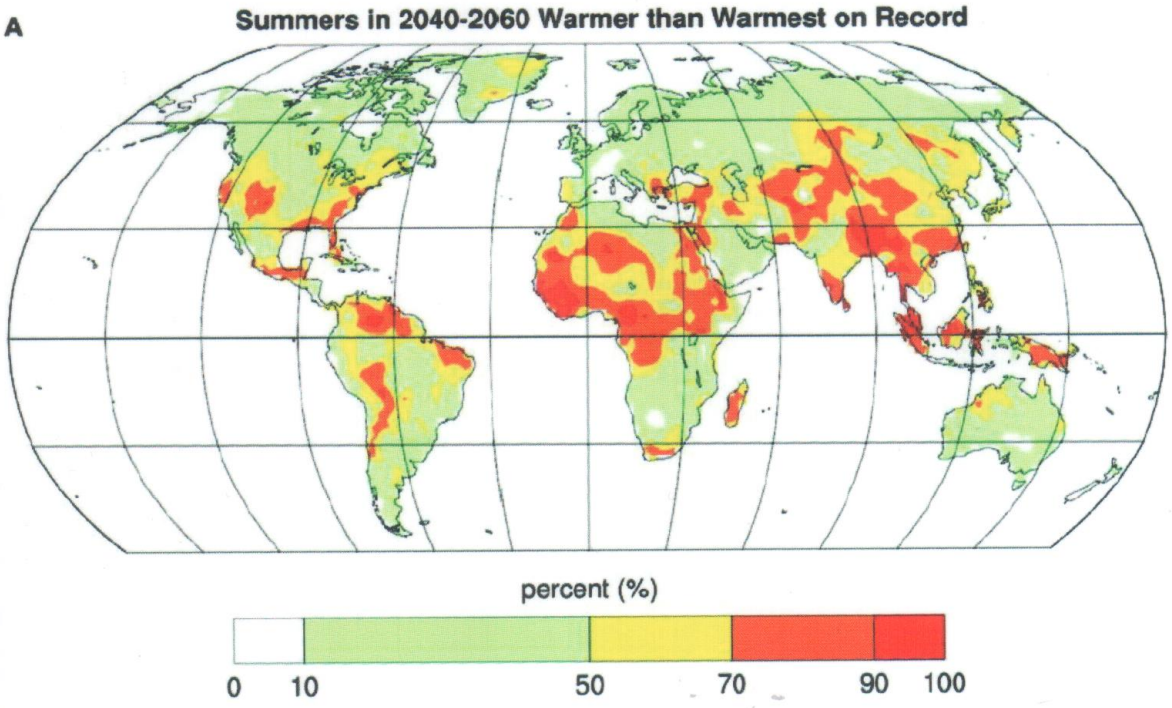
STABLE ADAPTIVE STRATEGY OF HOMO SAPIENS AND EVOLUTIONARY RISK OF HIGH TECH

Transdisciplinary essay

Edited by V.T.Cheshko, V.I.Glazko, G.Yu. Kosovsky, A.S.Peredyadenko



Moscow 2015

STABLE ADAPTIVE STRATEGY OF HOMO SAPIENS AND EVOLUTIONARY RISK OF HIGH TECH

Transdisciplinary essay

Edited by V.T.Cheshko, V.I.Glazko, G.Yu. Kosovsky, A.S.Peredyadenko

2015

УДК 608.1=03(02)-039
ББК 28.703(65.5)
ISBN 978-5-905742-88-0

STABLE ADAPTIVE STRATEGY of HOMO SAPIENS and EVOLUTIONARY RISK of HIGH TECH. Transdisciplinary essay / V.T.Cheshko, V.I.Glazko, G.Yu Kosovsky, A.S.Peredyadenko; Ed. by V.T.Cheshko. M., 2015. 252 p.

The co-evolutionary concept of Three-modal stable evolutionary strategy of Homo sapiens is developed. The concept based on the principle of evolutionary complementarity of anthropogenesis: value of evolutionary risk and evolutionary path of human evolution are defined by descriptive (evolutionary efficiency) and creative-teleological (evolutionary correctly) parameters simultaneously, that cannot be instrumental reduced to others ones. Resulting volume of both parameters define the trends of biological, social, cultural and techno-rationalistic human evolution by two gear mechanism - gene-cultural co-evolution and techno-humanitarian balance. The resultant each of them can estimated by the ratio of socio-psychological predispositions of humanization/dehumanization in mentality. Explanatory model and methodology of evaluation of creatively teleological evolutionary risk component of NBIC technological complex is proposed. Integral part of the model is evolutionary semantics (time-varying semantic code, the compliance of the biological, socio-cultural and techno-rationalist adaptive modules of human stable evolutionary strategy).

CONTENT

Abbreviations

BHDT, BHDTK - Biological and Humanitarian Disciplinary Technological Complex

SESH- Stable Adaptive (Evolutionary) Strategy of Homo

E - Evolutionary Efficiency

High Hume technologies of control and enhancement of the genetic, socio-cultural and cognitive codes that let to control of biological and sociocultural human evolution, i.e.to technology of rational evolution in applied to Homo sapiens

HN- *«human nature»* complex of mental-psychological predisposition**s**

HU- *«humanity*» complex of mental-psychological predispositions

K- Evolutionary Correctness

NBIC- nano-bio-information-cognitive technology (technology of driven evolution)

INTRODUCTION

Welcome to the Anthropocene.
Slavoj Zizek [1, p.327]

In our struggle against its own vulnerability, we create new vulnerabilities and thus transforming the world transform themselves
Mark Coeckelbergh
[2, p. 87]

The words of the philosopher-postmodernist cult of modern Western civilization, handed down in the epigraph, intuitively perceived as spiced with obvious irony, if not derision. The way it is. Anthropocene – not formalized unit of geological time scale, the geological epoch, characterized by the transformation of human activity in the primary factor in determining the direction and flow patterns of geological processes.

The famous line that ends with «The Divine Comedy» by Dante Alighieri [Dante Alighieri. La Divina Comedia. Paradiso, Canto XXXIII] ─ «Love that moves the sun and light» (l'amor che move il sole e l'altre stelle) creates emotionally charged image of sensual evolving universe, which can be considered a brand of Western (Atlantic) civilization of the last millennium.

The fundamental principle that the image becomes the prime mover, the substrate that is based on the synthesis of reason and faith, begets love, and that, in turn, determines the trajectory and the final goal of evolution of the cosmos. Only the accents in this triad (Will ─ Reason ─ Love). In the era of Dante in Love Will carried through reason. In the age of Enlightenment was the basis of everything impersonal, objective law. This socio-cultural transformation has reached its peak in terms of Darwin's theory. As a result, the confidence of Dante into a classical Kantian antinomy: «Evolution (Law of Nature and Reason) versus the Divine Will (and Love) moves the sun and the light?» As scientific and technological progress first fair was «Law and Mind driven by the sun and light» and then (with the advent of technology High Hume) ─ «laws of nature and is driven by the Will of sun and light». The scenario of the future course of evolution of the biosphere and man became a matter of personal choice and calculation. That is just the interpretation of the divine perfection hammered string Alighieri quietly disappeared. However, the human mind and Love, as it is known, to err or not see obvious facts. The world has entered an era Anthropocene.

The term Anthropocene is in line with the concept of «noosphere» Vernadsky, Leroy, «pneumatosfere» Florensky etc. In all these cases, the original

intention of the genesis of these is the concepts of statement rationalization and technologizing current global evolution – its biological, geological and space components, not to mention the actual socio-anthropogenesis. However, differences still extremely important.

Anthropocene is usually dated to the 17th century – the formation of an industrial society. In more advanced interpretation of this data is moved to the beginning of the Neolithic revolution [3, p. 835-836].

Thus, the concept of the noosphere and the Anthropocene are not equivalent. Noosphere implies a direct effect on the mind during the evolutionary process. Thus, the noosphere chronologically later stage Anthropocene. However, these significant differences between the two concepts are not exhausted.

Offensive Noospheric era of thought of the author – Vladimir Vernadsky – diagnosed, so to speak, with the help of «socio-humanitarian syndrome» – a complex of symptoms related to the social and spiritual life (see: [4]).The latter include, for example, the elimination of war and the establishment of a world government, etc. The core, the backbone of the noosphere is a new feature of the mentality of human civilization, «the dictatorship of the Mind» as the root cause of the subsequent evolution. Thus, the origins lie in noospherization perfect, are the responsibility of not only natural, as the humanities. In our previous work, we have already mentioned that the concept of the noosphere Vernadsky in terms of the intellectual tradition has a «hybrid» origin. Equally, it was influenced by the ideas of Russian cosmists starting with Nikolai Fyodorov and theoretical understanding of accumulated empirical and scientific facts. Vernadsky and Tsiolkovsky, experienced in his youth influenced by the teachings of the founder of Russian cosmism, managed to reduce some of its ideas to scientist research and technological-innovation program, rationalizing the concept of Nikolai Fyodorov, made it acceptable to the technological mentality.

The idea of the Anthropocene, owned by Eugene Stormer ecologist and Nobel laureate Paul Crutzen in 2000 [5], completes the process of rationalization of the irrational concept was originally seeking to overcome the hegemony of technocratic determinism. Offensive Anthropocene – it is not abstract, theoretical, let alone ideological and humanitarian problem. It is a matter of empirical verification, i.e. Search criteria (symptoms) of a new geochronological period clearly established purely empirically. Management of the evolutionary process, including in the least the man himself as, simultaneously, the object and the subject of manipulation transformations. This informs the term Anthropocene metaphorical sense by putting in another, without scientific terminology and emotionality metaphorical associative array, starting with Frankenstein and «Brave New World». This series has obvious signs anti-utopia, color negative perception of the image generated by them.

Since then, the sequence of diagnostic signs of a new era once again split into technological and natural science (changing composition of the atmosphere, the mass extinction of species, global warming), humanitarian and anthropological (ecological catastrophe, biogenetic reduction of human beings to the manipulated

tools and general information and a digital control of our lives [1, p.327]). The first (natural sciences) series corresponds to a system of technological risks, be solved using algorithms established safety procedures. The second (number of socio-humanitarian) series presented risk anthropological. At the end of both series have obvious destination intersection and merge evolutional existential risks.

During the previous three or four centuries of being technological civilization its rational humanistic ideologue could make «bracketing» the equation of social and global evolution of the substantial foundation of human existence – the notorious human nature as a kind of global constant. This operation is primarily focused its individualism, as a resultant of the genesis of society interests and individual life projects of its members. In the post-Darwin era it been reduced to the establishment of the damping of the biological evolution of Homo sapiens, replacement anthropogenesis socio-culture-genesis, made logically consistent concept of human rights and its consistent transformation of its naturalistic version («natural law») in a purely conventionalist doctrine. The basis of this transformation macro evolutionary and macro-Kantian rationalist mentality has been a revolution in epistemology paradigm: emancipating the mind from the shackles of its material substantiality. In other words, – exemption from the non-rational characteristics of the material substrate, which is an attribute of intelligence with his characteristic ability to transform subjective and objective reality in accordance with its own way – for purposes not related to that, the non-rational reality. After more than a century and a half the desired goal of Teilhard de Chardin called the «Omega Point.» The mind does not simply become the ruler of the reality, it becomes over it as a transcendental agent, programming and formats the evolution of the universe.

There were during the first half of the twentieth century two events – the rediscovery of Mendel's laws and the establishment of chromosome theory and the creation of models of DNA and deciphering the genetic code, the person who made the object of manipulation of information technology. They radically transformed our understanding of the evolution and the universe and of our own nature, have radically changed the structure of science itself, its social status and, finally, have led us to the threshold of «post-human future» intelligent life.

These changes affected all aspects of human life – from the global environment to economic theory. In addition, it turned out that the new system of spiritual priorities and guidelines evolutionary «rational model psychologically unrealistic»[6, p. 1449]. Specifically, it has been said about the economy. However, fact applies to the evolution of any self-organizing system involving human subjects. This is even more applicable to the evolution – biological, cultural, social – of the human (Homo sapiens).

The introduction of the mentality of the two concepts soon became the symbol of modern technological civilization brands transhumanism (J. Huxley, the end of the 1950s.) In addition, bioethics (Van R. Potter, 1960s.) was a symptom of the deep multi-dimensional reconstruction of the evolutionary landscape in which the socio-culture-genesis process takes place. As one researcher recently wrote,

«we do not need to know a lot of human nature, we had to ethical concerns on changed human nature by biotechnology ...» concept «human nature» must be related to something real world, if we want to have the moral reasons for this, but we are not necessarily at the same time be able to say exactly, what means 'to be a man' »[7]. This dimly intuitionistic anxiety in specific scientific research and empirical gets, because inevitably fragmentary confirmation. These arguments, however, violate a coherent hierarchy of deductive inferences linking limit abstract principles with individual fragments of human existence, and strengthening alarmist expectations of modern civilization.

In our previous articles we wrote that the mentality of Western civilization characterized by an explosive mixture of absolute individualism, technological strength and humanistic intentions of the human intellect, embodied in the declared Karl Popper [8, p. 53-54] ideology of «social engineering of partial solutions.» In the age of genetic engineering technology and High Hume this mixture threatens to blow up the line anthropogenesis by astrosphere existential individual projects, which would mean the end of humanity as a certain integrity of intelligent beings [9, p. 12]. Because of the global constant, bracketing the equation sociocultural genesis, the nature of man is transformed into a variable that could eliminate themselves the most. Believe in the power of the human mind to overcome the results of its own evolutionary history, the independence of the system of human values from the biological component of human beings has become increasingly difficult. As well as in the absence of the inverse effect on the evolution of human culture of the genome of modern humans.

Positions of philosophical and biological incarnation anthropological science at this point seem almost mutually exclusive. Even Immanuel Kant argued that finding the mind, a man found, and the ability and the duty to set goals, independent of the laws of nature, and thus moved from the realm of necessity to the kingdom of freedom. Two hundred years later the cult American social philosopher Francis Fukuyama in his sensational turn of the century book «Our Posthuman Future» brought Kantian maxim that even thinking devils in hell will have to adhere to certain rules of morality [10, c.35]. The obvious interpretation of this saying: the world of moral norms have a transcendent reality, not reducible to the physical reality, and, consequently, the evolutionary-biological ones. F. Fukuyama, with the interpretation, by the way, do not agree. As the antithesis, Kant and Fukuama strong argument sounded equally compelling considerations of contemporary Italian theoretician and economist Hugo Pagano. The categorical imperative of Immanuel Kant requires that a person belonged to humans is not the means of achieving of goal. It comes indirectly from the inherent human capacity for compassion and empathy, the possibility to put yourself mentally in the place of another human being [11, p. 52]. Its human ability is the result of structural and functional organization of the higher parts of the brain of the hominid, provided the appropriate genetic programs and there in the course of biological evolution. These general philosophical, abstract and theoretical calculations, paradoxically, come to a particular legal practice.

As demonstrated in some modern theoretical description of human neurogenesis the formation of structural and functional organization of the higher parts of the brain and therefore the mental processes in the postnatal period is the so-called «second peak» synchronous with the period of puberty. Inherent in adolescence and early adulthood human plasticity and organization instability of high brain regions is a manifestation of biological adaptation – a high level of intellectual abilities. The intellectual abilities, as we know, are associated with the process cephalization (increase the volume and complexity of the structure of the brain), dilated during postnatal development of man up to two decades. However, this system is a biological adaptation entails adapting cultural and social ones – the need to adjust the application of legal rules (in practice double standards adjudication and execution), delayed on the age of the defendants. In the development of the human nervous system, there is a time when the individual an increase in the threshold to meet sensory deprivation (pursuit of new sensations) increased emotional excitability at a relatively low ability for rationally control the impulsive behavioral acts. It leads to a high dependence on the social environment, the propensity to engage in risky behavior, and so on. The social and socio-psychological characteristics of the age group correlated with the structural features of the prefrontal cortex. Correction of jurisprudence in the direction of increasing attention to the psycho-physiological ontogenetic factor is hard trends of Western legal culture, in particular the United States [12].

The same mutual connotations underlie modern explanatory models of social and historical dynamics of traditional culture and modern society [13].Technological and economic progress is a factor of demographic changes.at one stage of demographic evolution as a result of the increase in the quality of life the youth share of the population (as just mentioned, different high emotionality and activity) greatly increased. It in turn destabilizes the resistance of trends of social development and the stability of social order [14,p.288]. Developmental dynamics features of the formation of the human nervous system is largely stem from cephalization, which, in turn, stimulated and stimulating sociocultural genesis. Development of social intelligence as a condition for growth and complexity of the organization of competing societies brought the size of the brain beyond the morpho-physiological norm of prenatal period of gestation of a human being. So stretched during childhood predetermined logic of the process of social development.

Then, sociocultural genesis not only deterministic by but also adapted to the biological reaction rate and morpho-physiological limits of human possibilities. (An obvious example in terms of social statics is the legal practice. From the perspective of social dynamics, such example would be the economic and political algorithms to ensure the stability of social development – without the turmoil and crises, or vice versa, exploiting social instability in the interests of certain social groups). As part of this concept, biological (genetic) and the social (economic) reductionism, as the dilemma of explanatory models in sociology and anthropology Nature versus

Therefore, on the one hand the biological factors, socio-cultural and technological nature are included in the fabric of modern theories and technologies of social and political control and manipulation. On the other – the basic philosophical and ideological systems of modern civilization formed mainly in the 17-18 centuries and are experiencing ever-increasing and destabilizing risk-taking pressure from the scientific theories and technological realities.

***

This monograph is the result of a study on the development of the concept of human evolutionary stable strategies as a unique phenomenon of global evolution. The authors seem necessary to make two clarifications.

First, the interpretation of the term «evolutionary (adaptive) strategy» is different from the classical definition. The difference is that the adaptive strategy in this context is equivalent to the survival, i.e. it includes the adaptation to the environment and the transformation (construction) of the medium in accordance with the objectives of survival. To emphasize this difference and used verbal construction «adaptive» (rather than «evolutionary») strategy. In all other cases, the two terms may be regarded as synonymous.

Second, the first two essays were published in a book in 2012. Their main purpose was to develop a logically consistent methodological concept and reasoning SESH its heuristic capabilities as transdisciplinary scientific paradigm of modern anthropology. For this reason, both the essay mainly worn philosophical-theoretical and ideological character. The objective was to demonstrate the possibilities of the concept SESH in the description and explanation of the evolutionary prospects of interaction of social organization and technology (techno-humanitarian balance) and associated biological and cultural - - mechanisms of the genesis of religion (genetic and cultural co-evolution). In other words, it refers primarily to the sphere of cultural and philosophical anthropology, i.e., axiological component to any theoretical constructs that describe the behavior of self-organizing systems involving human subjects.

