. This segment is represented by highly skilled, intellectual workers capable of solving cognitive non-routine tasks;
2. The formation of such an employee is determined by the potential of the secondary school in terms of the qualitative solution of the problem of the third element of the Pinsky triad — "how to study", according to the PCB theory. From the point of view of the level of the school graduates learning, this should have a triple effect: first, to strengthen such components of their 21st-century skills as competencies and character qualities (Table 1), secondly, to increase the educational success (satisfaction) of students, which, in third, objectively initiates the growth of their economic success (satisfaction). It should be noted that the 1st and 3rd above conclusions have a pronounced relation to socialization;
3. Since the main result of a student's self-organization should be his formation as an intellectually autonomous person capable of creating in a non-material economy of the post-like future, then all budgetary expenditures and private financing of the education system should be interpreted as investments in a future national project. And the effect of its implementation should have a very definite economic assessment. Improving the quality of education in terms of the ability of students to completely overcome the PCB and better process and assimilate information objectively leads to an increase in the number of intellectually autonomous people who can multiply the economic effect in the knowledge economy after the pandemic. Under these circumstances, it is possible to estimate the economic return on the capital invested in education. It should be emphasized that an intellectually autonomous person combines both the qualities of high intellectual abilities, but also the desire to serve the national community (and this is already adequate socialization).

Below is the authors' assessment of the relationship between education and socialization of students in the process of their self-organization in Russia. The international PISA study revealed that in 2015 about 28% of the Russian 15-year-old students did not master the minimum necessary skills in at least one of the three areas (natural science, mathematics, and communication on their native language). By the way, in most OECD countries those indicators were much lower. This situation makes it possible to assess the level of educational failure, which prevents the formation of the necessary conditions for achieving a high level of learning and socialization in the country.

Besides, the educational failure has certain economic evaluations. So according to experts of the Centre for Strategic Research (Russia) (Centre for Strategic Research, 2018. P.3), the reduction of school unsuccessfulness twice (in our case up to 15% of all unsuccessful) corresponds to an increase in GDP growth by an additional 2% on a 10-year horizon (annual growth of 0.2%), by an additional 5-6% on a 20-year horizon (annual growth of 0.25%) and by an additional 10% on a 30-year horizon (annual growth of 0.3%). It should be noted that this effect can be achieved only if the success in education is coordinated and the value priorities of graduates and social norms are coordinated. Otherwise, the violation of the dialectical connection between education and socialization can lead, at best, to a zero amount of gain, and at worst to significant negative consequences. This conclusion was supported by the events accompanying the societal crisis caused by the coronavirus pandemic.

The correlation between educational and economic failure is high. The increase of students' economic success occurs in the process of modernization and of solution of the problem of the simultaneous rapid growth of the category "Knowledge" and the reduction of the categories "Rules" and "Skill" in the preparation of schoolchildren. This effect, according to experts of Boston Consulting Group (2017, pp. 56-57), is estimated at an additional 1.5% of annual GDP growth, which makes it possible to obtain a cumulative effect of 10 trillion roubles in current prices by 2025. The economic success as a result of adequate ion of the graduate demonstrates the state of sufficient conditions, necessary for intellectually autonomous humans to desire to become main drivers of future knowledge economy after pandemics.

Below there are presented the calculations that evaluate the Russian educational system as an investment project connected with formation of intellectually autonomous humans, highly educated and adequately socialised (Pilipenko, et al., 2019).

(1) We take half of the Russian graduates of basic school (grades 8-9) who have only a basic level of education, i.e. can use the knowledge gained at school in simple familiar situations. At the same time, about a fifth of the graduates of the basic school do not reach the threshold level of the formation of functional literacy in accordance with international requirements.

Moreover, from the beginning it is taken for granted that the problem of eliminating school failure couldn't be immediately solved, therefore an additional 0.2% annual GDP growth rate due to the reorientation of the teaching technology, an increase in the level of learning and socialization can be observed only from 2022. And before this year, it would be ideal to get additional GDP growth of at least 0.1% per year.

In order to compare the described estimates, the forecast data of GDP growth at current prices for the period 2000-2025 were constructed (Fig. 11).

To study and predict the dynamics of GDP_t, we use the capabilities of the adaptive Brown model (Brown, (1962).

The calculated value at a time moment $t+\tau$ is obtained according to the equation

$$Y_{Br}(t-1+\tau) = a_0(t-1) + \tau \times a_1(t-1), \quad (3)$$

where τ – forecast horizon (lead interval or number of prediction steps).