In contrast, the present work is an attempt to introduce this concept in the field of biological anthropology and, therefore, its main purpose is to demonstrate the possibility of verification of its basic provisions by means of procedures developed by natural science, i.e., It refers to a descriptive component of the same theoretical designs. The result of this in the future should be evaluation methods for calculating and predicting the risk of loss of biological and cultural self-identity of the person associated with a permanent and continuously deepening the process of development of science and technology.

Given all this, one of the fundamental philosophical conclusions the transdisciplinary text is follows: with the emergence of technology opportunities and socio-cultural motivation to streamline and control the progress of your own

evolution sociocultural context becomes the most powerful factor for global evolution. Therefore, the future evolution trend varies dedelayed on socio-cultural type, where the process of generating and implementation of technological innovation is realized. There is a real prospect of technologically determinate dichotomy of the Atlantic and the East Slavic civilizations, etc. Therefore, over-goal of the research is familiarizing Western readers and experts with the general mentality context of evolutionary risk problems in East-Slavic variant of the technological civilization.

In the context, the term culture is not equivalent to its traditional understanding of the (philosophical) anthropology. Here, the term referred to as information that can affect the behavior of the people and get from members of their social groups through education, role models, and other forms of social communication.

Last note. Some prolegomena to this research have been published previously in articles and chapters of the books. The list of most important publications given below:

1. Cheshko V.T., GlazkoV.I.High Hume (Biopower and biopolitics in the risk society). M.: RGAU-MTCHA, 2009. 319 p. (In Russian, summary in English)
2. Cheshko V.T. Stable adaptive strategy of Homo sapiens. Biopolitical alternative. The problem of God: Monograph. – Kharkiv: PH «INZHEK», 2012. – 596 p. (In Russian, summary in English)
3. Cheshko V.T., Ivanitskaya L. V., KosovaY. V. Configuration of Stable Evolutionary Strategy of Homo sapiens and Evolutionary Risks of Technological Civilization (the Conceptual Model Essay) // Biogeosyst. Tech., 2014, Vol.1, No 1. P. 58-69. (In English)
4. Cheshko V.T., Ivanitskaya L. V., GlazkoV.I. Evolutionary risk of high Hume technologies. Article first. Stable adaptive strategy of Homo sapiens // Ìntegrat. Antropol.. 2014. No 2. C. 4-14. (In Russian, summary in English)
5. CheshkoV.T., Ivanitskaya L. V., Glazko V.I. Evolutionary risk of high hume technologies. Article 2nd. Genesis and evolutionary mechanisms of risk formation // Ìntegrat. Antropol.. 2015. No 1. C. 4-15(In Russian, summary in English)
6. Cheshko V.T., Peredyadenko A.S. Descriptive and socio-cultural (ethical) components in the structure of an evolutionary risk of gene engineering technological complex //E environmental. Herald, 2015. No. 1. C. 64-72 (In Russian, summary in English)

Acknowledgements

Monograph appeared in the discussion and promotion of many researchers in 1990-2015. Some personality already not existent among the living. Prof., academician of the Academy of Sciences of higher school of Ukraine V.G. Shahbazov (Kharkov), Prof. A.N. Shamin (Moscow), Prof. V.l. Kulinichenko (Kiev) should be mentioned first. Fortunately, many of the organizers of scientific meetings and participants fruitful deliberations, especially participants of National Congresses on Bioethics, gave valuable comments continue to be active in this area. All mention impossible, but you must call at least, cad ofYuI. Kundiev, Prof. A.I. Bozhkov, Prof. V.A.Bondarenko, Prof. V. I. & K.I.Karpenko, Prof. P.N. Witte, Prof. N.A. Chashin, Prof. J.G. Shckorbatov, Prof. S.V. Pustovit, Prof. Yu.K. Duplenko, Prof. O.N. Kuz, Prof. P.S. Ponomarenko (Ukraine); prof. T.V.Misatchina, prof. S. B. Melnoff, Prof. I.S.Iaskevici (Belorussia), T.N.Tirdea (Moldova), Prof. I.V.Melik-Gaykazyan, acad. RANS L.I.Ivanitckaya, acad. of RAS B.G.Yudin (RF), etc.

Special thanks for years of support, encouragement and solidarity addressed by our relatives, especially L.V. Vodolagskya.

1 CONCEPTUALFIELD, EVOLUTIONARY FOUNDATIONS AND IDEOLOGICAL HISTORY OF THE THEORY OF STABLE ADAPTIVE STRATEGY OF HOMO SAPIENS

Any explanation of the above-described phenomena in socio-humanitarian and natural science in planes very quickly brings researchers to the problems in one way or another connected with the underlying mechanisms of the evolutionary process in general, and the evolution of intelligent life in particular. Evolutionary-anthropological theorizing always oscillate between the two poles – the Scylla and Charybdis of a biological or sociological reductionism. Despite the intentions of the authors of the various interpretations of natural or natural-philosophical socio-culture-anthropogenesis up their reflections on the substantial foundations of human existence ultimately directed to one of these alternatives.

In this study we try to offer third logically consistent solution – the theory of stable adaptive strategy Homo sapiens (SESH) that, in turn, in accordance to the original working hypothesis should serve as Prolegomena to a new conceptual model of the evolutionary risk NBIC-technological complex.

The formation of a holistic concept of a stable adaptive (evolutionary) strategies humanity has a key, even globally crucial importance. In any way, without claiming to establish a complete theoretical construction, we would like to express their own views on the preliminary starting point of the search.

In recent decades, tremendous progress of new technology of research ontogeny and phylogeny directs researchers toward biological reductionism and awareness of the extent caused by the same technological innovations and humanitarian civilization crisis –to sociological reductionism approaches. The conflict itself is a serious challenge for humanity, consisting of the need to overcome the cognitive dissonance between the two components of the holistic nature of Homo sapiens, and created by technological civilization in their natural and social manifestations. At the same time, it is also a powerful risk-taking factor on existential significance level, fraught with the loss of self-identity of human intelligence, beauty and goodness as the supporting structure of human essence.

In the introduction to the book under the symptomatic title «Homo Novus– A Human Without Illusions,» published in the series «Frontiers of Science», it aims to proclaim the editors refutation 6 myths rooted in the mentality of the West (Atlantic) civilization as the basic principles of its ideology and contradictions all the data of anthropology and the theory of anthropogenesis [15, p.1-2].

1. The person is a unique creature in the universe;
2. We depend on our evolutionary-biological history;
3. Biological laws do not determine the development of human society and the individual;
4. Biological past is not reflected in the content of our consciousness;
5. Morality, religion and culture are only social constructs;

6. We are absolutely free to moral choice.

In order that these theses are illusions and myths we can agree, but with no less validity can be challenged and opposed opinions:

1. Man is a natural result of the laws of biological evolution in particular, the global process of evolution of the universe;

2. We are dependent on our evolutionary-biological history;

3. Biological laws dictate the development of human society and the individual;

4. Biological past determines the content of our consciousness;

5. Morality, religion and culture are solely the result of biological evolution;

6. We are not free in their moral choices.

If the first set of myths describes the basic postulates of the philosophical and cultural anthropological disciplinary matrix, the second set characterizes the disciplinary matrix of physical (biological) Evolutionary Anthropology. In addition, the validity of this conclusion follows from the internal logic of interpreting empirical observations and theoretical concepts in the study of humanities and natural scientists, regardless of the methodological declarations of their authors. We can say that the concept of humanity and human nature, whose content is determined by the said two sets of postulates-myths steel supporting structures antinomy implicit knowledge in the natural sciences and humanistics as fields of theoretical science in general.

Out of this antinomy of our understanding of ourselves is, in our opinion, in the postulate of co-evolutionary nature of human nature, consisting of several independent but related modules, providing our evolutionary success. Hence arises an empirically established parallelism and coherence of historical reconstructions based on an analysis of the socio-cultural, linguistic and genetic phylogeny. Such comparisons conducted L.Cavalli-Sforza, since 1980s [16;17], and later became accepted methodological basis of the historical and evolutionary ethnogenetics.

The source, based on the empirical data of anthropology postulate is a statement of the complex phenomenology of (socio-techno- culture-)anthropogenesis. The emergence of anthropogenesis appears in unpredictable results macro-significant micro-evolutionary deviations. (The famous metaphor of the «butterfly effect» from one of the fantastic stories of Ray Bradbury). This emergence of a new macro-mutation change occurs suddenly, on reaching a certain threshold of complexity, manifested in the appearance of a plurality of threshold micromutations. Consequently, we are dealing not just with the evolution of the human species and the evolution of some complex adaptive systems and the crossing the critical level of complexity and the entry into singularity zone for biosystematical identify of Homo sapiens.

Biological and socio-cultural foundation substrate rationalist human existence has ceased to be a constant in the world anthropic global evolution equation. One of the well-known researchers, political scientists Peter Khatami said recently, in fact,

co-evolution of the nature of the relationship of genetics and culture, Biology and Genetics, of course very important, but their role is not fixed. We are forming a policy that creates evolution [18] . Therefore, as result the juxtaposition of the two disciplinary matrices – biological reductionism (evolutionary anthropology) and sociological reductionism (culture anthropology) – a new conceptual framework is empirically unverifiable ideological antinomy. A researcher and his co-authors in another paper referred to the proven, in their view, one-sided and incomplete of «paradigm of socialization» [19, p. 101, next].

The main conclusion that can be drawn, the uniqueness of the human phenomenon is characteristic of a system arising out of the nonlinear interaction of biological and cultural adaptation module Homo sapiens. In addition, therefore, futile search for «key evolutionary factor» to initiate a process of anthropogenesis and-determining evolutionary history and evolutionary success of humankind. The role of this factor plays a network of relationships between various factors anthropogenesis. Such a network can be adequately interpreted in the framework of the macroscopic description of the evolution of hominids and the use of macro parameters of such a process. This macro parameter can serve as a radical expansion of the adaptive data is generated and replicated mode of genetic inheritance.

This idea is not unique. It is almost exactly same as, for example, the ideas of the Australian philosopher and evolutionary Sterelny Kim. He stated in his lectures given in Paris and dedicated to the memory of Jean Nicot, « In the evolutionary concept of the origin of man has been dominated by the search» key innovation «modules: It tried to show that the unique features of human life and mind emerge more or less inevitable, as a single critical adaptive innovation ... I am skeptical about all such notions of a certain magical moments [evolutionary history of man], a key innovation of the module; I guess instead, the existence of co-evolutionary, positive feedbacks are responsible for large-scale and rapid phenotypic divergence us and our closest animal relatives « [20, p.13]. As suggested by the author of the above quotation (Kim Sterelny), a measure of the complexity of such a system of progressive inter-module communications is the growing number of adaptive information transmitted by extra-biological (extra-genetical) way.

Research and description of the network structure between autonomous units encountered during adaptatiogenesis of hominids, are the subject of this essay.

Self-organizing (evolving) systems are objects that contain a structure, acting as carriers spontaneously replicating and mutating the information necessary for the existence of these objects (a), and the operator providing this information, the process of implementation (b).

Within the framework of the theory, evolution is a process of change of information fragments into self-organizing objects.

Adapting means any information internalizing fragments, whose presence in the system increases stability and replicability of the information contained therein.

At the end of the XIX century, James Mark Bollduin first drew attention to the role of epigenetic inheritance as system shaping factor in cultural form of human evolution. It consist not only biological signs, but also a set of social patterns of behavior, values and norms that were essentially passed from one generation to another, and ultimately have as great an impact on which direction will prevail anthropogenesis (Baldwin effect) [21].According to modern scholars [22], in the same direction and moved Piaget, based on their own socio-humanitarian positions. According to Piaget, the psyche of the child is formed in the course of successive transformations because of integration into the preexisting sociocultural environment. The general idea of the concepts Baldwin and Piaget is the implicit concept of a self-sustaining cycle of co-evolutionary change: 

, which are the basis for epigenetic transformation of the genetic program [23].

Obviously, one of the common time trends of evolution process in general and adaptation-genesis in particular is multiplication of systems of generation (or induction), replication and translation (realization) of adaptive information, and accordingly, the multiplication types such adaptations [24;25;26;27et al.]. Currently, such systems, there are, at least in relation to human and hominid – four: genetic, epigenetic (in turn divided into subsystems methylation, complexation with histones, alternative splicing); cultural (behavioral); symbolic (natural and artificial languages).

Etienne Danchin and Matteo Memeli, emphasizing the multidimensionality and poly-substantiality of inheritance information evolving objects, postulated the existence of the phenomenon, inclusive, (a common) inheritance as integrative result of the operation of all systems of heredity in the global process of evolution [28].

(E.Danchin and other statement [29, p. 484], that it is in the article of the Italian economist Matteo Memeli first formally identified the concept of «non-genetic inheritance,» formulated in our view too, and in the abstract, but because – correctly. It, incidentally, follows already from the desk review of sources cited in the article Memeli [28, p. 35-37]. The concept of «social heredity (inheritance) in this context is, so to speak, «a remake of the ideas of the 1930s. It occupy, for example, a place of honor in the works of the Russian-Soviet economist Nikolai Kondratieff (see [30]).Contribution M.Memeli much more precisely formulated himself, designating as its main objective to show the «reality of relations between non-genetic form of inheritance and non-genetic form of natural selection.» Add – thus the author connects the non-genetic forms of heredity with the overall problem of the organization stable adaptive strategy of humankind as a species [31, p. 5]).

The empirical basis for the confirmation of the reality of an inclusive system for generating and recording of information is impossible to adaptively significant reduction heritable component of phenotypic variation in molecular genetic variations in the genome. According E.Danchin and some other researchers, based on the meta-analysis, a large number of publications, the association mononucleotide replacements in the genome, taking into account the large-scale

(over 500 000). Molecular genetic markers can explain no more than 5% heritable phenotypic variance [32].The reality of inclusive, integrated in nature, inheritance, adaptive significant features is the real explanation of «phantom inheritance», however, is not the only possible one.

(This refers to the genome-wide study of statistical association with single nucleotide substitutions heritable phenotypic traits (Genome-Wide Associations Studies, GWAS). Compares the structure of the genome (usually a sequence of nucleotides) certain carriers of hereditary traits and the control group of individuals.

The method allows identifying a statistically significant correlation between the presence in the genome certain alleles or nucleotide sequences and the presence of a particular phenotypic trait [33].An important indicator is the ratio of synonymous nucleotides substitutions to not synonymous ones. Prevalence of not synonymous ones substitutions it allows you to make an educated guess about the selective and, therefore, the adaptive significance of this locus [34]. Based on the data can to calculate the ratio GWAS the heritability trait, calculated by taking into account mononucleotide replacements and similar methods of molecular genomics, heritability, and the same feature set in classical genetics. Currently, the calculated values of this magnitude is significantly less than unity heritability [32]. The assumption of the important role of non-genetic forms of heredity in the formation of these symptoms – not the only possible explanation. An alternative hypothesis is related to the possible role of epistatic gene interactions are not considered in the technology GWAS).

In the organization of the inclusive meta-information system of inheritance adaptive implemented in parallel two alternative evolutionary mode of generation, replication, and implementation of adaptive information – Darwin-Weismann modus and Lamarck modus.

Darwin-Weismann modus is a stochastic – is not intended to rigidly determinate information structures and/or controlled by signs, (a), unspecified – is not adequate and does not correlate with changes in the external environment (b), not projective not constructive, i.e. is not capable of directly (intentionally or not intentionally) change the adaptive landscape, in which the evolutionary process (c) and is not recursive – cannot be changed except by re-stochastic events (d); fixing the rate of new adaptations of the higher, the smaller the size of populations €; in the dissemination of the newly generated adaptations of horizontal transfer (diffusion contamination as a result of communication) is significantly inferior to its importance to the vertical, i.e., proper inheritance from ancestors to descendants (f). Modus based on the genetic code and provides a so-called Eigen hyper-cycle [35] – binary bonded nucleic acids and proteins with a rigid division of replication (DNA, RNA) and implementing adaptive data (proteins). The adaptive significance of information fragments acquired and recorded during the stochastic selection, not directly related to the generation of functional dependency information. Selection and Replication adaptive data in this case occurs only in a vertical direction. Modus

in relatively pure form actualized in the course of biological evolution phase (biogenesis).

Lamarck Modus is teleological, i.e. – aimed at certain information structures and/or controlled by signs (a), is adequate and/or correlated with changes in the external environment (b), a projective-constructive, i.e. able to direct changes in the adaptive landscape and (cultural) ecological niche where there is an evolutionary process, moreover – to deliberate their reconstruction (c), and recursive – available correction in the course of (d); fixing the rate of new adaptations increases in parallel with the growth of the size and density of the population (e); in the dissemination of the newly generated adaptations of horizontal transfer (diffusion contamination as a result of communication) is comparable in its importance to the vertical transfer generation to generation (f). Modus is based on socio-cultural code and provides systems mimesis (cultural inheritance), and oral and/or written language (symbolic heredity). The adaptive significance of information fragments acquired and recorded simultaneously with the generation of information and direct functional relationship with the latter. Selection and Replication of adaptive data occurs in this case both in the vertical and horizontal (diffusion inside and outside simultaneously existing social communities of different rank) directions. Modus in relatively pure form actualized in the phase of social evolution (sociocultural genesis).

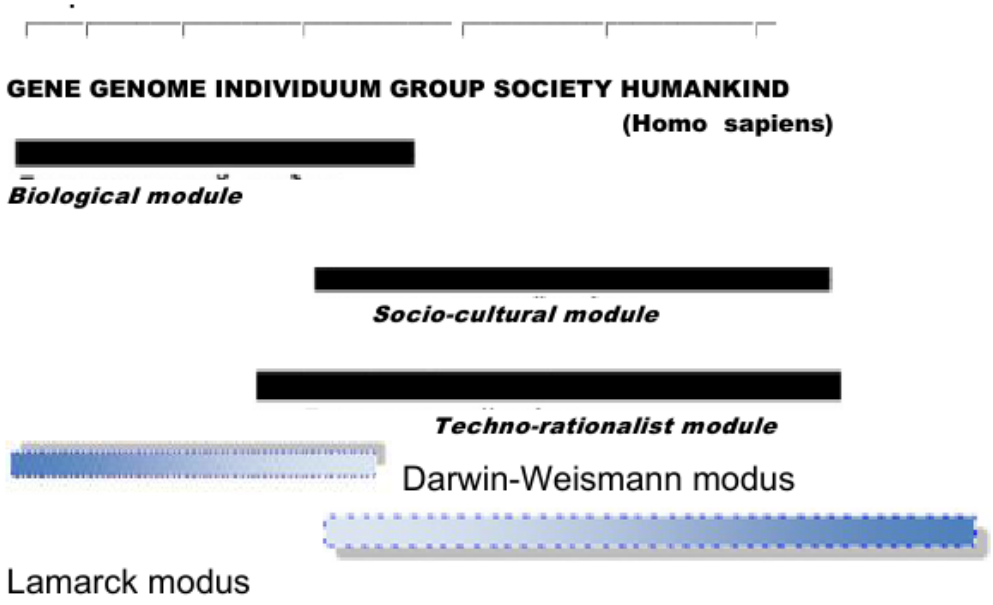


Fig.1.1 – The nomogram of action modes and Lamarck Darwin-Weismann in relation to the application domain elements SESH (explanation in the text)

As shown in fig.1.1, coverage of three components SESH overlap. Also, overlap the areas of application of alternative modes of adaptatiogenesis. In general, the Darwin-Weismann modus dominates on genetic, genomic and individual (organismic) adaptatiogenesis and is reflected at the level of the

evolution of social groups (group selection). Lamarck Modus begins to manifest itself at the level of individuals and its value progressively increases as one moves from group to a human.