If $\tau = 1$, then the formula (3) takes the form:

$$Y_{Br}(t) = a_0(t-1) + 1 \times a_1(t-1). \quad (4)$$

This value is compared with the actual level of the time series Y_t and resulting forecast error $e_t=Y_t-Y_{Br}(t)$ is used to adjust the model. Adjustment of parameters is carried out according to the formulas:

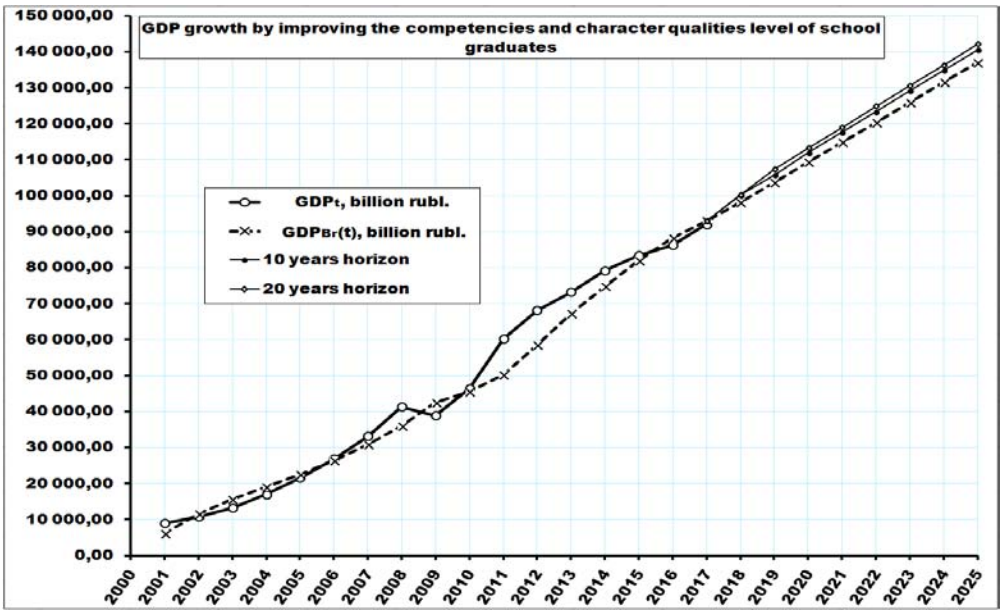
$$a_0(t) = a_0(t-1) + 1 \times a_1(t-1) + e_t(1-\beta^2) \quad (5)$$

$$a_1(t) = a_1(t-1) + e_t(1-\beta)^2, \quad (6)$$

where β — coefficient of data discount rate, reflecting a greater degree of confidence in earlier data. Its value varies from 0 to 1. In the calculations, the value is taken as $\beta = 0.8$.

Model modification process ($t = 1, 2, ..., N$), depending on current forecast qualities, ensures its adaptation to new patterns of development. The model obtained in the last step is used for forecasting (if $t = N$, where N – time series).

Figure 11 shows the dynamics of GDPt (*in billion roubles*): the corresponding adaptive Brown model $GDP_{BR}(t)$ *(in billion roubles*) and point forecast for this model. In order not to overload the graph, the interval forecast is not given.



Sources: the authors' calculations based on the Rosstat' data

Figure 11: Dynamics of GDP of Russia in the scenarios: (1) forecast; (2) reduction the students' educational failure; (3) reduction of the students' economic failure for the period 2019-2025 (in billion roubles)

The corresponding adaptive Brown model $GDP_{BR}(t)$ *(in billion roubles*) and point forecast for this model serves as a basis for comparing the dynamics of GDP, which is changing due to a factor of the school failure reduction: at first this growth is additional 0.1% per year, and after 2020 - additional 0.2%. In Figure 11, this change is demonstrated by the GDP curve called 10 years horizon.

(2) As noted above, the decrease of school failure of students results in a reduction in their economic failure. Economic assessments of the reducing economic failure' effect are also given by

experts of Boston Consulting Group (2017). According to them, if you double the number of graduates from primary schools with a high level of learning, and consequently, with growing economic success, due to increasing competencies and character qualities, it could be possible to get additional annual GDP growth by a maximum of 1.5%. In Figure 11, the last changes are demonstrated by the GDP curve called 20 years horizon.

At the same time, as in the case with school failure, the lag between the introduction of new learning technologies and returns in terms of economic effect has been taken into account (Pilipenko, et al., 2019). For this purpose, the problem of the economic return due to the reduction of the economic failure of general school graduates are differentiated as follows: in two years (2019-2020) the effect of improving preparedness is calculated only for 1/5 of the unsuccessful students because of the increase of the level of their competencies and character qualities. Then, since 2020, the economic effect is calculated as an additional 0.3% of annual GDP growth rate (+1.5% GDP per year are divided into 5). In Figure 11, this change is demonstrated by the GDP curve called 20 years horizon. It could be reasonable to add an extra 0.3% GDP growth each year, beginning from 2020. But the process of reducing school failure of the students and the following economic failure is a very long way, with a large number of problems and various obstacles. Fig. 11 demonstrates the conservative variant of the economic progress.

(3) But the above assessments let us present the education system financing as the investment project. For this purpose the table is built (Table 2) to show the GDP (projected) in current prices, the net economic effect of reducing school unsuccessfulness of students (GDP, 10 years horizon) and of decreasing their economic unsuccessfulness (GDP, 20 years horizon) and education financing at the level of 2018 plans (3.6% of GDP) which is unchanged for the entire forecast period.

Table 2: Evaluation of the financing of the Russian education system from the standpoint of an investment project for the period 2018-2025 (in billion roubles)

Year	Forecasting horizon $GDP_{BR}(t)$, billion roubles (1)	Extra GDP growth due to the reduction of educational failure of schoolchildren (10 years horizon) (2)	Extra GDP growth due to the reduction of economic failure of schoolchildren (20 years horizon) (3)	Education system financing as planned for 2018 (3,6% GDP) (4)
2018	98 200.591	1 965.778	2 064.076	3 535.221
2019	103 740.937	2 071.683	3 547.639	3 734.674
2020	109 281.284	2 707.994	3 966.042	3 934.126
2021	114 821.630	2 852.321	4 192.293	4 133.579
2022	120 361.977	3 117.009	4 403.992	4 333.031
2023	125 902.323	3 272.902	4 615.690	4 532.484
2024	131 442.670	3 423.046	4 827.388	4 731.936
2025	136 983.016	3 573.190	5 039.087	4 931.389

Source: Pilipenko, et al., 2019

If considering education financing (4) as net costs, then GDP growth from the reduction of educational unsuccessfulness (3) and of economic unsuccessfulness (2) could be treated as net return on education investments. There have not been given the further authors' estimates of return on education investment from the view point of an investor, since the data obtained indicate unrealistically high (speculative) profits (significantly more than 100%).

In any case these calculations prove that even in conservative scenarios, Russian education can give a tremendous impetus to the growth of the national economy. But this will happen only if we take into account the many "BUTs", connected, first of all, with formation of high quality education and of adequate socialization. To do this, it is necessary to rethink the approaches to organizing the education system through the prism of the dialectics of interaction of all participants in the educational process, taking into account the dialectics of education and socialization of students, overcoming numerous PCBs for the purposes of their self-development as intellectually autonomous individuals. Without such fundamental transformation of the approaches to the education and socialization of the younger generation, it hardly makes sense to wait for the knowledge economy construction in the short run in Russia.

V. Conclusion

According to the President of the European Central Bank Christine Lagarde (WEF, January 2021) 2021 will be accompanied by a very high level of uncertainty – until the moment when there will be a transition to a "new economy". And in this uncertainty, according to the WEF debates, another specificity of the future reality has appeared. The latter is due to the fact

that, despite all previous experiences of post-shock recovery of countries of the world, each country will have to get out of the current global pandemic in isolation, oriented only on national capabilities. And the main resource that each country can count on is associated with its own humans and their level of education and socialization. In modern conditions, this workforce must have the quality of intellectual autonomousness in order to be able to "launch" a new "technological platform" and construct a dynamic economy and integrated society on its basis.

So the formation of self-developing national systemic integrities will lead to a significantly greater variety of forms of their organizations, which will be regulated by a completely unique variety of embodiment of the capabilities of the technological revolution 4.0 in combination with a national workforce with the qualities of intellectual autonomousness. In other words, each country will go its own way to the post-pandemic future.