The fuzzy hierarchical system adaptatiogenesis is result. This complex gives a higher chances of survival, but at the same time, is fraught with an increased likelihood of conflict between the adaptive elements have arisen due to the existence of different evolutionary modes.

The inevitability of generating evolutionary risk in In the above mentioned SESN structure derived from a formula that describes the relationship between group (W) (w) and individual adaptability in systems combining selective inter-individual processes and inter-group levels [36]:

$$W_i = (\sum^{1/\alpha} w_{ij})^{\alpha}, \quad (1.1)$$

where α – share of the group acts in the adaptive behavior of the individual. Since the parameter α for individual and group adaptability refers to the various level characteristics, growth of group adaptability can be accompanied by a fall to a dangerous limit of some individual component. The famous aphorism about the army of suicide bombers, who are able to win the battle but not the war, is the Illustration. (Of course, if the latter ones is carried out for quite a long time, but for the adaptive evolution of this condition is satisfied by definition).

The principle of complementarity of the two evolutionary modes: Darwin-Weissmanmodus is more inertial and reliable when adaptive information transfer for vertical versus Lamarckmodus. Substrate basis of Darwin-Weissman modus (variance of genetic variability) after the elimination of selection factors is stored for a longer time and therefore provides a more sustained time trend. Lamarck Modus many orders of magnitude more efficient in comparison with the mode of Darwin in the process of horizontal transmission (more precisely to say – diffusion) of adaptive information. Thus, the optimal co-evolutionary configurations are a combination of both modes, or stretched childhood that provides overlapping periods dissemination of cultural adaptations beyond one generation. The third factor, which provides fast and reliable dissemination of adaptations, is socio-controlled expansion extension later stages of ontogeny beyond biologically justified reaction norm. Caring for the elderly members of a social group makes them a natural biological «flash drives» of adaptive information useful for the survival of the group. (All three adaptive evolutionary solutions seen in hominids).

Genetically(in the sense of origin) the most likely terms of the relationship model both modes a priori seems genesis of Lamarck modus as results of autocorrelation spectra of adaptive significance and inherited/diffusing innovation over time (see. [37]).The autocorrelation in the model is determinates by superposition of several autonomous parallel adaptive processes taking place at different levels of self-organizing systems.

According to the generally accepted definition [38, p.206] complex adaptive system is an evolving entity, characterized by a dynamic transformation of its organization in time and space. Its structure and composition is determined by a

built-in mechanism for the transmission and processing of information, which allows adapting to varying external and internal conditions.

In addition, we have to enter some teleological parameter − adaptive information organized and structured in the form of strategies, i.e. resulting from the terms of the behavioral repertoire of solving tasks of survival and auto-reproduction together with the rules of transition from one member of Repertory set to another ones. We concluded that the central element of the explanatory model of anthropogenesis concept becomes stable adaptive (evolutionary) Strategy.

This interpretation of anthropogenesis allows passing from the substantial explanatory model to the relativistic ones, i.e., from search of key features of the organization to search of mutual sapientation connotations between them.

This hypothesis goes back to the evolutionary and epistemological constructions of Donald Campbell [39;40] Karl Popper [41] P.Tomson [42].Here we did learned, another idea – deep homology essential processes of biological evolution, cognition and learning – too. In general, the whole history of the formation of the classical (Mendel-Morgan), molecular-genetic and epigenetic paradigms does not contradict this interpretation.

From contemporary sources are not necessary to mention the monograph of Geoffrey Hodgson and Tornbern Knudsen «Darwin's Conjecture» in which the idea of superposition is associated with another concept – the need to distinguish each member of a binary bundles autonomous functions inherited information – replication of its carriers (Replicator) and realization (implementation) most of this information (interactor). In fact, this autonomy enables the binary transmission mechanism adaptively important information: replication by itself and by epigenetic contagion (infection) [43, p.80]. A further argument in this study will be based on these two principles as the basic postulates of the whole concept.

Another concept that describes the evolution of human as a complex bundle of parallel co-evolutionary processes of biological and socio-cultural evolution, is called hypothesis of socio-cognitive niche [44]. This concept goes back to the ideas of the theory of niche construction, according to which epigenetic changes of adaptive genetic information change the conditions of its implementation, and therefore evolutionary landscape of selective processes.

In the original version of the concept of anthropogenesis, as already mentioned, three main system-forming factors of sapientation (so-called hominid triad) exist. More precisely one should speak of two triads – morphological (bipedalism, hand tools able to manufacture and highly brain – the neocortex and frontal lobes) and psychophysiological (abstract thinking; the second signal system – the language; deliberate and purposeful labor activity). It is easy to notice that the first triad refers the biological component and the second triad is adjacent to the sociocultural anthropogenesis.

The concept of sociocognitive niche expands the list of ligaments due to signs under common (genetic and sociocultural) control. The main attributes of sociocognitive niche, in this concept, is the ability to abstract thinking, empathy,

language, cultural transmission, combined into a single adaptive complex and turns social group of its owners in the unit of group selection.

As a result, (1) there is a gradual drift of the parameters of the ecological niche, have the opposite effect on the direction of adaptatiogenesis; (2) creates an additional cycle of co-evolutionary interactions «evolving environmental – evolutionary objects – evolutionary system of objects»; (3) initiated the genesis of two parallel systems of generation and fixation of adaptive data genetic and socio-cultural inheritance –, and. therefore, – two autonomous «database» – genome and Culture. In general, this configuration generates emergent evolutionary effect – the trend in the progressive change in the cultural and ecological environment as a direct result adaptatiogenesis Homo sapiens.

We add that the prerequisite of an emergent cultural jump acts constructivism predisposition, i.e. directed outward desire to transform the surrounding reality, making it more comfortable for himself and his social group. (In philosophy, this item is commonly referred to as the emergence of self-awareness – the separation of perception of reality in the «I» and «World»).

Even closer to the stated views of the concept presented in the monograph of the British sociologist Walter Runciman [45].This concept goes back to the ideas of the theory of niche construction, according to which epigenetic changes in the genetic information of the adaptive change the conditions of its implementation, and therefore evolutionary landscape selective processes.

We add that the prerequisite of an emergent cultural predisposition acts jump constructivism, i.e. directed outward desire to transform the surrounding reality, making it more comfortable for himself and his social group. (In philosophy, this item is commonly referred to as the emergence of self-awareness – the separation of perception of reality on the «I» and «World»).

Even closer to the stated concept views presented in the monograph of the British sociologist Walter Runciman [46]. Like our own model, according to his ideas Adaptive human evolution involves emitting biological, cultural and social components. The authors shaped these views independently. The difference also lies in the fact that from the point of view of Runciman all three components evolve exclusively in accordance with the mode of Darwin, that is, by selection. In addition, a third (social) component of adaptatiogenesis is heterogeneous, and can be attributed in part to cultural and partly to the rational-technological adaptations. More, we consider this issue below.

We assume that [47]:

a) ***biological adaptations*** is encoded in the genome peculiarities of structural-functional organization of the individual that increase the probability of fixation and replication of fragments of genetic information which determine their appearance;

b) ***cultural adaptation*** is behavioral stereotypes prevalent in concrete social group as the result of imitation and communication between the individuals and increasing the probability of its (group) survival and growth of number of commits

and replication of fragments of information that determine their emergence by means of emotional and symbolic communication;

c) **rationalist or technological adaptation (innovation)**is the material means and methods of purposeful and efficient conversion, cognitive-projective activity and pieces of information common for this social group as a result of symbolic communication between individuals through written and oral speech, using natural and artificial languages and increasing the probability of its (group) survival and growth of number of fixation and replication determining of their (means and methods of transformation) the appearance (c).

As applied to the technology we are talking about originally projective (deliberate and rationalist) form of adaptatiogenesis. Thus, concepts «adaptation» and «innovation» are interchangeable. On the other hand, the name «adaptation process» indicates the mode of implementation and "rationalistic adaptation" indicates the way of generating of this class adaptations. Therefore, both terms in the context of the study will be used interchangeably. In our previous publications, preference was given to the term «technological adaptation».

Outside, coming into contact with other individuals, the stimulus generating act of the adaptive information (cases b, c), as far as can be judged, involves the induction of a specific sequence of epigenetic modifications caused selectively specific external stimulus. If the latter is the contact with a carrier of a certain type epigenetically modified trait, it is a heritable cultural adaptation. If this incentive is the result of the perception of a data message transmitted through artificial code, we are dealing with a rationalist adaptation.

One of the most difficult and controversial aspects of the concept of Homo sapiens adaptatiogenesis as a superposition of three autonomous units derived from the functional dependence of the integral adaptive effect of interdependence influences of all modules of the process adaptatiogenesis. In other words, the establishment of such a system involves initial coordination of all its modules. Thus, the use of tools as a means of group adapting (it is one of the key elements of the rationalist adaptive module now) provides simultaneous implementation of several prerequisites:

1. Reliable and correct integration of tool use in the human behavioral repertoire, including the existence of the trigger mechanism on/off patterns that provide such activities and its situational transformation;
2. . Adequate physiological and morphological organization (grasping hand, bipedalism, brain development);
3. Sufficient level and direction of cognitive mental processes to solve adaptive routine tasks in this way;
4. Synergistic pressure of environment and social structure to evolutionary success, achieved through using of the above-mentioned traits.

From this list of conditions, 1 and 3 provide for the existence of biological and 2 and 4 – socio-cultural adaptive modules. Each of the three types of

adaptations has its own substrate and substantial basis – the mechanism of heredity, i.e. generation, replication of the (broadcast) and selection of potential or actual adaptive information. At the same time the functional organization of all three mechanisms of heredity from the standpoint of relations between their elementary functions includes the same elements [48, p. 2171]:

• Mutations (innovation) – the appearance of qualitatively new features, implies the existence of a new fragment of heritable information;

• Modifications –quantitative parameters varying of existing signs with regard to the conditions of the information fragment translation;

• Recombination – combining several features in a single complex, while maintaining the specificity and integrity of their information coding fragments.

Our conception is based on the classification scheme and the general model of the hierarchical organization of the mechanisms of inheritance described in the monograph Eva Jablonka and Marion Lamb [25]. We have already mentioned it. From the analysis we excluded epigenetic inheritance, since it is due to genetic inheritance not only evolutionary, but also functionally, taking part only of biological form of adaptatiogenesis.

The difference between genetic and cultural adaptive modes of obvious lies in the different ways of adaptive information replication – by biological and/or socio-cultural inheritance. The difference between the cultural and technological (rationalist) adaptive modules due not only and not so much to differences in the methods of replication (symbolic inheritance plays there, and there is quite important), but also in the nature of the relationship with the biological (genetic) component adaptatiogenesis. The chain of cultural transformations behavioral can be very long, but it always has a point of initiating biologically determined emotional response, and this substantial foundation supports the entire chain of socio-cultural adaptation. The final link in the chain can be virtually autonomous from this basis and in the form and content, but the destruction of the biological substrate like trigger off the whole chain. Truism, social stress in a person «too easily turns into an animal». This process hampered by secondary connotation between different branches of socio-culture-anthropogenesis, servants to stabilize cultural module as a whole.

Fundamental important conclusion is that the addition of a third (rationalist) element in the original co-evolutionary genome-culture bunch –the latest in turns a triple helix – autonomous self-sustaining cycle generation of system complexity. This cycle is organized by type of evolutionary fractal. Let`s take a look at the main features of its constituent elements.

The biological (actually genetic) mechanism of inheritance is based, as already mentioned, on the Eigen hyper cycle and on mostly unambiguous clear relations of correspondence between the nucleotide and amino acid sequence in the molecules of biopolymers (the genetic code).

The genesis of cultural adaptation is associated to characteristic hominids (and not only them) are capable of empathy (empathy), mimesis (imitation of behavioral of other individuals and other species), and imprinting (etched in the

memory of emotive images that cause the implementation of a specific sequence of behavioral acts).

This neuro-psychological complex, may be to transform into a sequence of verbal constructs (language) and thereby create a new coding system adaptively important information (it is one of the most likely evolutionary trajectories of the genesis of art) [49, p. 96]. By spreading from individual to individual this information has led to a doubling, then 3-lingof adaptatiogenesis cycles because of the development in the psyche of the emotionally colored image of reality (cognitive models of the surrounding world). The emotional evaluation of the verbalized image of the world («reality») is bifurcated into two components – that is, («things»), and that potentially can cause positive emotions («must»). In the beginning it was concerned to a system of international communication, and then of reality in General.

Obviously, there is a certain line – an unambiguous or ambiguous – between the structure of neural networks and behavioral stereotypes (sociocultural code), as well as sensual ability to act as ideal models of reality (cognitive code). The phenomenological description of the mechanism of sociocultural heredity established by psychology, during the 20th century. Decades ago, Eric Berne [50, p. 3-4] proposed it on classical form, that is very appropriate to the objectives of this study: From the very first months of the child learn not only what to do, but also what to see, hear, touch, feel and think ... All these instructions are programmed into his mind and brain as firmly as if they were punched cards, laid down in the computer's memory. In later years, what he thinks of as his independence and its autonomy is simply the freedom to choose some cards, but most of them are the same holes that had been inflicted on them at the beginning. [Behavioral] scenarios are planned to last a lifetime. They are based on solid solutions of children and parental programming, which repeatedly supported. Reinforcements may take the form of daily contact, as in the case of men who are working on their fathers or women who every morning call their mothers to chat, or it can be less frequent and more subtle, but just as much.

The third generation system – fixation of adaptive information associated with the symbolic inheritance. This type of heredity assumes a special rationalistic mechanism (or rather – had a way) of occurrence, and the replication of the information that implies [51, p. 216-220] not only the existence but also the construction of abstract ideal objects – interpretant, conventionally associated with the symbols for actual or threatened legal assistants (facts and artifacts).

(Interpretant (interpretive thought or thought-form) – a term coined in the scientific and philosophical discourse of Charles S. Peirce (see: [52, p.82]). Here, he plays a key role in the explanatory model of the evolutionary and functional relationships between biological (evolutionary more old) and younger socio-cultural and technological components SESH).

In other words, as a form of technogenesis and adaptation mechanism implies cognitive (semantic or symbolic) code. Its special feature is the hegemony of an arbitrary system of correlative correspondence between thought-forms

(interpretants), employee's promoters adaptive significance of behavioral acts, and appropriate symbols. Have interpretant combines mechanisms of socio-cultural and rationalist component SESH. The difference between them is precisely in the arbitrary coding system of adaptive behavioral acts capable of altering the physical, social and mental reality, increasing or reducing the individual and/or group adaptability of their carriers. This idea is not something entirely new. Back in 1987, for example, in an article claiming that the basis for the uniqueness of human evolution is the ability to conceptually abstract from the situation of modeling the actions necessary to achieve the objectives that have been correlated with fitness. This ability, in the language of the theory of knowledge, to create the perfect rationalist model of objective reality, called «cognitive» niche [53, p.2009]. The above argument specificity (not to say – unique) SESH can be formulated as a postulate of the rationalization process adaptatiogenesis of Homo sapiens, as well as other hominids.

The origin of rationalistic forms of adaptatiogenesis linked the emergence of yet another theoretical and methodological paradox – the question of the relationship between adaptability and validity of cognitive constructs. The emergence of this problem as soon as it was stated is connected with the second evolutionary dichotomy.

As a result, the first dichotomy in the evolving reality became possible to allocate a bunch of co-evolution of the two self-organizing systems – ecological niche (environment, decisive phase of space trends of selection) and organisms as a self-organizing evolving systems using ecological niche as a resource to ensure its own existence (subject to selection). It was assumed that a result of information exchange between the members of this ligament is concordance of the organization evolving system and the parameters of the evolving environment. This correspondence provides an increase in the number of evolving systems – carriers of information. The appearance of some way connected with the cognitive processes (psyche) forms of adaptation is equivalent to the creation of the new contour of information exchange – between a reality and its ideal image. If this image is adequate to reality, it in the theory of knowledge is regarded as a true and adaptive to the theory of evolution at the same time. In the simplified formulation of the thesis that «every true (in a weaker formulation – reliable) information is both adaptive concept» – is a central postulate of evolutionary epistemological concepts of Karl Popper.

However, for Dennett the reverse thesis – «all the adaptive information is true» – in general, is not always true [54, p.493]. The selection criteria and the criteria of adaptability fit into a multidimensional adaptive (evolutionary) landscape. In this landscape of adaptability is the projection onto time-survival of some (including socio-cultural ones) set of factors. A situation that the selection criteria based on axiological system of priorities for several different parameters will be biologically adaptive and, in principle, others not adaptive may arise.

Meanwhile, for the elements of psychic life in general and spiritual culture in particular has only one dimension, when the relationship between the two sets of uniquely identified – the adequacy of reality (the truth). However, socio-cultural types and their specific form of ideology and worldview are many, and they are durable. In other words, it is not always the truth of adaptability and self-replicating elements of culture are identical (synonymous). There are a special class of cultural innovations that are adaptive, but not true. (It named a «positive illusions» or an «adaptive misbeliefs» by McKay and Dennett [54]). The reason for their fixation during adaptatiogenesis of regular adaptive changes observed as a result of implementation. The positive effect was observed on the more important parameters of adaptive misbeliefs; overlapping maladaptive changes to the elements occupy lower positions in the adaptive priority. In other words, the integral balance of the adaptive error is positive, despite the fall in certain indicators of fitness.

In fact, in this respect, socio-cultural adaptive misbeliefs quite similar items subsystem biological adaptation. The modular principle of the structural organization of ontogenesis, not exclude, but assumes the appearance of conflicts between the individual functional elements of adaptatiogenesis – by virtue autonomy of the evolutionary origin. . The conclusion applies to relations between elements of the same module SESH, as well as module-to-module co-evolutionary or functional (semantic) relationships. (On one side the conflict between individual self-replicating elements of the genome is a universal attribute of life [55, p. 3].On other side genetic conflicts reflect local differences in SESH male and female [56], that in hominids are initiating element of social differentiation. Therefore, it reflect conflicts between the pools of biological and socio-cultural adaptations, too).

The basis for fixing individual adaptations is their partial impact on the spread in the population of their carriers. For this reason, the selection of individual items within certain limits SESH involves multidirectional evolutionary trends in multidimensional adaptive landscape. The same principle applies within each of the three main modules SESH. Inside each of them, there is a sub-modular organization, which elements occur in parallel in the course of evolution. With regard to the type of biological adaptations modular organization argued set of experimental data on the simultaneous genesis of autonomous adaptive systems more system features anthropogenesis presented in the works J.C.K. Wells, B.Krespi and others modern evolutionary anthropologists [57,58,59].

With the growth of the proportion of Rationalist (Lamarckian) module in the general process of mankind's adaptatiogenesis value of «adaptive misbeliefs» and the intra-genomic adaptive conflicts (see below) should decline, while the value of the system (between-component) conflict – increase. Indeed, different kinds of adaptive technological innovation only with very large distortion can be compared with the «adaptive error». It is intuitively obvious, however, that the social and biological risks associated with the development and integration of high-tech innovations involve significant adjustment in the socio-cultural component of the

adaptive complex. Consequently, at the level of meta-system adaptations manifestations «adaptive illusions» will be more important on frequency and scale effects.

If we continue this line of reasoning, then the validity of the thesis of adaptability certainly true concepts circulating in cultural tradition be imposed limitation: it is valid only in the dynamic sense, as in this case, the adaptability largely determined by the system properties of the whole complex of social and cultural innovation. Knowing even true, destroying the already existing system of «adaptive misbeliefs» can reduce the adaptability of the carrier – an individual or a social group. This item will also serve as the subject of analysis in the future.

(Difference between adaptability and truth of sociocultural and rationalist concepts must be taken into account when determining the origin of religious belief mechanisms in both the bio-anthropological and philosophical-anthropological aspects. The rationale for this thesis is devoted to our previous publication [47, pp. 286-543]).

Therefore, of the three types of adaptations that ensure the survival and evolutionary progress of Homo sapiens, most are not clear mechanisms of generating cultural adaptation and adaptive technological innovation. In general, the form of adaptatiogenesis (biological, sociocultural and rationalist) that his theories to explain without fundamental gaps is not exist.

Even following assumption seems not so much a scientific hypothesis, as the concept of natural philosophy, despite the fact that modern cognitive science, neuroscience and evolutionary psychology provides us with a large amount of experimental data, the majority of which it confirmed, and there are those that are absolutely incompatible with it.

According to our assumption (this was already mentioned above) there is a continuous series of transformations, which is the originating point of the appearance of a certain configuration of neural networks as reasons for updating certain behavioral patterns, and, at the same time, the hypothetical emotional thought forms (determination of necessity rather vague). The thought forms ensure the stability of these stereotypes and are likely to include a range of emotional states in association with a certain feeling, adequate external and internal environment. In any case, we assume that

- Between the biological, socio-cultural and rationalistic forms adaptatiogenesis evolutionary continuity and a transmission mechanism exist;
- The same mechanism and ensure continuity exists between their biological, socio-cultural and symbolic forms of inheritance;
- This transmission has a co-evolutionary nature, i.e. implies the harmonization of autonomous origin series adaptively significant signs-sociocultural and biological, such as

The presence of epigenetic adaptive modification information processes, which is the object of an external regulation by alternative systems of

inheritance, is a necessary condition for the emergence of such a mechanism is.

(For example, the main differences in the structure of the human genome and other primates, predominantly associated with the sector noncoding nucleotide sequences, which presumably plays basically the role of regulatory elements (enhancer, etc...) These elements are capable of radically changing pattern of activity of the structural gene that in turn, leads to an equally radical system changes the phenotype equivalent mutations in their expression of the structural sector of the genome. It is these non-coding nucleotide sequences have evolved in the course of anthropogenesis with the highest rate (for details, this model of molecular genetic processes of anthropogenesis set out in [60]).In accordance to our hypothesis is through epigenetic regulators sociocultural module SESH reformats activity distribution of individual elements of a biological unit for the expression of their own (socio-cultural) adaptation).

Next, we analyze the empirical and theoretical arguments in favor of this working hypothesis and conclusions in terms of methodology and technique of calculation and prediction of the amount of risk NBIC-technological complex. “NBIC-technological complex” we see how the term identical terms “technology controlled evolution” and “High Hume”.

Meynard Smith introduced as known to the academic community the concept of evolutionarily stable strategy as species-specific set of modes of solves emerging problems of adaptation. The concept Maynard Smith is a special case axiomatized game theory in general and the so-called «Nash equilibrium» in particular. One of the most pressing problems of the modern theory of anthropogenesis have origins and organization of stable adaptive (evolutionary) strategy of hominids (SESH). The solution to this problem is all the more important that now we are approaching the point of regular global bifurcation of transition to controlled evolution phase, the cause of which is global evolutionary and ecological implications of a SESH.

The initial methodological postulates explanatory model-underlying hypothesis developed below, at various times offered Vavilov, Vernadsky J.Huxley. Nikolai Ivanovich Vavilov authored metaphor «human directed evolution» [61]. The metaphor was the starting point, which semantic connotations gradually filled by verbal-logical constructs available for comparison with an array of empirical data and theoretical constructions of developed evolutionary and philosophical anthropology.

Holistic «ideology» (the original system of theoretical postulates) is the theoretical core of this concept is known as the triple helix model. The latter provides that a self-organized and able to progressive evolutionary development system include the structure of the three autonomous but interdependent (co-evolving) and overlapping elements. It is in hybrid zones, where the interpenetration of autonomous social institutions with the formation of hybrid structures is carried out by a new generation of adaptive

information. («Hybrid nature of the» generator of new knowledge is reflected in the «hybrid» structure of the theory itself – appears in its composition that we have previously designated as «ethical and epistemological hybrid constructs»). Each of the elements capable of autonomous adaptive evolutionary changes in a particular context, but In general, their evolutionary trajectory invariably tends to the point of stable equilibrium. Similarly, binary bundles of these elements oscillate around the equilibrium points described Volterra-Lotka equation tray.

As a result of the superposition of three separate objects co-evolving as a team, where each part is associated with any other cycle forward and backward linkages generated different dynamic structure. In this case, in the phase space of the parameters of system complexity arises adaptive evolution curve (the «triple helix»), which is applied to the society and is known as the scientific and technological, social and human progress (in spite of the ideological loading of the term, in which the authors give full aware).

In terms of information theory, the Shannon, this process can be represented by the equation:

$$I(ABC) = H(A) + H(B) + H(C) – H(AB) – H(AC) – H(BC) + H(ABC), \quad (1.2)$$

where I (ABC) – Information generated by the interaction of individual members of the co-evolve triad (ABC – in this case, science and technology, state power and business, respectively), H- entropy of a single element and their interactions. Thus, there may be situations where the total entropy decreases (correspondingly increasing the amount of information). However, the reverse is also possible – additional feedback loop causes the destruction of at least one of the members of the triad, which ultimately becomes the general crisis – degradation socio-institutional organizations. Such information interpretation nonlinear model of co-evolution (triple helix), developed in articles L.Ledersdorf and others since 2008 [62].

The presence of a third element complicates the interaction of a binary co-evolving systems ligament and leads to an additional feedback loop, bearing either positive or negative. Accordingly, the generation is either organized complexity of each element of the ternary system, and herself as a kind of integrity, or their degradation (increase in total entropy).

So, stable adaptive strategy Homo sapiens includes original superposition of three main types of adaptations – biological, cultural and rationalistic.

Functionally three components of SESH form a hierarchical system of information cycles. Each loop provides a consistent generation, replication, selection and fixation or elimination of adaptively significant information. However, in parallel there is a stochastic process of loss of information because of random replication errors. The tendency to reduce the amount of information is overcome because of further acts of generation. As stated by one of the founders of

modern ecological paradigm Howard Odum [63, p.224-237] from the point of view of thermodynamics, the above information cycle is more «profitable» in terms of energy. In other words, adaptive data replication is associated with high-energy consumption, compared with its generation and selection at a time. Thus, SESH in this aspect can be seen as a hierarchy of three-member information cycles composed of biological, cultural and rationalist adaptation. The overlying loop acts as an «ecological niche» for the previous filtering and transforming signals from the proper environmental safeguard and thereby stabilizing the evolutionarily more ancient information cycle. Thus, the evolutionary cost of maintaining each component of SESH reduced, that appears in reduce the rate of evolution of the relevant components. (The rate of biological evolution of Homo sapiens, for example, is markedly reduced in comparison to the development of socio-cultural and rational technological components of anthropogenesis).

The idea of a hierarchical organization SESH borrowed from some publications of Thomas Abel [64, p. 44]. He apply it to the organization exclusively culture. In accordance with its concept of culture (cultural adaptation to our terminology) is a hierarchy of information cycles described above. The author does not regard the problems of organization of biological adaptation, as a result of a multi-level process of realization of genetic information, however, judging by the currently available concepts of post-transcriptional and post-translational transform genetic information (epigenetic inheritance); it can be assumed that a similar hierarchical scheme of the adaptatiogenesis applies to biological components SESH. Therefore, even without a detailed analysis of specific mechanisms technogenesis there are good arguments to suppose that SESH is a three-tier system of information adaptive cycles (bio-, culture-, technological). At the same time within each level sub-passages, ending a phase transition to the next elementary found. The border between the levels determined by the appearance of an alternative stand-alone module generation – replication – selection – fixation of adaptive information.

Thus, each of these subsystems is autonomous from the rest of the origin and way of implementation, but dependent on their functional significance and direction of the subsequent evolution. This feature can be stated as follows: for major evolutionary transformation trends each subsystem (module) of the adaptive strategy depends on both the other two elements of the evolutionary landscape and, in turn, acts against them as part of the landscape. Therefore,

• First, the landscape evolution of hominids become significantly more multidimensional in comparison with the evolution of other biological taxa;

• Secondly, the share of environmental factors in the evolution of human and including human (socio-) ecological systems generally declining;

• Third, there is an imbalance in conjunction adaptive strategy – ecological environment periodically reaches a critical value and allowed environmental crisis.

Since the outcome of such a crisis in every case of uncertainty, including a change in the individual elements of the adaptive strategy, the environment, or a combination thereof, this point should be called evolutionary singularity.

As a result, the overall and specifically socio-cultural trends of anthropogenesis in inter-singular period of its development in a lesser extent determinate by ecological dynamics and becomes more spontaneous (intentional), i.e., due to the nature and parameters of the internal organization of a stable evolutionary strategy rather than stochastic or directional changes of the external environment. The Russian anthropologist A.A.Zubov, in our opinion successfully calls this phenomenon by term «adaptive inversion» [65,p.7].

In its own publications, we are not using the term, wrote that man, unlike all other creatures not adapting to the environment, and adapts environment to himself, or rather, to organize of own biosocial – physical and mental substrate. In principle, this proposition was to neo-Darwinian («synthetic») theory of evolution trivial. However, in recent decades it has been revised in the new – epigenetic disciplinary matrix.

Hypothetically, it may be offered an evolutionary algorithm that can lead (and probably led) to the genesis of adaptive inversion. A priori possible to postulate the existence of three different mechanisms of generation and fixation of adaptive information: random statistical information frequency drift of population fragments; stochastic process of the emergence of new fragments (mutation) in combination with selective reproduction (selection); purposeful design based on rationalist outlook of the future. During most of the biological and socio-cultural evolutionary phases of human history dominated by the first and second mechanisms [66, p.221]. A radical change occurred as the internal law of cultural genesis.

First, we note that the behavioral (proto-cultural) adaptation can ensure compliance with strict behavioral specific set of environmental factors, and in this case, a narrow range of reaction rates characterizes these kind of adaptive innovations. The condition for the effectiveness of such adaptation is the relative constancy of the parameters of a new ecological niche.

An alternative is the generation of complex high-ductility behavioral stereotype with broadband plastic norm of reaction. This stereotype may have the potential to change over time according to changes in the external environment. This type of adaptation is effective in regularly changing (cyclically or directionally) ecological niche. Therefore, this property could be interpreted as the ability to forecast the future of the environmental situation.

However, if changes to the ecological niche was largely stochastic or too fast, the proto-cultural adaptation of the second type may acquire property, which should be called creativity. Anticipation of future changes in habitat and behavioral acts aimed at survival in the new has not yet come under merge into a single cognitive activity bunch. The result of this association becomes a phase transition to a teleological development of ecological niches – at first spontaneous, then rational. To implement this (forecast) adaptive function in the human psyche there are some standard cognitive models – interpretation algorithms of empirical information ([54], as amended [47]).

Intentional algorithm based on the decoding of behavior of the object in accordance to the analogy of own behavior in the same specific situation. The interpretation of the behavior of an object (person, animal, artifact, whatever) when it ("he") is perceived as a rational agent, i.e. its «choice» of «action» is guided by their «beliefs» and «desires». In simplified form, this algorithm provides for compliance with a few simple criteria of reliability of the forecast:

- evaluation of reliability of the forecast corresponds to the following list of actual or potential underlying causes of behavioral acts or events (each successive member is less likely compared to the previous ones)artifact → volitional action → objective reason of a certain phenomenon, event or situation (1);
- it is assumed that inanimate objects have goals and intentions similar to the actions of the members of a social group (2);
- external factors (for example, the force of gravity) are regarded as the internal characteristics of the object, i.e., its attributes (3);
- The cause of motion or change is always some kind of action needs serving motive beginning of change. If such a motivator cannot be found, it is assumed that it is rooted in the internal needs of the object (4) [15, p. 233].

Constructive (functional) algorithm considers a fragment of reality as an element of an artifact created in order to implement certain specific functions in the implementation of the project or program.

Mechanistic (physical) algorithm: properties of the system is a superposition (linear totality) of its constituent elements, forecast the future is a result of unique extrapolation change of system and its components to the change in external conditions.

Magic algorithm is a combination of intentional and mechanical algorithms: on the one hand, the reality is the result of purposeful activity of transcendental rational agents, on the other – the agents themselves open to rationalist control and manipulation by rational action agent.

The mechanistic component (scientific and technological innovation) algorithm provides psychological «substrate» for meaningful interpretations in the mass consciousness [67].In other words, the image of the discoverer of objective connection of fragments of reality merges and/or transformed in the image of the creator of this reality. In this case, a statement of the possibility or impossibility of achieving the desired state becomes conscious in the willingness or unwillingness of the same state. In retrospect, the science is evolutionary homologous (derived from) to magic, as «effective» its variant.

(As he wrote in the last century E. Garin [68], «Magic is a practical activity that transforms nature, including the game of its laws»).

In the long term Science as social institution evolutionary increasingly uses its own cognitive codes of other social institutions. Science and technology in the structure of mentality increasingly overlap [69, p. 370-371; 70,p. 116]. The objects of scientific research including human-dimensional (genome, the psyche, and so on.) originally considered as a aim of technologized transformation, the boundary

between the «true» science and «false» magic again becoming illusory as in the Renaissance [47 to . 384].

Theistic (religious) algorithm (synthesis intentional and constructive) is considering all of reality as a whole as the embodiment of a certain initially selected program, its predictive component is so absolute and temporal and spatial aspects of what is empirically unprovable but irrefutable (trivial), no was subject to immediate selection.

An evolutionary algorithm is the result of combining constructive and physical algorithms and leader in this bundle is the last. Generated as a result the predictions become exposed to direct selection for adaptability.

Among the anthropological hypothesis that aim to explain the mechanisms of origin of spiritual culture and consciousness it is now the most reasoned seems the concept connected these phenomena with the development of social or Machiavellian intelligence. This term refers to the ability to establish semantic communication with other individuals within their own social group, population, species and beyond [71] to anticipate behavioral acts of individuals that will be implemented in the future, or to reconstruct actions committed by these individuals in the past in certain circumstances and, therefore, manage or manipulate them for own purposes (safety and reproductive success).

The point of an evolutionary jump, i.e. the genesis of out biological - cultural inheritance and, accordingly, sociocultural module of SESH might formed the gender selection. By assumption S.Savel'ev [72, p.35-40] in a developed social hominine organization and in supportive, resource-rich ecological niche most stiff competition may have in the field the opportunity to enter into a porcine reproductive and sexual contact with individuals of the opposite sex. The means to achieve of more fitness in this case are communication skills, and morphological basis of the adaptive advantages is development of the forebrain, which have more amphibians and reptiles provided hormonal and emotional basics of sexual behavior, and then became morphological basis for the neocortex of hominid brain. The function of the latter, as is well known, and are complex forms of social behavior and thinking. Despite a certain share of shocking, this hypothesis is logical explains general trend of early stages of socio-culture-anthropogenesis: environmental degradation (replacement of tropical African forests to savanna due to climate aridity) established socio-cultural adaptation, based on a new diet and a new distribution of social roles between the sexes. It was starting the process of formation of a complex socio-cultural adaptation, leading eventually to the Neolithic revolution (see. Below).

Obviously, the most easily established evolutionary association between social intelligence and interpreted in the framework of adaptatiogenesis intentional algorithm. It therefore can be seen as a progressive adaptation of the original, while the physical algorithm for forecast the future (again, initially) served as added, safety ones only.

Machiavellian intelligence, according to the latest neuropsychological views, consists of two parallel proceedings cores – emotional and cognitive [73, p.18]. It

was, apparently, an adaptation of the system, to initiate or support trail secondary adaptations that originally served as an enhancer of its predictive function, and subsequently more autonomized from his biosocial substrate. The empirical argument in favor of this hypothesis are the recent psychological research data. In accordance with them, read bestseller works improves test scores on the cognitive ability to adequately assess and interpret individual emotional state and interpersonal social relations [74].

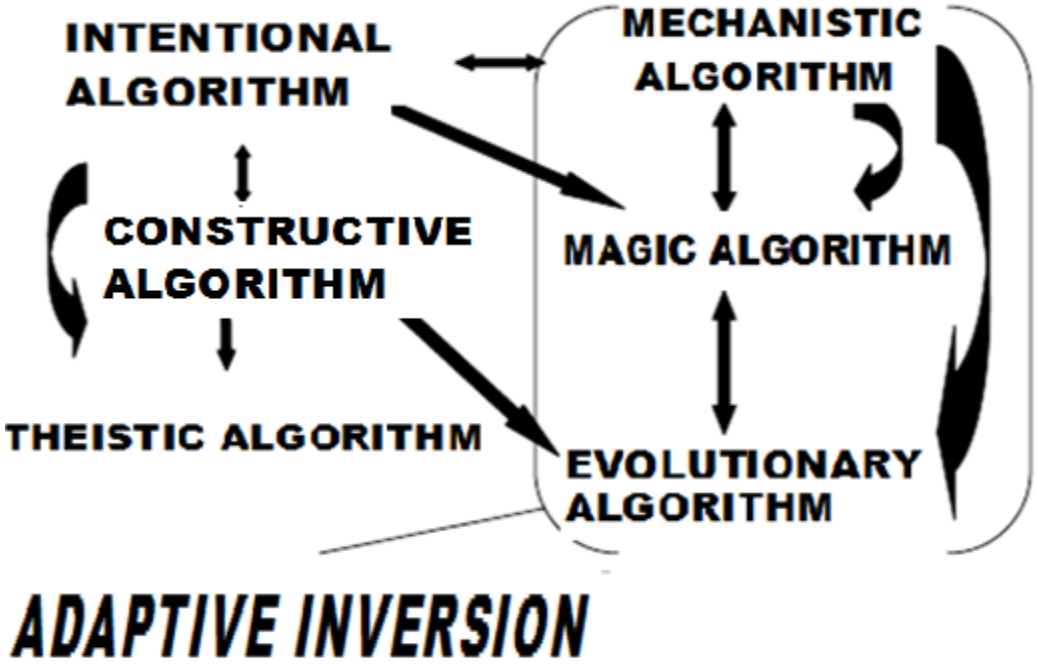


Fig. 1.2 – Hypothetical pattern of the evolutionary origin of adaptive inversion because of the evolution of adaptively prognostic of cognitive algorithms.