As a result, on the one hand, a significant number of fundamental questions were formed, united by one – "what to do?", and on the other, a set of necessary elements was formed, which makes it possible to solve the existing puzzle. Indeed, the structures of both the economy and society are being destroyed under the influence of the dialectical law of denial of denial, people have lost confidence in the nation state, ceased to consolidate in the fight against the COVID-19 pandemic, and increasingly become in opposition to all preventive actions of the government in connection with the coronavirus. This is on the one hand. On the other hand, industrial revolution 4.0 rapidly spreads new technological solutions and gradually covers all spheres of human activity (Schwab, 2018; Schwab, et al., 2020a, 2020b). It was the CEOs of self-sufficient companies who were the first to raise the issue of talents, without which new technological projects cannot be introduced, new structural ties in the economy cannot be built, a new social reality cannot be constructed, and the collapsing relationships of human systems with nature cannot be harmonized. Thus, the humanitarian catastrophe caused by the COVID pandemic overnight reduced the human-created structural ties to ruins and at the same time gave humanity a chance to solve the riddle of a new post-covid reality, putting a person with the quality of intellectual autonomousness and the human-centric principles of organizing his activities on the basis of the systemic integrity.

It is the person, as the main subject of goal-setting in society and the main beneficiary of all the results obtained, who must become the main actor, embodying the technological and socio-economic reality of the future Berger, et al., 1966). A person with the qualities of intellectual autonomousness is able to understand the principles of interaction of material innovations introduced by various technologies, to combine digital production technologies with the biological world. These fantastic plots can only be realized by a person with the qualities of intellectual autonomousness, capable of solving the most complex problems, both in theory and in practice. Given the rapid spread of new technologies and the breadth of their coverage of the spheres of human activity, the requirements for highly qualified specialists, adequately socialized are radically changing in connection with the enormous opportunities of the industrial revolution 4.0 (Cook, (ed.), 2019).

As a result, the role of education and socialization in the formation of the human with qualities of intellectual autonomousness changes (Becker, 1985a, 1985b; Schultz, 1960; Schultz, 1961; Mincer, et al, 1995). To understand the deep psychological patterns of changes in the essence of education, the authors were forced to delve into the theoretical aspects of human psychology and the psychology of education (Slobodchicov, et al., 1995; Slobodchicov, et al., 2000; Slobodchicov, et al., 2013). At the same time, the interpretation of the human phenomenon by the authors is consistent with the opinion of the great humanists (Vernadsky, 1960; Vernadsky, 2018; Gumilev, 2012a; Gumilev, 2012b), who associated it with a variety of known and unknown properties and qualities that, under certain conditions, can manifest themselves in society and be used for the benefit of social progress. In human psychology, the processes of self-organization and self-development interact dialectically, which predetermine its properties to reflection and to transcendence. In the conditions of the formation of a new technological paradigm, the most important property of a person is his ability to transcendence as the essence of the mechanism of the human socialization. This is due to the fact that an intellectually autonomous person is capable of self-development, easily adapts to a rapidly changing external environment, and copes with non-trivial problems due to the growing uncertainty of future transformations in all spheres of human activity. However, the emergence of the ability to transcend should be preceded by self-organization of a person in the process of education, socialization, and the generation of his ability for intellectual autonomousness.

In the context of the modern 4th technological revolution, the problems of self-organization and self-development of a person came to the fore. And this is critically important, since today humanity has two alternatives: either put man at the forefront and take all measures so that the subject-creator begins to structure a promising future; or do not change anything and each time return to unsolved problems that predetermine stagnation and regression. The latter option brings mankind closer to the catastrophe of its own, of society and of the entire eco-natural system, which nurtured a person as its child. But in any case progressive trends will for sure prevail, but time could be lost and it will be

much more difficult to start all over again with the participation of those generations whose parents lost the chance for a better life, first because of the pandemic, and then because of the short-sightedness of political decision-makers. The most important thing is that it should not become too late, as environmental problems grow to catastrophic proportions.

References Références Referencias

1. Ananiev, B.G. (1977). *The Problems of Modern Human Science*. Moscow
2. Anderson, K. J. Arrow, D. Pines, Eds. (1988). *The Economy as an Evolving Complex System.* Addison-Wesley, Reading, Mass.
3. Arnold, V.I. (1979). Catastrophe theory. *Nature*. No. 10. pp. 54-63.
4. Arnold, V.I. (1975). Critical points of smooth functions, *Proc. of International Congress of Mathematicians,* 1974. Vancouver. V.1. PP. 19-40.
5. Arthur, W. B., S. N. Durlauf, and D.A. Lane. (Eds.). (1997). *The Economy as an Evolving Complex System II.* Addison-Wesley. Reading Mass.
6. Arthur, W. Brian. (1999). Complexity and the economy. *Science*. April 2. 284. 107-109.
7. Arthur, W. Brian. (2013). Complexity economics: a different framework for economic thought. In W. Brian Arthur (2014). *Complexity and the Economy*. Oxford: Oxford University Press
8. Baker, Scott R., Nicholas Bloom, and Steven J. Davis. (2015). Measuring economic policy uncertainty. *NBER Working Paper*. No. 21633. October
9. Becker, Gary (January 1985). 'Human capital, effort, and the sexual division of labor'. *Journal of Labor Economics. 3 (1): 33–58.*
10. Becker, Gary Stanley (1993). *Human Capital: A Theoretical and Empirical Analysis with Special Reference to Education*. Chicago: University of Chicago Press/
11. Becker, L. S. (1977). Property rights: philosophical foundations. Cambridge, 1977
12. Berger, P. L., and Luckmann, T. (1966). *The Social Construction of Reality: a treatise on sociology of knowledge.* USA: Penguin Book
13. Bertalanffy, Ludwig von. (1968). *General System Theory: Foundations, Development, Applications*. Canada, Edmonton: University of Alberta; New York: George Braziller.
14. Bogdanov, A.A. (1934). *Tectology or General Organizational Science*. Moscow
15. Boston Consulting Group (2019). *Mission Talent: Mass uniqueness: A global challenge for one billion workers.* BCG August
16. Boston Consulting Group. (2017). *Russia 2025: From Average Students to Talents*. October. Moscow: Boston Consulting Group.
17. Braudel, Fernand. (1981). *Civilization & Capitalism: 15th–18th Century. The Structure of Everyday Life: The Limits of the Possible*. London: William Collins Sons & Co Ltd.
18. Brown, R.G. (1962). *Smoothing, Forecasting and Prediction of Discrete Time Series*, New Jersey, Prentice-Hall.
19. Center for Strategic Research. (2018). *Twelve Solutions for a New Education*. Report of the Center for Strategic Research and High Economic School. Moscow.
20. Chardin, Pierre Teilhard de (1955). *Le Phénomène Humain. Paris : Éditions du Seuil*
21. Chechulin V. L. (2012). *Set Theory with Self-affiliation (foundation and some applications).* 2-nd ed. Perm (Russia): Perm State University
22. Cook, Justin W. (Ed.). (2019). *Sustainability, Human Well-Being, and the Future of Education*. Switzerland AG: Palgrave Macmillan
23. Craib, I. (1992). *Anthony Giddens*. L.: Routledge
24. Dam, Nick van (ed.) (2019). *Elevating Learning & Development: Insights and Practical Guidance from the Field.* Mckinsey & Company
25. Davydov, V.V. (1996). *Developmental Learning Theory*. Moscow: INTOR
26. Durkheim, Emile. (1895). *The Rules of Sociological Method*. Beverly Hills, CA: Sage Publications
27. Edelman (2021). *Edelman Trust Barometer 2021: Global Report.* Retrieved from: *https://www.edelman.com/sites/g/ files/aatuss191/files/2021-01/2021-edelman-trust-barometer.pdf*.
28. Elkonin, D.B. (1989). *Selected Psychological Works*. Moscow: Pedagogy Publisher
29. Giddens, A. (1982). *Profiles and Critiques in Social Theory*. Basingstoke: Macmillan
30. Guckenheimer, J. (1973). Bifurcation and catastrophe. Proc. International Sympos. In: *Dynamical Systems*. Ed. by M. Peixoto. New York: Academic Press
31. Gumilev, L.N. (2012a). *Ethnosphere: History of People and History of Nature*. Moscow: Eksmo Publishing House.
32. Gumilev, L.N. (2012b). *Ethnogenesis and the Earth's Biosphere*. Moscow: Eksmo Publishing House.
33. Haken, H. (1977). *Synergetics. An Introduction*. Berlin-Heidelberg-New York: Springer-Verlag
34. Haskel, Jonathan, and Stian Westlake. (2017). Capitalism without Capital: The rise of the intangible economy. Princeton, N.Y.: Princeton University Press
35. Hausmann, R., and Gavin, M. (1996). Securing stability and growth in a shock prone region: the policy challenge for Latin America. *Inter-American Development Bank. Working Paper.* No. 315. Office of the Chief Economist. January.
36. Hayek, Friedrich August von. (1991). *The Trend of Economic Thinking: Essays on Political Economists*