This conclusion seems trivial only for humanitarian knowledge and everyday consciousness. In philosophical study, it acts as the initial premise, realized accepted implicitly or unconsciously, but an indispensable condition for the reliability of logical constructions. That is to say, the test that validates the logical constructs analysis of the phenomenon of consciousness and cognition. «We are thinking the mental states, i.e. desires, beliefs, images, etc. of other people, as well as in other natural objects; they aren't given directly. This guessing is universal for the particular type of situation», – writes Russian philosopher V.V.Vasilev [75,p 15]. The paradox lies in the fact that such «guessing» initially able to rely solely on an introspective comparison with their own actual or potential mental-emotional states. In other words, human projects his own spiritual (in the humanities) or mental (in the natural sciences) condition to the world. To adapt to this world or to adapt the world to self, you must first become like him.

For proper natural sciences, the same package is one of the first technologies to approach the objectification reflect the evolutionary role of art (or

at least certain aspects of it) in the theory adaptatiogenesis hominids. If this logical-empirical construct will not be questioned by subsequent studies, are scheduled until the very vague prospect of detection of the bifurcation point in anthropology, which outlines the separation of complex introversionally social (religion and art) and extra-versionally environmental (science and technology) adaptations and innovation in framework of SESH.

The general scheme of evolution predictive of cognitive function as a socio-cultural adaptation can be represented as follows (fig. 1.2).

Thus, a new, synthetic algorithm, which merged into a single system source (constructive, intentional and mechanistic) cognitive component of the psyche. This event can be regarded as identical phenomenon of «adaptive inversion» – socio-cultural adaptation, the genesis of which culminated in the phenomenon of technological civilization. In the first stage of this process, constructive algorithm associated with the intentional, functional and tool use in the «substrate» relationship, incorporated/replaces mechanical algorithm as a cognitive mechanism for forecasting changes in reality. Then this role back to the original mechanistic algorithm, but the adaptive transformation of modes of behavior has been developing for a constructive pattern. In other words, a change of behavior in accordance with the (predictable) changes in the environment are replaced by changes in the environment respectively the new behavior patterns. The scheme as a whole brings us back to the triad of conjugate evolving elements that provide a progressive increase in the complexity of the «triple helix» system model. Thus, the general scheme of the conjugate evolution of biological (G) and socio-cultural elements SESH is an alternation of direct ($C_i \rightarrow C_{i+1}$, $G_i \rightarrow G_{i+1}$), recursive ($C_{i+1} \rightarrow G_i$) and inter-module ($G_i \rightarrow C_i$) communication junctions of co-evolutionary process (fig.1.3).

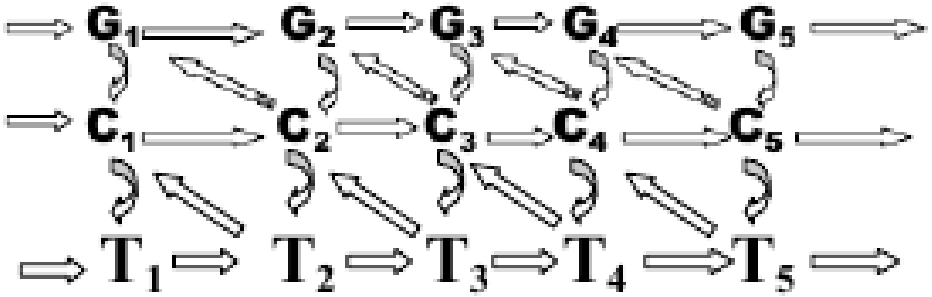


Fig. 1.3 The block diagram of gene-culture co-evolution and techno-humanitarian balance

.

We now clarify in the proposed scheme. Certain conditions of each module SESH (G_i, C_i, T_i) is not a single adaptation, innovation, and a set of adaptive evolutionary solutions (ΣG_{ni}, ΣC_{ni}, ΣT_I). Features of adaptive evolution (evolutionary-adaptive window) of each such set is determined by its composition, structure, relations between its members and the patterns inter-module connections.

Relations between pools of elements that make up each of the three modules SESH, are restrictions placed upon each of them by the two remaining. The relationship between a dynamic evolving (techno-rationalist and socio-cultural) and more conservative biological modules has the substrate-substantial character. In other words, a set of genetically determinate and supported traits serves as material for the formation of sociocultural adaptation. Reverse the impact of socio-cultural and techno-rationalist biological adaptations are functional in nature. Adaptability or maladaptive appropriate biological trait is determined by its use as an element in the socio-cultural and techno-rationalist complexes. Possible areas for further evolution of each module can be represented as a certain set of potentially admissible trends of varying magnitude and direction. The value of the individual (elementary) evolutionary trend (trend) is determined in conjunction with other modules; it can be ranked by descending on a supported, neutral, radical (repressed) and lockable (not allowed) ones.

Thus, the potential implementation of a set of possible rational-technological innovation (techno-rational adaptive window) is limited to a subset of admissible under the current socio-cultural composition of the module. In other words, there is currently a lot of social and cultural value priorities sets limits on the development and implementation of new technological solutions, regardless of their adaptive value. In a metaphorical sense, the current moral predisposition determine not only the results of the implementation of new technologies, but also the possibility of their occurrence. However, new elements and enrichment pool of technological innovation, in turn, modifies the composition of the socio-cultural module so that those scientific and technological developments that were previously considered moral (cultural) unacceptable, go to the category of radical, but acceptable. The fate of traditional technologies, which in this case are close to the borders of sociocultural determinate norms, can develop in two ways:

• they are stored in the form of a kind of rudimentary within a narrow «technological and adaptive niche» or saved as a «basis» because of its reliability in providing vital life-support functions (equivalent to an increase of volume technological module of SESH);

• or they are no longer supported the existing socio-cultural configuration of the module and out of use (equivalent to the evolutionary «drift» – changing the composition of the pool of technological module of SESH).

The first scenarios correspond to any increase in the volume or complexity of technological pool of SESH. Intuitively, it appears that the first possibility is realized more frequently and, therefore, the composition and structure socio-cultural module expands and becomes more complicated as well.

If all of the above translate into the language of ontology, as a result of adaptive inversion «environment» is split into «the world objectively existential (the world of things)» and «projective ideal world (the world proper)» and thus becomes a «reality». A distinctive feature of the reality of the environment is the subject of a binary opposition (world proper) and object (the world of things). Traces ligament intentional-design algorithms in the «evolutionary history» of

technological civilization is clearly seen in the philosophical and ideological traditions of deism 17-18 centuries.

In principle, the same design (fig.1.3) virtually unchanged apply to the second co-evolutionary conjunction of SESH – the techno-humanitarian balance. Under this model, the adaptive evolution of humanity is represented as oscillation size and orientation relative to each other three adaptive windows, while maintaining the integrity of the entire structure. Quantitatively, the evolutionary process is described as a projection of the areas of all three windows on three-dimensional coordinate system: BIOLOGICAL SURVIVAL – SOCIO-CULTURAL – COMPLEXITY – TECHNOLOGICAL POWER. Evolutionary risk equivalent to the progressive narrowing of the absolute and relative magnitude of at least one of the windows.

This, of course, purely speculative scheme, which, however, does not contradict the data of paleoanthropology, and helps to explain how cognitive and cognitive components of the converter behavior gradually become so important in anthropology. Note that this process, which arose in the evolutionary history of humankind once, could not stop at the first stage. The first adaptive inversion spawned inversion of the second and third level.

Adaptive inversion radically changes the criteria for selection of evolutionary innovations. The evolutionary success or failure of social and cultural, and then rationalist innovation determined by the dynamics of transformation of individual elements of the environment in the resource life support of an individual and social group. Adaptability of this innovation stems from its ability to transform the components of the environment into a source of life support and expand the number of carriers of the same innovations. From the perspective of evolutionary theory comes progressive animation environment niches available Homo sapiens. Thus, biological nature of adaptive innovation carriers remains unchanged, at least – in the latter stages anthropogenesis. In other words, the evolutionary divergence of changing its nature – of the genetic (biological speciation) becomes a socio-economic differentiation; ecology replaced economies.

The dynamics of the process of fixing the socio-cultural and technological innovation (the conversion of the latter into adaptation) clearly describes the S-shaped curve where the initial linear increase in the number of carriers has arisen innovations in time gives way to an asymptotic approximation to the constant level, after which it becomes possible to progressive decline in the numbers This form of the evolutionary curve is determined by two factors [76].

The first of them is entirely similar to population-genetic factor in the case of biological evolution: speed ratio of generation innovations and their distribution in the «population» (society) [77, p.5]. The damping growth in the number of carriers in this case, there is a simple saturation effect.

The second factor corresponds to environmental parameters is the capacity of newly established «ecological» niches (potentially available for using volume of resources). In this case, the phase of the linear or exponential growth occurs when the amount of resources used by the potential well below the affordable volume.

The transition to the phase of the logistic growth occurs when these values are comparable.

Next, SESH included in hierarchically structured fractal evolution. Each fractal level is a system capable of generating adaptive complexity (fig.1.4).

In this scheme, each level acts as a superstructure to the previous and provides the genesis of the most dynamic element overlying the triad. In the triad of civilizational level such acts rationalist adaptation, which ensures the functioning of the social level of the triad (more accurate to say – the level of social institutions).

During anthropogenesis happening permanent increase in acceleration and efficiency of adaptatiogenesis resulting increase in the proportion of socio-cultural and technological adaptations. In other words, there is a gradual replacement of Darwin-Weismann modus to Lamarck modus as the ability to update the higher rates of evolution and/or adaptatiogenesis.

From the perspective of an outside observer, this process looks like braking and stopping process components adaptatiogenesis, determined by slower modulesof SESH, becauseof rapidly growing modules. Parallel to advent and socio-culturaland then techno-rationalist form of adaptatiogenesis there is a «virtual» braking and stopping of evolutionary transformations, first the structure and composition of the genome, and subsequently – the unification of culture. Last transform to mass culture.(Unification of social organization and culture is, as is known, the essence of the phenomenon of globalization.) In our model, the evolution of SESH – this impression is an illusion that does not meet the internal mechanisms of integral human evolution (socio-culture-anthropogenesis).

Intra-modular conflicts between elementary adaptations previously overcome in the course of subsequent evolution. Now (with the emergence of Three-modal SESH) they do not just «preserved», but also supplemented by conflicts between modules. There are gaps and expand the network of functional connections between the individual adaptations within a given adaptive windows, which are perceived as growth in evolution load. «Filling» of these gaps is sudden acceleration of internally module evolution: spontaneous (induced by socio-cultural module) and then externally managed and directed (determinated) by techno-rationalistic module. External determination in this context means that adaptatiogenesis proceeds in accordance to characteristics of more rapidly evolving module. (With reference to the biological evolution «external determination» means that it is carried out by technological innovation, not selection or genetic drift.)

Here the leading role in co-evolutionary bundle plays an element with a higher speed of (adaptation) evolution (1);separation autonomous system complexes of encoding-replication-generation-broadcasting of new adaptive information is precondition of existing of co-evolutionary triad (2) [78;79,p. 154; 80]. In general, these two thesis adequately describe the basic characteristics of evolutionary systems (sequence) of objects (processes) HUMAN (biogenesis) –

CULTURE AND SOCIETY (sociocultural genesis) – TECHNOLOGY (technogenesis).

The emergence of this system presumably happened at that stage of our evolutionary history, the essence of which comes down to the evolutionary divergence of phylogenetic lineages primates and hominines – direct human ancestors.

Modern hypothetical explanation (cited in: [81]) of driving forces and mechanisms of the passage of this stage synthesizes postulates explanatory models put forward in the 19 century by Friedrich Engels and Charles Darwin. First as a main sapientation factor (the emergence of modern human species)offers a collective labor activity (production and use of tools); second ones – sex selection. As modern researcher (O.Lovejoy) believes, a change in the environmental situation forced early hominids living in the lower tier of the forest, go to a new adaptive strategy based on a clear division of social roles between male (supply of food) and female (child-bearing and nursing children) sex. Indeed, as shown by current research, male sex shows a greater propensity for risk behavior and fosters this feature serves as an attractor for the female sexual activity. In other words, the tendency of males to risky behavioral acts have quite a strong positive incentive for women sexual choice; men, at least in the Western cultural type are more risk-oriented than women, and the latter focused on the more positive perception of the risk behavior of male [82, p. 36].

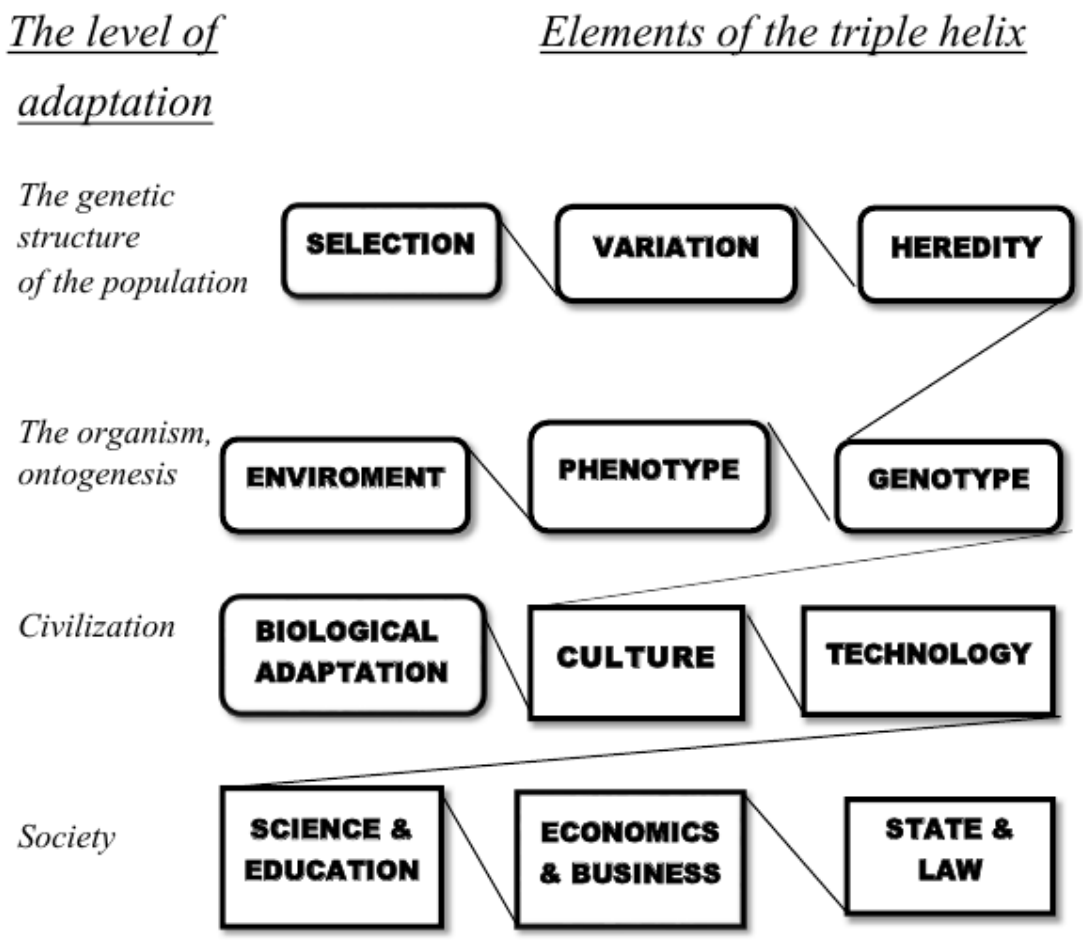


Fig. 1.4 – The hierarchical pattern of g generation adaptive information in accordance with the model of the «triple helix».

All these facts and conclusionsare still within own biological evolution. Individual elements today inherent in SESH, met among living organisms belonging to very distant taxonomically species. Favored the approval of a new strategy of adaptive features of the landscape were a relatively long period of childhood and life, which is based onscavengering and/or hunting. This contributed to the liberation of the forelimbs (transporting food) manufacturing tools (initially – to break up production, as well as hunting, defense and attack on the competitors). Another adaptation was accompanying the development of language as a communication tool, providing a total success in obtaining food, and its neurophysiological bases (cephalization – increase in the relative size of the evolutionarily younger parts of the brain). Changed and a number of other trends of hominid evolution – reducing aggression within the social group, the weakening of the external manifestations of the reproductive cycle and the seasonality in the female, etc.

Thus, the initial behavioral adaptations that over time more and more were based on not biological, but socio-cultural inheritance, entailed a complex

biological (morphological and physiological) adaptive traits – the so-called hominid triad:

• bipedalism – 6 mln years ago;

• hand tools capable of manufacturing – 1.8 mlnyears ago;

• a highly developed brain (neocortex and frontal lobes) – 2.5-1.8mlnyears ago.

On the other hand, the same behavioral adaptations initiated the development of tool use, which was later transformed into phenomenon that we now call technology and technological progress. The whole process of constituting the new adaptive strategy completed 25 thousandyears ago. Since then, the further evolution of SESH become self-sustaining process of co-evolution of the genome, culture and technology, accompanied by a continuous and spontaneous increase in system complexity. Because of the presence of several (at least two – genetic and socio-cultural) autonomous systems generation, replication, and implementation of adaptive information another, very important postulate of the disciplinary matrix of modern genetics and evolutionary theory flows. Along with natural selection of individual genetic determinants (genes) and organisms essential role in the evolutionary process has the selection of social groups. The very selection, in this case has a multilevel hierarchical organization.

With the advent of Charles Darwin's «Origin of Species» in 1859 and the emergence of population genetics (S.Chetverikoff, S.Wright, F.Dobrzhansky etc.) Then it began periodically growing and periodically calming debate between supporters of gene-centric and organizm-centric methodological approaches to the interpretation of the concept of natural selection. The essence of the disagreement comes down to whether you can be considered a single point of application of the selection of the genetic determinants (gene) or a single individual (organism)? Accordingly: Can the equation of the evolutionary process to reduce a change in gene frequency (gene-centism, the most famous representative of this methodology is Richard Dawkins) or frequencies of the individual phenotypes (organizmo-centrism, that brightest advocates at various times have been I.F.Shmalgauzen, M.Lerner, R.Levontin).