and Economic History. Ed. By W. W. Bartley III and Stephen Kresge. Chicago: University of Chicago Press. London: Routledge.
37. Hegel, Georg Wilhelm Friedrich. (1892). The science of logics. In: *The Logic of Hegel.* 2nd Edition, revised and augmented. Oxford: Oxford University Press.
38. Hegel, Georg Wilhelm Friedrich. (1967). *Hegel's Philosophy of Rights*. Trans. by T.M. Knox. Oxford: Oxford University Press
39. Hodgson G.M. (2002). Reconstitutive downward causation: social structure and the development of individual agency. Fullbrook E. (ed.) *Intersubjectivity in Economics: Agents and Structures*. L.; N.Y.: Routledge. PP. 159-180.
40. Hodgson, G.M. (1988). *Economics and Institutions. A Manifesto for a Modern Institutional Economics,* Polity Press, USA.
41. http://links.jstor.org/sici?sici=0022-3808 (198610) 94:5<1002:IRALG>2.0.CO;2-C
42. International Monetary Fund (IMF). 2020. Fiscal Monitor: Policies for the Recovery. Washington, October
43. IPSOS (2021), *COVID-19 one year on: Global public loses confidence in institutions*, IPSOS website, *https://www.ipsos. com/en/covid-19-one-year-global-public-loses-confidence-institutions*
44. Kant, Immanuel. (1781). *Critic der Reinen Vernunft*. Riga: Verlegts Johann Friedrich Hartknoch
45. Kedrov, B.M. (1963). *The Unity of Dialectics, Logics and Theory of Cognition*. Moscow.
46. Kondratiev, N.D. (1984). *The Long Wave Cycle*. Translated by G. Daniels. Introduction by J.M. Snyder. New York: Richardson and Snyder.
47. Lonergan, Eric, and Mark Blyth. (2020). *Angrynomics*. UK: Agenda Publishing Ltd.
48. Malone, Thomas W. (2018). *Superminds. The Surprising Power of People and Computers Thinking Together*. Little, Brown Spark.
49. Maor, Dana, Angelika Reich, and Lara Yocarini, (2017). The people power of transformations. McKinsey & Company
50. Marx, K., and Engels, F. (1955-1974). Coll. Cit., 2nd Ed. Moscow: Political Literature Publishing House.
51. Marx, Karl. (1995). *Capital: A New Abridgement.* Oxford: Oxford University Press.
52. McKinsey Global Institute (2021). Getting tangible about intangibles. The future of growth and productivity? Discussion paper. McKinsey Global Institute. Retrieved from: www.mckinsey. com/mgi.
53. McKinsey Global Institute (2021). Getting tangible about intangibles: the future of growth and productivity? *Discussion papers*. June. Retrieved from: www.mckinsey.com/mgi.
54. Milanovic, Branko. (2019). *Capitalism, Alone: The Future of the System that Rules the World.* Harvard: Harvard University Press.
55. Mincer, Jacob, and Polachek, Solomon. (1995). 'Family investments in human capital: earnings of women (1974)'. In: Humphries, Jane (ed.), *Gender and economics*, Aldershot, England Brookfield, Vermont, USA: Edward Elgar. PP. 317–349.
56. Mirimanoff, D., 1917; Mirimanoff D. (1917). 'Les antinomies de Russel et de Burali-Forti et le probleme fundamental de la théorie des ensembles'. *L'Enseygnement Mathematiques*, Vol. 19, 37-52.
57. Mises, Ludwig Heinrich Edler von. (1998). *Human Action: A Treatise on Economics.* Yale: Yale University Press.
58. Nordhaus 1994 Nordhaus, William D. (1994). *Managing the Global Commons. The Economics of Climate Change*. The MIT Press
59. North, D. (2003). *Understanding the Process of Economic Change*, Princeton University Press, Princeton.
60. North, D. C. (1981). *Structure and Change in Economic History*. New York: W. W. Norton & Co.
61. North, D. C. (1997). 'The process of economic change', *Research Paper* 128;
62. OECD (2020), *Education at a Glance 2020: OECD Indicators*, OECD Publishing, Paris, https://doi.org/10.1787/69096873-en.
63. OECD. (2021). *The state of school education – one year into the Covid pandemic*. OECD Publishing, Paris. https://doi.org/10.1787/201dde84-en
64. Piaget, Jean V.F. (2008). *The Psychology of Intelligence*. Moscow: Direct-Media
65. Pilipenko, A.I. (1997) 'Cognitive barriers in teaching physics and methodological principles for overcoming them'. *The Dissertation Abstract for a Scientific Degree of Doctor of Pedagogics.* Russian Academy of Education, Moscow.
66. Pilipenko, A.I. (2020). Education and theory of psychological and cognitive barriers: human capital as driver of stable economic growth. In: Magdalena Ziolo (ed.) (2020). *Social, Economic, and Environmental Impacts Between Sustainable Financial Systems and Financial Markets* (A volume in the Practice, Progress, and Proficiency in Sustainability (PPPS) Book Series). USA: IGI Global.
67. Pilipenko, A.I., Z.A. Pilipenko, and O.I. Pilipenko. (2019). Education and inclusive development: puzzle of low-learning equilibrium. In: Bruno S. Sergi (Ed.). (2019). *Modeling Economic Growth in Contemporary Russia.* Bradford, UK: Emerald Publishing Limited.
68. Pilipenko, A.I., Z.A. Pilipenko, and O.I. Pilipenko. (2021a). Rebuilding a stronger business in the uncertain post-covid-19 future: factor of intellectually autonomous and adequately socialized employees. In: Magdalena Ziolo (ed.) (2021). *Adapting and Mitigating Environmental, Social, and Governance Risk in Business.* USA: IGI Global.

69. Pilipenko, O.I., Z.A. Pilipenko, and A.I. Pilipenko (2021b). *Theory of Shocks, COVID-19, and Normative Fundamentals for Policy Responses.* (A volume in the Advances in Finance, Accounting, and Economics (AFAE) Book Series). USA: IGI Global
70. Pilipenko, Z.A. (2020). Shocks' Theory: Financial Mechanism of Economic Systems' Destabilization. In: Magdalena Ziolo (ed.) (2020). *Social, Economic, and Environmental Impacts Between Sustainable Financial Systems and Financial Markets* (A volume in the Practice, Progress, and Proficiency in Sustainability (PPPS) Book Series). USA: IGI Global Зоя шоки
71. Pilipenko A.I., at al. 2015. Innovative Models of Education: The Aspect of Psychological and Cognitive Barriers. Date posted: May 27, 2015. Online at SSRN: http://ssrn.com/abstract=2597968
72. Pinsky, A.A. (1978) 'Methodology as a science'. *Soviet Pedagogy,* No. 12 p. 115-120
73. Precariat: the emergence of a new class (collective monograph). (2020). Ed.: Zh.T. Toshchenko. The Russian Academy of Sciences. Institute of Sociology. Federal Center of Theoretical and Applied Sociology. Russia. Moscow: Center for Social Forecasting and Marketing.
74. Rajan, R. G. (2010). *Fault Lines: How Hidden Fractures Still Threaten the World Economy*. Princeton University Press
75. Rassmussen, Y. (1983) *Skills, Rules, and Knowledge; Signals, Signs, and Symbols, and other Distinctions,* in Human Performance models
76. Romer, Paul M. (1986) Increasing returns and long-run growth. *The Journal of Political Economy*, Vol. 94, No. 5. October. PP. 1002-1037
77. Romer, Paul Michael. (1988). Increasing returns and long-run growth. *The Journal of Political Economy,* Vol. 94, No. 5. (Oct., 1986), PP. 1002-1037. Retrieved from: Stable URL:
78. Sandbu, Martin. (2020). *The Economics of Belonging*. Princeton: Princeton University Press
79. Schelling, Friedrich Wilhelm Joseph von. (1993). *System of Transcendental Idealism.* University of Virginia Press.
80. Schultz, Theodore W. (1960). "Capital Formation by Education". *Journal of Political Economy*. 68 (6): 571–583.
81. Schultz, Theodore W. (1961). Investment in human capital. *The American Economic Review*. 51 (1): 1–17.
82. Schwab, Klaus (2018). *Shaping the Future of the Fourth Industrial Revolution*. Switzerland. Geneva: World Economic Forum.
83. Schwab, Klaus, and Thierry Malleret. (2020a). *COVID-19: The Great Resert*. Switzerland. Geneva: World Economic Forum Publishing.
84. Schwab, Klaus, and Thierry Malleret. (2020b). COVID-19's legacy: This is how to get the Great Reset right. *Sustainable Development Impact Summit.* July 14. WEF.
85. Schwab, Klaus. (2016). *The Fourth Industrial Revolution*. Geneva: World Economic Forum
86. Schwartz, Shalom. (2012). 'An overview of the Schwartz Theory of Basic Values'. *Online Readings in Psychology and Culture*. Volume 2. Number 1. scholarworks.gvsu.edu.
87. Sheptulin, A.P. (1975). *Dialectics of the Special and of the General*. USSR: Krasnoyarsk.
88. Sheptulin, A.P. (1978). *Marxist-Leninist Philosophy*. USSR: Progress Publishers.
89. Slobodchicov, V.I., and E.I. Isaev. (1995). *Human Psychology*. Moscow.
90. Slobodchicov, V.I., and E.I. Isaev. (2000). *Psychology of Human Development*. Moscow
91. Slobodchicov, V.I., and E.I. Isaev. (2013). *Psychology of Human Education. Formation of Subjectivity in Educational Processes*. Moscow.
92. Standing, G. (2011). *The Precariat: The New Dangerous Class*. London, New York: Bloomsbury Academic
93. Summers, L.H. (2014). Reflections on the new secular stagnation hypothesis. In: *Secular Stagnation: Facts, Causes, and Cures.* Ed. by C. Teulings, R.L. Baldwin: CEPR Press. P. 29. A VoxEU.org eBook.
94. Summers, L.H. (2020). Accepting the reality of secular stagnation: New approaches are needed to deal with sluggish growth. *Finance & Development.* A Quarterly Publication of the International Monetary Fund. Volume 57. Number 1. March
95. Taleb, Nassim Nicholas. (2007). *The Black Swan: The Impact of the Highly Improbable* United States. New York: The Random House Publishing Group
96. Taleb, Nassim Nicholas. (2012). Antifragile: Things That Gain from Disorder (Incerto). New York: The Random House Publishing Group.
97. The Economist (2020). Covid-19 and the crisis for higher education *Report*. London: The Economist Intelligence Unit Ltd
98. The Econonist (2020a). Leading from afar (2020). The new world of work calls for a more creative and adaptable approach to leadership. The Economist Intelligence Unit Limited
99. Thom, R. (1969). Topological models in biology. *Topology.* V.8. PP. 313-36.
100. Thom, R. (1974). Catastrophe theory: its present state and future perspectives. *Dynamical Systems-Warwick*. Lecture Notes in Mathematics. Math. V. 468. No. 468. Berlin; New York: Springer-Verlag, 1975. PP. 366–372.
101. UNESCO (United Nations Educational, Scientific, and Cultural Organization). (2016a). *Global Education Monitoring Report 2016, Education for*