Since the beginning of the 1960s this dispute arose additional caveat – group selection. In accordance with the hypothesis of group selection formula adaptability of definite social groups (Hamilton Formula) has the form $rb + b_e > c$, where r – the degree of relation between the subject of altruistic act and object of altruistic act; b – an evolutionary advantage of individual objects of altruistic behavior; b_e – total adaptive gain of the entire group, independent of the degree of relationship; c – individual damage of altruistic subject incurred by altruistic act. In accordance with the formula altruistic, aimed at the benefit of group behavior is genetically determined and consists of two components – that aims at the immediate families and promotes altruism genes in the population (rb), and that from the genotype does not depend (b_e) . The author – William Hamilton – believes that the second term of the equation $b_e = 0$. In other words, any act of altruism can be reduced to the action of a single «predisposition to altruism»gene and the

existence of human social behavior can easily be explained by a change in the relevant gene frequencies.

The above-mentioned adaptive inversion (transition «prime mover»function in adaptive evolution from ecological environment changes to the evolution of culture), in fact in some degree inherent in all biological species. Various epigenetic transformation, shifting the original genetically programmed form of reaction and thereby reformat parameters of ecological niche are the basis for it[83;84;85].«The construction of niches» (a term which designated the process) is a modification of the evolving system (the organism, in this case) by products of metabolism, behavioral acts – congenital or acquired parameters of the (not necessarily their own) ecological niche. Over time, this «epigenetic drift» and/or «epigenetic optimization» of the original genotype changes the trend of natural selection and initiate the transition of population to a new ecological niche. The evolution of organisms under the influence of natural selection, contributing to an increase in their adaptation to environmental conditions, and the evolution of the environment influenced by adapting toit the evolving organisms are conjugate binder. Introducingthis link to the mechanism of adaptatiogenesis, we thereby change the overall conceptual model of the evolutionary process, complicate the scheme of cause-effect relationships between its individual components. Determination of by changes in the external environment and the natural selection process of biological and behavioral adaptatiogenesis balanced determination by new behavioral patterns (within the existing norms of reaction existing genotypes) of direction selective pressure and environmental conditions.

The mechanism described in recent years have increasingly called ecological inheritance. However, it should take into account that the construction of niches are not related to specific elements of replicating fragments adaptive information. In the evolution of hominids value and power of epigenetic transformation as evolutionary factor passed some threshold value. It was a result of increase of autonomy of behavioral epigenetic transformation from the actual genetic (DNA-RNA-protein) mode of generation, replication, fixing of adaptive information to the new (socio-cultural)modes of realization the same set of functions in adaptatiogenesis. In contrast to the ecological inheritance, cultural inheritance can be correlated with not biological specific replicators – carriers corresponding adaptive/maladaptive information.

The appearance in the new system of inheritance in anthropogenesis, is by phenomenological way associated with the occurrence of cumulative mechanism of behavioral adaptations. Their numbers began to increase rapidly. As result the total amount of cultural and technological innovations that have adaptive significance, became more than can provide individual physiological capabilities of the human brain. Evolution of biological components SESH lags behind rates of generation and fixing the socio-cultural innovation. In other words, the process of sociocultural adaptatiogenesis is becoming so quick and successful, that becomes adaptive problem.

The solution to this evolutionary task is achieved through the separation of social and cultural component adaptatiogenesis on an individual and group level. In other words, the efficiency of the exist pool sociocultural, and then rationalistic adaptations provided by social differentiation within the group and the transformation of communication structure to the economic structure. A single function communication system to ensure the cooperative interaction between group members split into cooperation and exchange. The first function of the large-scale adaptation, requiring the participation of the entire group, the second – brings together the results of highly specialized adaptations implemented intra-cluster of individuals.

Driving commit serial number of socio-cultural adaptation was not required as a mandatory link conversion (replacement) of the previous socio-cultural adaptation to its genetic and biological analogue, as well as its corresponding form of compulsory «genetic context»(contrary to the requirements of the Baldwin effect). The role of such context, providing adaptability appropriate (cultural or technological) innovation, in some cases can take on elements of the same (cultural and rationalist) subsystems of SESH. In other words, a dynamic equilibrium mode of Darwin and Lamarck modus radically shifted towards Lamarck ones.

The existence of socio-cultural inheritance makes it possible to differentiate the functions of individuals within the social group. It opens the possibility of a significant intensification of the formation of supra-individual adaptations and competition between groups. A necessary condition for it is a system of information communication between group members. By the same logic the existence of epigenetic inheritance – post-translational modification, chromosomal and gene imprinting, and so on – leads to a higher adaptability of cells and multicellular organisms with relatively isolated genes or gene complexes.

These two assumptions form the core hypothesis of multilevel selection, created as a result of cooperation of two American evolutionists with the same name – the founder of sociobiology, Edward Wilson and interested in the problems of evolutionary psychology of religion David Sloan Wilson. Because of this thesis adaptability is an integral derivative of a few potentially divergent acts of selection – genetic, organismic and group of its forms. Therefore, the frequency of individuals within a social group or cells within the body, providing a higher level of adaptability, can grow significantly faster than allowed Hamilton. Or, as he wrote D.S.Wilson a few years earlier, the selection of types of cultural changes the evolutionary process by increasing the capacity of inter-group selection and reduce the potential for selection within the social group, compared with what would be expected if the acting mechanisms of evolution based on their own genetic laws [86, p. 34-35].

In their joint article, David and Edward Wilson led the famous rule of ethics, present as an initial, fundamental postulates in any culture and in one form or another, in any common religion. The Judaic interpretation (I century BC Rabbi Hillel) it reads: «Do unto others as you want to be done unto you. In this – the entire Torah, the rest – just a comment». This dogma, in their view, could not

become a species-specific characteristic of Homo sapiens exclusively due to biological mechanisms of generation and fixation of adaptive information, which are based on genetic and/or individual forms of natural selection: «Selfish beats altruism within the [social] groups. Altruistic groups supersede selfish groups. All the rest is commentary»[87, p.345].

Sic, the emergence of the autonomous from DNA and RNA replication system of generation adaptive information itself is a progressive adaptation. As a direct result of it there is a significant increase in specific weight and the rate of supra-individual (group) adaptationsthe emergence. In turn, this means moving the selection process to the next, higher level of evolution – the evolution of the socio-cultural objects. At the heart of the latest is already the competition is not just social groups but different social communities – societies, ethnic groups, cultural types, etc. The starting substrate for it is the biological diversity of humankind. Characteristically, the most obvious result of gene-culture co-evolution according to the author of this hypothesis, is a religion that provides a high level of stability and integrity of the individual social communities in the process of socio-cultural evolution.

During of sapientation set of phenotypes that are within the structural complexity of the adaptive value of the higher parts of the brain and its corresponding set of genotypes that control this complexityformed. Gradually multiple phenotypes in the evolutionary landscape shifted toward the maximum values of fitness. The accumulation of average values of complexity and lability of nervous and mental organization close to the maximum possible level of adaptive led to excision during sexual reproduction genotypic variants beyond the adaptive norm. These limits are set adaptive balance between creativity and resistance to psycho-physiological stress.

Thus, a stable feature of the hominid evolutionary strategy is, as we see in the biological transformation of maladaptation in the socio-cultural adaptation, that increases the chances of survival of carriers. Perhaps the most clearly manifested in relation to the functional organization of the higher nervous activity, which has become an essential factor of socialization and the formation of culture. Stable Homo sapiens evolutionary strategy is dualistic, with at least two levels and/or in two aspects:

- Substantionally-somatic level – biological adaptation versus techno-cultural adaptation;
- Reflexive and cognitive levels – emotionally intuitionistic (coherent) versus logical-rationalist (causal) way to describe an ideal assessment, prediction of objective reality.

The duality of the cognitive behavioral mechanisms of human formation currently is not being questioned, not only in natural sciences but also in socio-economic and sociological methodological paradigms [88, p. 2003; 6, p. 1451; 89, p. 42]. Moreover, the most radically-oriented exploration of theoretical constucts market theory (neuroeconomics), this thesis serve as fundamental postulat.Opportunities of effective progressive genetic adaptation (further

complicating the organization – the «social brain» and the growth of social groups) have been exhausted, and the role of leader of human evolution moved to the socio-cultural component of the adaptive strategy Homo sapiens. In this new phaseof the evolutionary processthe sociocultural types are its substantion of evolution. They are formed on the basis of extreme variants of genotypes and phenotypes near the border between adaptation and maladaptation. In this way, there is a mechanism for changing functions, in which the psycho-physiological maladaptation/pathology transformed into socio-cultural adaptations that increase the chances of survival of social groups. (In the words of the Russian neuroscientist and evolutionary S.Savel`ev [72, p.29-30], «all the additional properties of the brain that are artificially revalued simulation and imitationally-social hominid associations are random consequences of biological adaptation».)

Next bifurcation pointis«a change of the dominant purpose» of socio-cultural adaptation of the conversion behavior of individuals and groups in a changing environment to the change of the environment in accordance with the existing system of genetic and sociocultural generated and reproducted behavioral patterns. The data of not physical, but actually cultural anthropology (in combination with evolutionary psychology and civilization theory) allow to identify this second turning point as the birth of industrial civilization, i.e.approximately17-18 century.

Like the previous transformation – the transition leadership roles in hominids adaptatiogenesisfrom genetic (biological) to social and cultural inheritance it required to achieve of a threshold proportion of the respective components in the integrated adaptation valueThe shift this threshold during bio-socio-culture-genesis meant change of spontaneous "ecological niche construction" on inherent only Homo sapiens "environmental engineering" [90, p.306]. The latter term has designated rationalist (purposeful) transformation of reality based on the source of knowledge and forecast the future. This methodological intention is nearer the traditional paradigm of socio-humanitarian than the natural sciences. This is the essence of the first adaptive inversion that occurred during the genesis of SESH. Outside spontaneous/rationalopposition [83, p.306], or, if you like – is a natural process/intelligent designantinomy, the difference between these classes of evolutionary phenomena has no content.

Overlay multiple processes of generation, replication and fixing of adaptive information and three systems of adaptations leads to the genesis of hierarchically organized structure of multi-level selection. Each adaptatiogenesis level functions as a modulator for underlying level and generator of substrate blocks for higher level. Integral adaptability is derived from the number of potentially divergent acts of selection(genetic, organismic and group its forms).

Animated structure of generation-replication-fixing information is both a cause and a consequence of adaptatiogenesis, i.e. it forms a loop with positive feedback. A new level of adaptatiogenesis is built (like epiboly) over existing repertoire by extending the modulation of individual members of a set of adaptations/maladaptations. Thisset is used as a substrate for a set of emerging adaptive elements on upstream level. Therefore, the variation of elements of the

underlying level fixing and expanding as a result of the formation of a new level of adaptatiogenesis system. "Attribution" adaptions/maladaptations of the elements of the source level controlling bynext level of selection. Phenomenologically it manifested in increasing the scale and speed of evolution«pseudo-drift» of the previous level, and these changes are not adequate to meet the structural transformation of adaptive dataunderlying level.(The «pseudo-drift» term used here because actually one level of adaptive selection projects on downstream levels own adaptive-evolutionary trends. Selectively neutral or even harmful elements of the biological module may be a prerequisites for social and cultural adaptations, for example). The enlarge of distance between the functional levels, so they are more autonomous from each other and the more difficult to diagnose the connection between them.

An observer inside the system perceives the situation of bifurcation in this case as an act of free choice (free will), the outcome of which depends solely on formed his system of values. This perception can`t be destroyed as a result of uniquely identifying the mechanisms and causal relationships that have led to this situation and influencing its outcome, so far as may be possible to integrate new knowledge to the original system of values.

Epigenetic modulation of genetic information, thus, serve as a transfer mechanism for co-evolution of Darwin-Weismann modus andLamarck modus, remaining themselves within the boundaries of the sphere of influence of the genetic code itself. For rationalist adaptations (innovation) transfer mechanism similar function in relation to the biological (genetic in the biological sense of the term) adaptation played until recently culture.

The autonomy of each of the three elements of a SESH led to different speed of operation cycle generation-replication-fixing adaptive information in each of them. Integrity of the system provides two co-evolutionary ligaments of its elements – gene-cultural co-evolution and of techno-cultural balance.

The general scheme in relation to adaptatiogenesisof hominids provides regular change of phases of adaptive plasticity and stability in the transition from the individual to the population-ontogenetic and phylogenetic levels of fixation of adaptive changes. As say in a recent paper[91], the original adaptive response to environmental challenges affecting primarily the structure, that call biological component of SESH, i.e. phenotypic modification homeostatic processes within the existing rules of the genetic response. By virtue of the latter, such adaptive changes are highly labile and easily reversed to its original state. (According to the authors,an increase in heart rate and blood volume observed in contact with a person in a high-altitude oxygen deficiency can serve as example). If you have a long, beyond the lifetime of one generation ecological time-trend, the initial adaptive response, reducing the capacity of homeostatic systems of the organisms to further changes in living conditions, is replaced by more resilient adaptive transformations (in the above example – the increase in lung volume, etc.). While maintaining the trend of adapting the level become irreversible.

In general, in the evolution of hominids [91], phenotypic plasticity «paves the way» and contributes to the genetic (add – rationalist and socio-cultural) evolution in accordance with the following algorithm:

(1) population (spatially or temporally) is introduced into new environment;

(2) adaptive phenotypic plasticity provides a «fit» phenotype and the environment;

(3) changes in the genotype replace phenotypic modification, opening the way for the subsequent phylogenetic development.

It should be noted that the described presentation actually repeated on a new empirical data and new theoretical context I.I.Shmalgauzen, M.Lerner et al. ideas expressed in 1940-1950.

If we extend this idea to other types of biological adaptations (metabolic, primarily), it takes the following form. Initial adaptive phenotypic and epigenetic transformation moving to the level of the socio-cultural component of SESH, and then initiate the technological innovations that are already causing secondary changes of ecological and cultural environment. Thus, the phenotypic plasticity of biological component of SESH unlike traditional neo-Darwinian point of view plays a role not brake, but the trigger mechanism and enhancer of macro- and global evolutionary process. It also confirms the above conjecture that the biological components of the substrate serves as a basis for socio-, culture- and technogenesis.

However, from our point of view is true thethe converse too. There is a back-and-recursive branch – from the technological and socio-cultural innovations to biological ones. It is carried out by the same epigenetic gear.

At this point, we are forced to move from the sphere of natural science in the field of humanistics (axiology). We need to find a correspondence between the phenomenological theory of the stable evolutionary strategy and the theory of values, because it is from the latter depends on the possibility of an evolutionary transition from the potential risk to the actual form and move it across the threshold of existential risky level.

First, the system by definition relates to the field of culture, which actually detects and evaluates the difference between reality and ideal reflection. In philosophy, this discrepancy constituted in two ways – as a compliance/noncompliance between the ideal cognitivist model (knowledge) and reality (the object of knowledge), and between reality (existence) and its conversion project (world proper). The first binary opposition is the content of a theory of truth, the secondones – the theory of values. Both are members of the projective-activity binary bundles, because knowledge is regarded as a tool for updating values.

It is necessary, however, to determine the nature and composition of the «values» within the concept developed. In modern axiology accepted to allocate two alternative concepts that reflect some evolutionary dichotomy. In accordance with the naturalistic concept activities intention determinedby multidimensional topos of the interests of individualized mental subjective reflections of objective

parameters of the most favorable environmental objective reality. In terms of ontology – the world of things and the world proper associates by network of causal although not necessarily uniquely relations.

In dating back to the writings of Immanuel Kantand David Hume transcendental concept projective-activity system of intentions is determined by objective values, i.e. the discrepancy between reality as it is and the world as it should be, and the last image (world as it should be) can`t be derived logically from the existence. Thus, the values inherent in the culture as a counterweight and antithesis of biological and economic factors of life.

Suppose that the concept «interests» (needs) and «value» reflect the real alternative aspects of evolution of SESH, in general, and its cultural components, in particular. Then, with respect to the interests culture act as externalities caused genetic and rationalist components and values act as internalities, cultural factors caused the definition of the optimal evolutionary scenarios. Interests and values are equally equivalent term «selective factors» in evolutionary theory, but correspond to different (ecological and cultural-spiritual) aspects of socio-ecological niches of Homo sapiens.

The interests and needs are reflected in the genesis and differentiation of social institutions, while the value providing internal integration mentality and continuity of cultural types. The continuity of cultural types implies that each subsequent member of the series can be inferred from the previous member by converting its elements. Value priorities, are, rather evolutionary settings specificated a particular socio-ecological niche of Homo sapiens. They define the period of existence of the taxon.Consequently, the continuity of cultural evolution or the survival of Homo sapiens is not inevitable.

The problem, however, lies in the fact that the determination of the direction of evolutionary adaptive variability (interests → value or values → interests, culture → gene or gene → culture, etc.) are too ambivalent for unambiguous interpretation in theoretical and/or empirical verification. As recently wrote a well-known researcher of gene-cultural co-evolution A. Narayan, the first question that arises here is the following: «What are the causal relationships between different variables (environmental, historical and psychological) and how do they interact? Determine whether the institutional structures of certain values and preferences of the individual? Or values and preferences lead to certain types of social institutions? Or is it both?»

One thing is beyond doubt: between the phenomena of social heredity, biological heredity and socio-ecological environment, of course, there is a phenomenological correlation. In the framework of this correlation with respect to clearly traced its adaptive nature – partial or general. Rigidity or plasticity of socio-cultural norms and tough or weak system of penalties for violations, as shown by the recent extensive studies (33 ethno-cultural type) clearly vary dedelayed on the environmental and socio-historical history. Society, subjected or subjecting to the stressors of various nature (territorial or ethnic conflicts, lack of resources, epidemics, etc.), more strictly regulate norms of social behavior and more harshly

punished for its non-compliance. It is interesting that both types of socio-cultural adaptations to ensure social stability mobilized in this case simultaneously and in parallel:

• a higher status and extent of the influence of social institutions that regulate anti-stress norms (are determined by the interests and needs) and

• a higher level of self-control and greater intolerance of dissidents.

Thus, in the evolution of social and cultural components of SESH selective factors are both external and internal nature, which in fact is reflected in terms of gene-cultural co-evolution of techno-humanitarian balance.

Even more interesting is that the value of Internal (cultural) factors of formation of techno-humanitarian balance (as well as genetic and cultural co-evolution) is ambivalent. It can both catalyze and brake and increase/decrease the overall adaptability and increase/decrease of of evolutionary risk.

General methodological conceptual analysis, probably precisely because of its abstract nature and could not finish anything but antinomical conclusions. Let us try, however, to consider this issue in the alternative, if I may say so, positivistic aspect. This means that, in accordance with the theory of the construction of the ecological niche culture should be a powerful selective factor in the organization of biological adaptation. If this thesis is to take as the starting premise of the theoretical analysis, the existence of transmission mechanism through which culture influences the morpho-physiological constitution of human, adapting it to itself. If so, then there must exist a correlation between socio-cultural types and a variety of physiological, primarily neuropsychiatric patternov. The Russian neuro-morfolog N. Savel`ev goes even further. He suggests that these differences should be structurally-morphological (inter-neuronal patterns of synaptic contacts), not functional-physiological ones, since the latter provides predisposition to absorption of certain social stereotypes.While such predispositions polymorphism in his opinion serves as material for very intense selective pressure, displacing the "classical" (somatic) Darwin's selection as the primary mechanism for the further evolution of human [72]. This judgment can already serve as a falsificatedjudgment, making our arguments available to empirical verification. In this area in recent years, there are works that show that such correlation can indeed be detected.

An interesting observation the author of this study. Most direct empirical evidence in their relationship of cultural and biological differentiation, including those published in the European and North American scientific journals, made by researchers who have «east» (China, Japan) origin[92, p.111; 93].

We can assume that we are dealing with the peculiarities of the particular techno-humanitarian balance. This refers to the effect of the programming of concept of the scientific research field by basic system of values and socio-cultural type of ideology and the mechanisms that will be described later. For Western scholars, belonging to the individualist-humanist cultural tradition of a judgment on the correlation between cultural diversity and neurophysiological, and even more so, the genetic polymorphism is associated with significant disturbances in

the system of value priorities, and therefore displaced to the borders of theoretically and empirically valid and the «politically correct» scientific research.

So, let us remember that, first, it will continue on hypothetical reasoning, based on a rather poor (yet) experimental base, and secondly, the theoretical basis of this hypothesis is quite vulnerable in terms of the external (extra-scientific) view criticism and ideological and political speculations.

However, the very existence of technologies and social practices of genetic socio-cultural and cognitive codes manipulation (High Hume) makes the prospects of such research epistemologically unavoidable and social demand. The initial phase of the transfer of the original socio-cultural pattern on phenotypic modification for adaptive reaction norms and then encoding part of the genome involves, obviously, epigenetic transformation functional organization of mental processes and structural organization of the brain.

The impact of culture on brain activity is mediated by a regular long-term participation of certain clusters of neural networks in the implementation of a particular set of cultural tasks – behavioral scenarios designed to achieve the primary cultural value. Primary cultural values in this context define the position of the individual in the system of intra-group social communication, or in other words are the personal self-determination consistent adopted in this culture system, the coordination of individual and group interests. Such coordination system, firstly, provides a stable adaptive configuration of individual and group selection forms, and secondly, is specific for various types of culture.

Thus, in the Western socio-cultural type,the autonomy (independence) of the individualis the dominant element, and alternatively in the eastern (Chinese) cultural type,integration (interdependence) of the individual in social relationsis the dominant element. Activated as a result of neuronal clusters (specific to a given culture) provide cultural adaptation, allowing a person to blend in with the implementation of «cultural problems» [92, p.111; 66, p.221].

This term refers to the individual elements of the cultural tradition of performing discrete functions within the socio-cultural type, thereby ensuring the implementation of the system of value priorities. In a weaker form this judgment comes down to the determination of a system of value priorities together elements of cultural tradition, considered as a means of updating them. As such, this judgment seems more uncertain in a logical and more are realistic in the historical and empirical aspects. For carriers of Western culture activation of the medial prefrontal cortex areas of the brain and for the representatives of the Easternculturеventral area are diagnosed. Researchers associated with this functional divergence a cross-cultural psychological characteristics: the intention of representatives of individualistic Western culture on positioning in the zone of personal psychological communication of individuals and the intention of oriental culture to the definition of communication space by socially determined personal limitations. Definition of a socially deterministic personal limitations. This a psychological difference defines behavioral and perceptions stereotypes, that shape the relationship of the individual and society.

Clustered differences of neural networks, of course, relate to communication structures linking neural domains. Genetic reaction norm of transport and reception of neurotransmitters separate neural networks, ensuring the development of emotional reactions (serotonin, oxytocin, dopamine)changes are also. As is known, these neurotransmitters are involved, in particular, in the formation of social communication [91, p.111; 93]. This anatomical structure of the brain remains constant.

The results of a study specific expression of individual structural units of the human genome in the brain during development of alcohol dependence serve as indirect proof of the principal possibility of the existence of epigenetic transmission mechanism of socio-cultural influences on expressiveness ofindividual gene clusters. (Unless, of course, the postulate of a significant proportion of socio-cultural environment factors in incidence of alcoholism in the population is correct). In a recent study[94, p.1884] it is shown a decrease the activity of DNA methylation and, therefore, significant changes in the expression of functional gene clusters in the human brainas a result of regular intake of alcohol. These changes correlated with a progressive alcohol dependence. Thus, personal behavioral traits do reflect on the specific patterns of gene expression and functional status of the local regions of neural networks. (The question of a possible deterministic nature of the relationship remains open).

Parallel to this hypothesis line arguments of actually cultural anthropology corroborates. Leslie White, the known classics evolutionary cultural studies defines culture as the ability to generate relevant to their carrierssymbols[95, c.22]. In this conceptual and terminological space symbols can be defined as a trigger (sensory complexes)for genetically deterministic differential dynamic behavior patterns. The latter should have adaptive significance. Value of each adaptive behavior pattern causes the fixation or the elimination of the corresponding symbols in the socio-cultural evolution. In other words, the individual symbols or their complexes are generated adaptively important fragments of information, performing the role of the transmission mechanism between genetic and socio-cultural inheritance. As you can see, the structure of the explanatory models of biological and cultural anthropology surprising coincidence.

Culturally specific social norms serve, or can serve as an important selective factor in relation to the functional elements, and, possibly, structural organization of the genome. «Socio-ecological processes regulate the expression of human genes by activation of the central nervous system, which subsequently affect the activity of hormones and neurotransmitters in the periphery», – this hypothetical thesis expressed in publication on 2009[96, p. 133], over time is consistent with the increasingly numerous empirical data. Thus, a vicious co-evolutionary loop, and it is far from (biological or sociological) reductionist linear approximations.

For authors of the cited studies [91, p.111; 66, p.221] it seems quite reasonable to assume that members of polymorphic genetic series, the uneven distribution of populations belonging to different socio-cultural types, interact with specific ecological and cultural environment. The result of this interaction – a

single set of relevant cultural and psychological practices and adequate them to the patterns of psychological processes and neural networks clusters. Hiding behind cultural changes, organization of mental processes and associated neural pathways in the brain that constitute perhaps the base set of mechanisms by which culture, ecology and genetics of mutually affect each other [91, p. 125-126].

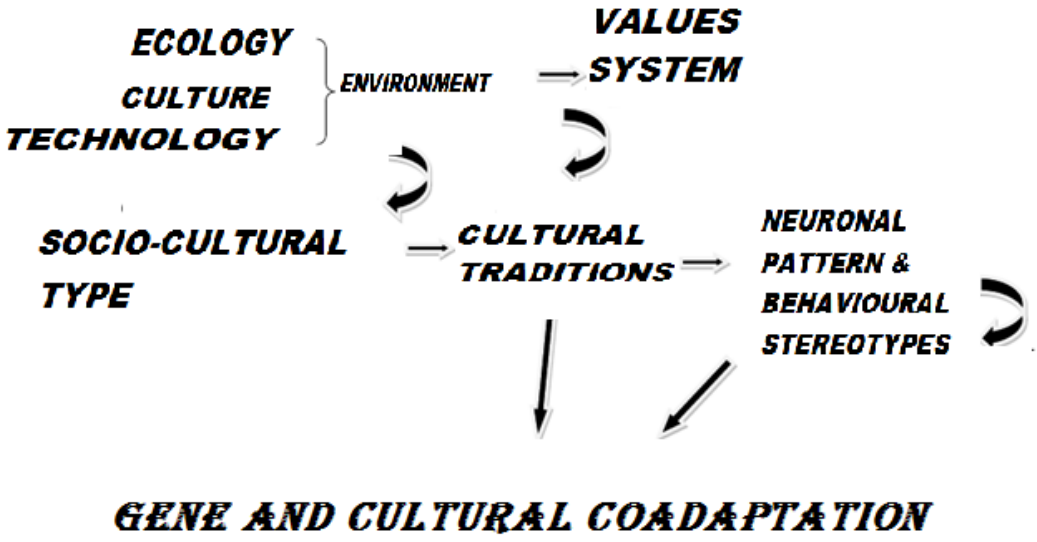


Fig. 1.5. A block diagram of the transmission mechanism of the descending branch of genetic and cultural co-evolution.

Thus, the organization of each link oftransmission mechanism between the socio-cultural and biological adaptations can be expressed as described herein, parallel-sequential three-stage scheme(fig. 1.5).

Another variant of the transmission mechanism between culture and adaptability draws the Czech-Canadian research group [66]. However, in terms of its basic system of organization, this scheme is similar to the above. Here is present the same three-stage co-evolutionary bunch – this time psychophysiological (individual), the intra- and inter-group communication components. The output of this co-evolutionary stage three parallel processes are adaptatiogenesis terminology authors of «psychological norms»(for example, bundles of cultural tradition – neurophysiological processes – positive or negative). The first (positive norms) are benchmarks that guide the activity of the group towards a common goal (functional – analogue directional selection). The second (negative-restrictive regulations, taboos and rituals of their support) –implement the function of stabilizing selection in biological evolution.

Under this scheme, the initial stage of gene-cultural co-evolution has presencesocio-ecological (cultural and environmental) preconditions of the process. Among these are rapid changes in the environment and group life and their means of software(biological pre-adaptation or exaptation).

Because of the rudimentary forms of social heredity, include a process of accumulation and integration of specific cultural means of survival and inter-group competition.Latter can be considered the beginnings of modern techniques and

technologies – tools, construction of dwellings, use of fire, livestock and crop production. All of this requires the formation of a specific environment to operate and maintain – a means of communication, psychological norms and mythological explanatory model. In his book «Bonobo and atheism: in search of the origins of humanity among primates» famous evolutionary ethologist, F. de Waal defends the hypothesis that the mythology, religion, morality is a socio-cultural amplifiers of «pre-created» by biological evolution behavioral patterns, whose impact on cumulative adaptability proved to be insufficient in the new circumstances. As a sequence of evolutionary phases of the functioning of the transmission mechanism between bio- and culture evolution de Waalstatement should be interpreted «morality precedes religion»[97, p. 5].

This position, which is shared by other proponents of evolutionary adaptability of religion [98],close to the author [9], although in our view correct to speak about the autonomy of social and cultural components of the original coadaptive ligament. This algorithm is the relationship between genome, culture and rationality can`t called reductionist ones. Rather, it is about ascending branches (from genome to technology) build hierarchical self-complexity increasing systems subsequently closed by downstream of adaptive transformations (from genome technology). We seea classic Hegelian (more precisely – a triple)helix rather than a linear inductive or deductive syllogistic structureis.

So, in the General system of complex cultural adaptations new, verbal-logical elementemerging and rapidly expanding.It constituted over time as mythology and religion [47].

This element requires the development as its substrate material relevant departments and structures of the brain and patterns of neural networks and their components. Functional differentiation of the cerebral hemispheres on the left – verbal and logical and right – emotionally-image hemisphere, thus stimulating the development of socio-cultural component of human adaptatiogenesis (see: [47]). Note that the «psychological norm» remarkably consistent «cultural problems» of the previous model. The difference between them is explained, probably, different angles, under which all these phenomena are projected on abstract theoretical constructs of evolutionary theory – social and neurological in one case and socio-psychological in the second ones.

Surprisingly, the socio-cultural adaptation and socio-cultural inheritance provides both

• high rate of generation and dissemination of cultural innovation as vertically (between generations), and horizontally – (between the members of the social groups and between social groups) and

• conservative and high resistance to destructive factors of socio-cultural types over time, often regardless of the area and preserve the integrity of the communication structure. Examples of conservation of cultural self-identity in the diaspora are sufficiently numerous and for all diversity «actors» very striking (Jews, Chinese, Gypsies, etc.).

At the same time, socio-cultural and rationalist adaptation fit into preexisting systems of biological adaptation is not completely; and emerging differences between them varies in magnitude, but in general are permanently expanding (noticed already on the 19 century, Friedrich Nietsche). As a result, a problem arises harmonization and integration into a complete system components of SESH.

On the one hand, epigenetic processes provide the foundation substrate of sociocultural adaptation by providing for their building material suitable for transformation into a cultural innovation. However, they also allow you to play the role of culture trigger reformatted genetic response rate from one mode of another – in accordance with the exist cultural and environmental context. Thus, between biological and socio-cultural level of adaptatiogenesisarises cycle positive and negative feedbacks (gene-culture co-evolution).A similar system (the techno-humanitarian balance) arises between culture and technological innovation.

In this case, the cultural inheritance, first, forms repertoire modules socially demanded by scientific and technological developments; second, changes the probability of spontaneous actualization of specific epigenetic module; and, thirdly, actually performs the individual selection of biological adaptation. The latter process (induced by culture selection of genetic information) is equivalent to the replacement of cultural adaptation by their biological counterparts.

The autonomy of each of the three system-forming elements of the SESH entails different speed operation –cycle of generation − replication −fixing of adaptive information each. In particular, the socio-cultural component of the evolutionary process takes place at a much higher rate compared with the biological component. As a result – to a certain extent can be spread such cultural elements that do not match the growth condition of frequency of genes that provide the highest possible biological devices.

The above argument is also valid for the other binary bundles – the culture-technology. In the context of significant reserves of resources that could be used as a means of survival, dominance of rationalist adaptation provides better survival of society appropriate types. However, technological innovations entail a mismatch between the behavioral patterns that have developed in this type of culture, and the terms of technologized environment. This imbalance is potentially more amplified and passed on – especially in the biological constitution of the genome controlling their clusters, etc. Features of this imbalance are analyzed for a long time – at the beginning of the last century, the famous Russian-Ukrainian-French biologist Ilya Mechnikoff his famousdilogy«Etudes of human nature» – «Etudes of optimism».

(«The human descended from some ape inherited an organization adapted to the conditions of life very different than those in which he has to live. Gifted with a much more developed brain than its ancestors of animals, people discovered a new way to the evolution of higher creatures. Such a rapid change in the nature has led to a variety of organic disharmonies which gave the more feel that people have become smarter and more sensitive. Hence – a whole string of misfortunes that poor humanity is trying to eliminate all the means available to him»[99,p.233]).

However, as thought the source and mechanism of this imbalance may be presented as unambiguously extrapolated ones, whereas the linear model is that some of its manifestations are not interdependent and not relatively easy to handle technology.(«Morality, therefore, should not be based on a perverted human nature what it is now, but on an ideal, i.e. such what it should be in the future. First of all, you should try to restore the proper evolution of human life, i.e., disharmony turn into harmony (orthobiosis)» [100, p.236]).

Since that time, it becomes clear that the mechanism adaptatiogenesis of Homo sapiens is constant, so that the occurrence and elimination of local imbalances is «internally integrated» into a stable adaptive strategy of our species. Consequently, the possibility of developing progressive loss of adaptability is imminent ones.

The integrity of the organization of SESH should be considered in two time dimensions – evolution (population, social) and ontogenetic (individual).

Let's start with the second (ontogenetic) aspect. Any information system should include the operator – defined structure, implement and regulate the process of decoding and re-storedgenerated information. With respect to the genome of the system is represented by a set of processes and the implementation of the epigenetic modification of the expression of genetic information. The system of direct and feedback interaction of cultures and genome comprises:

- firstly, the influence of ecological and cultural environment on the epigenetic processes and selection of genetic information. If the mechanism of cultural selection is obvious and talk about it, and will be discussed in this study, more than once, the cultural effects of epigenetic information began to accumulate only in the last decade. For example, it is known that epigenetic modifications parental behavior, diet, etc. can be transmitted to future generations [100];
- secondly, the mental processes and phenomena that contribute to the formation and spread of certain images, which can be converted to a different extent in the verbal and logical form. These images are in the form of intentions and predisposition to guide the development and channelizing of tecno-rationalistic adaptations.

Let us turn to the evolutionary aspect of the integrity SESH. From disintegration SESH is saving by embedded in her generalized mechanism of co-evolutionary interactions – gene-cultural co-evolution (E.Wilson, R.Doucins) and techno-cultural balance (John Naisbitt, A.Nazaretyan).

The finished paradigmatic concept of techno-cultural (techno-humanitarian) balance established at the turn of the 20-21 centuries by russian sociologists A.P.Nazaretyan [101].However, the prototypes of the idea expressed over, many years as an alternative to the paradigm of technological determinism. (The latter was particularly popular in the early twentieth century had a marked effect on a certain part of the researchers belonging to the Marxist philosophical tradition. One of the most prominent Marxists who tried to introduce the concept of technological determinism in the conceptual framework of the Marxist version of sociological theory was Karl Kautsky [102].)John Naisbitt emerging information civilization

and pointed to this: The world is moving toward dualism 'technical progress – peace of mind' when each new technology is accompanied by compensatory humanitarian reaction [103, p. 8]).

The first of these provides the coordination and harmonization of the binary bundles biological and socio-cultural components of the integrated adaptation of Homo sapiens, the second – the same role with respect to the culture and technology.

The concept of co-evolution – conjugated biological evolutionary development (and not only) of objects varying degrees of complexity proved to be applicable to the phenomena of multiple levels of the organization, – from molecular genetic (coding and regulatory evolution of molecular and genetic structures of various levels of complexity, in which the genome is formed as a acting in concert set of functionally differentiated genetic determinants) to population-specific and eco-systemic (interaction of all kinds, are members of the same eco-system) ones and sociogenesis [104].

The genesis of the phenomen of co-evolution associated with the formation of interdependent evolved systems. Direct exchange of information between them is impossible or at least difficult and rare. In this case, there is a mechanism for mutual adaptation of these systems and their integration into a new holistic units. Such a mechanism is reslised in the form of biological evolutionary process of natural selection. This co-evolution has a necessary condition of origin of holistic systems of various levels of complexity and of different nature with each specific forms of homeostasis– genomes, eco-systembio-sphere, societies and so on.

Recently, some researchers to emphasize the leading role of cultural evolution in the binary sequence of «biological adaptation» – «socio-cultural adaptation» prefer a clarification to the theory of gene-culture co-evolution. In terms of the concept of «guided culture of gene-cultural co-evolution»[105].The authors of the modern version of the theory niche K.Laland and J. Odling-Smee formulated this thesis in a stronger form [106, p. 137]: «cultural practices shaped the human genome».According to them, gene-cultural co-evolution in the future provides opportunities fot synthesis results of human genetics, evolutionary theory, data of anthropology and archeology; create new hypotheses and eventually lead to a broader understanding of human evolution. Thus, it remove biological reductionist interpretation of the concept of gene-culture co-evolution.(As many of supporters and almost all opponents have taken understanding of the concept that replaces «genetic and cultural co-evolution» genetic reductionism). In fact, everything is much more complicated.

Equally, it would be possible to say (equally incorrectly) on cultural (social) reductionism with respect to epigenetic paradigm. In extreme cases, he degenerates into a vulgar Marxist economic reductionism, which reduces all the features of the cultural and ecological environment in its economic-economic component.