People and Planet: Creating Sustainable Futures for All. Paris: UNESCO. Retrieved from: http://unesdoc.unesco.org/images/0024/002457/245752e.pdf.
102. UNESCO, UNICEF, the World Bank and OECD (2021). *What's Next? Lessons on Education Recovery: Findings from a Survey of Ministries of Education amid the COVID-19 Pandemic*. Paris, New York, Washington D.C.: UNESCO, UNICEF, World Bank. Retrieved from: http://creativecommons.org/licenses/by-sa/3.0/igo/
103. UNESCO. (2016b). Contemporary learning crisis: education' failure in "creating sustainable future for all". *The Global Education Monitoring Report.* Second Ed. France: UNESCO Publishing
104. Ushinsky, K.D. (2005). *Selected Works*: In 4 Volumes. Vol. 4. Moscow
105. Vernadsky, V.I. (1960). *Biosphere*. Selected works. Moscow
106. Vernadsky, V.I. (2018). *Philosophy of Scienc*e. Selected Works. Moscow: Youwright Publisher.
107. Vygotsky, L.S. (1960). *Development of Higher Mental Functions*. Moscow: Nauka Publish
108. World Bank. (2018). *World Development Report 2018: Learning to Realize Education's Promise,* World Bank, Washington, DC.
109. World Bank. (2020). *Realizing the Future of Learning: From Learning Poverty to Learning for Everyone, Everywhere.* Washington, D.C.: World Bank Group. Retrieved from: http://documents.worldbank.org/curated/en/250981606928190510/Realizingthe-Future-of-Learning-From-Learning-Poverty-to-Learning-forEveryone-Everywhere.
110. World Bank. (2020). The COVID-19 pandemic: shocks to education and policy responses. *World Bank Report.* May. World Bank, Washington, DC.
111. World Economic Forum. (2015). *New Vision for Education Unlocking the Potential of Technology,* WEF Report, Geneva, Switzerland.
112. World Economic Forum. (2015). *New Vision for Education Unlocking the Potential of Technology,* WEF Report, Geneva, Switzerland.
113. World Economic Forum. (2021). *Global Gender Gap Report 2021*. Insight Report. March. WEF.
114. World Economic Forum. (January 2021). Christine Lagarde. *Global Gender Gap Report 2021*. Insight Report. WEF
115. Zeeman E.C. (1977). Catastrophe Theory: Selected Papers. 1972–1977. Addison-Wesley: Reading Mass.
116. Zinoviev, A.A. (1960). Philosophical problems of multivalued logic. Moscow: USSR Academy of Sciences.