If there is a «guided culture of gene-cultural co-evolution", it must exist and «directed by genome gene-culture co-evolution» (the impact of the genetic context of the formation of cultural type and diversity of its elements). In this case, we

have culture, insofar as it contributes to the survival, forced to «take into account» the effects of genotype environment in which it is formed. Obviously, the same can be said for the other components of the co-evolutionary ligament – techno-humanitarian balance. At the same time communicate the generation and selection of technological innovation is mediated, as might be expected, the cultural environment, therefore the transformation of the genome to an object of technological manipulation that is uncompensated feedback «biological adaptation → technological innovation» (more on that below).

Evolutionary genesis of certamaladaptive behavior stereotypes and modes originates in cultural innovation, distributed in the population by socio-cultural inheritance. In the view of some experts the key for flow of anthropogenesis are as follows [107, p. 140]:

1) Training – transmission and distribution of socially significant experience, elements of culture, learning abilities and ways(strategies) of its implementation (strategies);

2) mode of supply, in particular, consumption of milk in the lifecycle;

3) the evolution of language and symbolic coding systems and communications;

4) the ability to intellectual activity, personal features;

5) maintain by culture of preferential use of the right or left hand and the related functional asymmetry of the nervous system;

6) the development of cooperation and altruism as a behavioral modes and forms of activity; the formation of markers of social and ethnic identity and self-identification;

7) the emotional system, contributing to the maintenance and observance of the norms of social life;

8) the repertoire of acceptable and unacceptable norms and stereotypes sexual and reproductive behavior, including relationship toincest, bisexual asexual, homosexual and heterosexual ways it (behavior) implementation; sexual preference system, directing or restricting the boundaries of sexual pairsformation and dominant trend of sexual choice (see:[107]);

9) behavioral norms determining the frequency and expression of signs of infanticide and/or parental care.

In all these areas the genetic (biological) features and determinants act simultaneously as prerequisites of the genesis and result of evolution of a cultural and behavioral elements.

At present, well-founded and reasoned induction seems kulturo- and technogenesis fixing in the gene pool of human genetic (monogenic or oligogene) determinantsof several phenotypic traits: constant lactase and amylase activity in human ontogenesis [108],sickle-cell anemia and other pathologies, lack of alcohol addiction [109], gay male behavioral activity [110],intention to reduce the emotional tension in interpersonal conflicts, the development of the speech center and so on. Evidence of this cultural induction of selection of genetic determinants in human populations obtained in the last two decades, and their amount is

multiplied by the day. A priori we can assume only two evolutionary mechanisms through which socio-cultural module of SESH involves genetic maladaptations spread in human populations:

- the acquisition of pathological features of the group as a result of the adaptive value of the induced culture lifestyle changes (sickle-cell anemia and other tropical areas gematopatii in irrigated agriculture - as a result of increased morbidity Malaria),
- and the transformation of highly adaptive biological characteristics to abnormal ones, for the same reasons (Crohn's disease, psoriasis, resulting giperreaktivnostiimmunnoy system) for the same reasons [111].

Consider some examples of «guided culture of gene-cultural co-evolution» in more detail. According to data of paleogenetics induced culture change genetic frequencies become noticeable during the so-called Neolithic revolution(the transition to agriculture and animal husbandry)[112].

As a result of the Neolithic revolution in evolutionary mechanisms anthropogenesis prevailed two new fundamental attribute – «conscious» (techno-rationalist) adaptatiogenesis components and adaptively significant increase in the size of social communities at the expense of not only population growth but the intergroup integration processes too [113, p. 65-67]. Create agroecosystems as a new ecological niche of Homo sapiens has initiated changes in the course of sociocultural genesis of creating of the preconditions for the formation of the earliest forms of state gowerment. It was an system adaptation. Its value was in providing coordination of individual forms of technologically deterministic and more pronounced correlation between volume of social groups and group adaptability. The cumulative effect of technological and socio-cultural factors has launched a cycle of evolutionary triple helix, in which initially a complex behavioral change has created a new structure and a new trend of the evolution of interspecific contacts and a new physical human environment, which in turn changed the trends of selective pressure against individual genes. Formed biological adaptation demanded inclusion in the agricultural technological process of new elementss. Formation of a new techno-cultural and ecological niche of Homo sapiens has become self-sustaining process.

The same scheme can be interpreted in a different aspect – as a mechanism to trigger the switching trends of adaptive evolution of the sphere of culture-genesis to the sphere of biogenesis or technogenesis. Cultural innovation creates a new ecological niche, which forms the background to generate provocative and fixing the secondary cultural transformations. If the latter are not sufficiently effective, the search included a cycle of technological solutions that modify the habitat. (In the later stages of evolution of SESH sequence changes – trying to find a technological solution is preceded by a change in culture). But if it is not sufficient too, it's turn of restructuring genetic constitution. The latter brings it into compliance with new environment (the term is used here in extended metaphorical sense).

Paleoanthropological data allow us to identify several core bearing elements of the biological components of the process – to adapt to a diet with a predominance of carbohydrates and milk as the main source of protein components, the formation of immunity to new parasites and pests. However, these changes concerned not only

(1) the changes in frequency of genetic determinants of lactose metabolism and its regulation in ontogenesis (parallel to the development of dairy cattle breeding) on the one hand, and
(2) carbohydrate metabolism (parallel to the development of agriculture in general) and gematopaty (parallel to the development of irrigated agriculture and, as a consequence, increase the range malaria) from another. No less important was the
(3) increase in the frequency of the gene FOXP2, associated with the development of language abilities.

Even N. Moiseeff (Russian-Sobiet systems analyst, who is known as one of the authors of conception «nuclear winter») [114]put forward the hypothesis that during the Neolithic revolyution direction ofgenetic component bifurcated. Pastoralist tribes in need of constant movement in space, the search for new pastures conquest of new territories. Unlimited expansion became adaptive strategies such tribes.

Crop production as the foundation of civilization type formed the alternativeconfiguration of SESH. The agricultural civilization accumulated in the river valleys, the survival of society implied the ability to unconditional subordination to occupy a higher position in the social hierarchy of individuals and severe restrictions of aggressiveness under conditions of high population density. The adaptive strategy in this case meant the harmonization of relations with the natural and socio-cultural environment. The socio-cultural transformation of biological aggressiveness will be in this case, the conservative-protective, savings generated by agricultural infrastructure against external threats. But in any case, «military power» as a component of adaptive strategies should be at relatively late stages of formation of SESH. According to archeological data, mass graves with traces of violent death from a variety of weapons appear exactly in the era of the Neolithic technological revolution [115, p. 874].

Accordingly, the «risk (adventure) genes» and passionary genotypes have been accumulated in the pastoral and alternative alleles – in the agricultural ethnic groups. Thus, for example, features the Japanese national character – emotional restraint and commitment to easing emotional tension in interpersonal contacts – probably due to the high frequency of occurrence of one of the alleles of a gene that controls the reception of serotonin. The very same gene pool of this feature is the Japanese socio-cultural explanation –selection pressure on the integration of the individual into a rigid system of social relations [116].

This example was not the only one.The earlest changes in the structure of the genome contribute to the reduction of conflict within the group about 40 million.

Years ago was both a prerequisite and an element of adaptation to the ancestors of modern human socialization.

Genomic studies of behavioral modes in modern human populations, however, have made substantial refinement to N.Moiseeff scheme. One of the most likely candidates for the role of the risk gene or geneof adventurism is considered DRD-4 [117], associated with the reception of dopamine in the brain cells. As turned out the genetic element in different allelic states able to enhances the pursuit of new sensory information or causes the syndrome of diffused attention from children. This gene is widely distributed in the populations of primates [118].Source provided by biological heredity signs (risk-taking stereotypes) have subsequently been «reassigned» new adaptive already sociocultural elements that also played the role of «romantic» incentives female reproductive choice.

This evolution is the change of the functions could go further, within the scope of even more remote from the primary (biological) units adaptive transformations. Analysis of individual variability of market strategies shows [119,120] the prevalence of the risky behavior or tendency to ensure reliability in the modern society clearly correlates with the presence in the genome of multiple genetic elements with mildeffect. The ratio of behavioral modes in this case is determined by additive mechanism. How powerful and ambiguous is the expression of the genetic transformation of epigenetic adaptations under the influence of socio-cultural component of SESH, indicate relatively recent attempts to find a correlation between the presence of the element and the DRD-4 «predisposition» to the liberal political ideology shows [121].In fact so straight reductionist interpretation isn`t hardly justified. Rather, we can talk about the relationship of gene variation and ease of adaptation to a certain social contextand/or implementation of social role. As part of our proposed concept the data interpretation indicates the mutual coupling of the various components SESH.

Cultural traditions of collectivism, hierarchy, obedience and cultural closeness to external influences potentially associated with the prevalence of «short» 5-HTT allele provides transport of the neurotransmitter serotonin across the synaptic cleft, in a social group. The selective advantage of this allele is likely induced by culture of biological adaptation, in turn, ensures social stability of society, who is a long historical time in the conditions of social or environmental stress. The increase of symptoms of depression in individuals, «dropped» from the system of social communication, as a result of violations of accepted social norms, migration, etc. is the reason for it phenomen. In the framework of the proposed us concept, this interpretation reflects the mutual pairing various components Metaphorically, we can do the following conclusion(and this is confirmed by direct observations).Within the individualistic-oriented cultural tradition, the frequency of alleles that hinder personal initiative, should be lower than in the socio-cultural types, focused on the prevalence of collectivist over individual interests [122;123].

An alternative hypothesis, not contradicting generally above data relates sociocultural balance egocentric (indvidualistic) and communitarialistic(collectivistic) cognitive intentions with the «binding» of each

ones to neurophysiological complex of testosterone and oxytocin-ergic processes. In accordance with the concept stage psychophysiological reactions determinate the alternative types of social behavior of individual [124].Manifestations and strength, as well as the adaptive value of each of these stages depends on the socio-cultural context. The obvious for authors conclusion from the above is next: socio-cultural adaptation of the «use» biological characteristics, is there in the population, as the substrate and the mechanism of self-realization - quite integrate in the concept of Three-modal SESH.

Hypothesis of N.Moiseeff thus fit in the general scheme of anthropogenesis and a currently existing database of molecular genomics.

Hypothetical constructions originating in the idea of N.Moiseeff don`t contradict, but rather complement and deepen the data communication features mentality of eastern and western cultures with the system of technological innovation. One of the most important socio-psychological differences between Western (Atlantic) and Eastern (Chinese-Japan) civilizations is the dominance of analytical rationalism and individualism in the West, and holism and communitarianism (collectivism) in the eastern (Chinese, Japanese) mentality.

Phenomenologically Eastern mindset is focused on the study of relations and dependencies between the objects of reality that corresponds to a module of social intelligence. In the Western mindset the substantial approach, concentrating on the search for specific «essence» of the same object, dominates. These features clearly diagnosed during psychological tests. In particular, partitioning a set of objects (for example, a rabbit, a dog, carrots) into separate groups of Western culture carriers are produced mainly by the criterion of similarity between them (rabbit, dog), and East ones – by the presence of the connections between them (rabbit, carrot).

As the data of the international group of researchers, the same patterns are observed within each type of crop. «Holistic» type responses dominates in areas where the main cereal crop is rice, which, given the above, it looks quite understandable. «Analytic» type responses dominates originating from those areas of China where, on near ethnic composition of the population, wheat has been used as main crop culture. In this case, a minimum level of social coordination and, accordingly, the minimum size of a well functioning (competitive) «production team» was significantly lower [125,126]. Probably less attention and effort can be spent on the maintenance of agro-ecological systems of cultivation of wheat, compared with rice.

So, the ideas that between the social structure and cognitive processes in the mind of its members, there is a mutual coupling, gets pretty wide empirical confirmation. Consequence is the emergence of sociocognitive homeostasis systems [127].This basic parameter and, at the same time, its adaptive evolutionary function in this study will be denoted by the term techno-humanitarian balance.

On initial impulse gene-cultural and techno-humanitarianco-evolution initiated, in turn, by the Neolithic Revolution (complex – cultural, technological), superimposed tehnokulturnye new innovations. One of the lines of adaptive divergence of rationalist and socio-cultural adaptations led to the emergence of tecnogenic (industrial) civilization. This system adaptation within evolutionary-psychological paradigm is characterized by several basic value priorities (intentions) [128, p.61]:

1. Western (analytical and holistic) type of mentality;
2. The high social status of theoretical and vocational Education;
3. Industrialism;
4. High levels of individual wealth (Richness);
5. The Democratic political system.

Culture, with its dominance of all of the socio-psychological intentions (WEIRD – the first letters of the English names of these attributes) is a negligible fraction of the original pool of cultural types, it is indeed strange, Weird[128]. But with the growth of its influence, it becomes the owner of a sufficiently high contagious component of socio-cultural inheritance. In other words, this type of culture is able to spread to other cultures because of «contamination on contact» with other types of societies. The high «infectivity»of technological civilization is present, however, and the economic-political and military coercion, because it is the very fact of its superiority forces competing socio-cultural types of «accept the rules of the game's characteristic.

Contagious modification and as a consequence, evolutionary convergence and parallelism in socio-, culture--, adaptation evolution components does not mean, however, required the appearance of cultures – doubles. There are new socio-cultural types, characterized by an incomplete analogy with the original type, while maintaining system originality. Quite often it is the result of combining the individual elements of Western and autochronous cultural inheritance (such as Confucianism and Marxism) with more adaptive to local conditions by modifying both.

We have reason to believe that the culture of «captivates for» preexisting genotypes in the population, forming a binary adaptive bundle. As the recent computer simulationshas demonstrated, the accumulation of risk genes exclusively through biological inheritance and genetically controlled adaptation is unlikely. The situation changes if the current system of parallel socio-cultural inheritance and socio-cultural group adaptations. The reason is the mechanism that supplies information to the generation of adaptive modus of Lamarck, according to which an adaptive effect cumulatively accumulated in several generations, «dragging along» reinforcing his genes. A necessary condition is the existence of social and cultural mechanisms that redistribute the positive effects justify risk- taking behavior to the entire group [129].

Socio-cultural on mechanism of developing population dimorphism of genes and phenotypes risk superimposed on an older biological sexual dimorphism on the same traits. Risk genes according to Lavejoyhypothesis should have adaptive

significance, especially in males – because of the problems of functional differentiation within the hominid social groups. Transfer mechanism for the growth of group adaptation may consist, for example, in the structure of family relations. It is possible that such genetic and cultural ligaments act as factors of ethnic differentiation and social mobility.

The «Genghis Khan haplotype» [130; 130, p. 5] is one of the most impressive, though not undisputed in terms of the reliability of the above interpretation. An international team of researchers (Britain, Italy, China, and others) published in 2003 data of analysisof mononucleotide replacements in the Y-chromosome of people living in the vast area of Asia, once part of the Mongol Empire Genghis. According to the results of at least 8% (approx. 16 millionpeople) of the population of these areas has a haplotype, which goes back to a very small group of founders of male sex. The study authors have identified this group as the most Genghis Khan and his immediate family, although this attribution, of course, conditional.

From the viewpoint of classical neo-Darwinian this phenomenon could be explained by the influence of genetic drift, i.e. stochastic fluctuations of gene frequencies in populations. According to this explanatory model of any personal characteristics of Genghis Khan any particular society, making it available for such a significant contribution to the gene pool of future generations. The most adequate analogue in such an interpretation would be a «founder effect» («bottleneck»). It is defined as a pronounced drop in the level of genetic variation and its displacement (asymmetry of distribution of gene frequencies) as a result of pronounced reduction in population. Then the gene pool of the new population is formed by a very small group of individuals and the probability of a random population to secure someone of a particular genotype increases dramatically.

Two things with the explanation are not the same and do not allow him to accept as unconditionally reliable or at least a «first approximation» – as a working hypothesis.

Firstly, we are not dealing with pure population wave numbers, but with the geopolitical and socio-ecological determinate long process of growing and proliferation the initial population in the other ones to form a new mega-populations (miksodem), which occupies a huge area and has a very complex genetic structure. In particular, such mega-population consisted of a system of local populations strongly expressed assortative mating. «The descendants of Genghis Khan» had in the mega-population reproductive advantage, determined by more and longer as not so much genetically but socially, or culturally. Therefore, to talk about the effect of the founder, as well as an over-the adaptability of the genome of Genghis Khan, at least not correctly.

Secondly, the progenitor (ancestors) of this haplotype was obviously some inherent characteristics, personality traits, consisting in the ability to subordinate their influence the masses of other people, the crowd (charisma) and the ability to withstand severe physical and emotional stress to achieve the goal (passionarity). These features cannot be considered indifferent to selective pressure.

Interpretation of the data received in the framework of SASN boils down to is that some of the personality traits of progenitus this haplotype (genetically, epigenetically and socially constructed) were in conjunction with the co-evolutionary inherent in the social organization of the Mongols. The latter was the so-called "social elevator", whereby owners of this haplotype got an incredible in terms of classical evolutionary theory adaptive superiority. Adaptive advantage in this case is absolutely does not match the purely biological adaptability of the individual, without regard to the gene-cultural co-evolutional tandem. In fact, because of the SESH structure we are witnessing a phenomenon that looks similar to the founder effect or genetic revolution, but, in fact, is an example of genetic evolution guided by culture. That is how we must understand the conclusion reached in a recent article that Genghis Khan haplotype is a prime example of social selection, moreover, it is no longer unique [131, p. 7, 132].

In another recent study [133]using a sample analysis of nucleotide sequences of mitochondrial DNA and Y-chromosome were obtained evidence of the emergence of sharp imbalance level of genetic variability male and female between 4-8 thousand years ago. During this period, the effective size of the population of males is sharply reduced, indicating a significant drop in the number of actively involved in the process of reproduction male. «Failure» in the level of variation and the effective size of the male population synchronized so-called Neolithic revolution. According to the authors of this observation, the most likely cause is culture-induced change, particularly in the demographic structure, family and marital communication, the social status of individuals in connection with their economic situation and so on. All of them, according to the study authors, led to the spread of reproductive success beyond one generation, that is, reconstruction of the main trends of genetic evolution because of the mechanisms and laws of social and cultural inheritance. Genghis Khan haplotype is only the most spectacular manifestation of this private general law.

Thus, selective evolution space of biological module of SESH becomes a derivative of the evolution of socio-cultural module. The meaning of this thesis is that the social and cultural heredity acts as «amplifier and the modulator signal» enormously increases the value of the original variations of selective difference of a genotype and extends the benefits of adaptive far beyond the physical existence of the genotype.

«More calm» example of social and cultural evolution of enhancer of biological module of SESH can be gleaned from the works of American anthropologist Napoleon Chagnon. He found that the more «sociable» man of one of the Amazon Indian tribes cultivate a high degree of aggressiveness of the male in relation to the families, neighbors in the formation of coalitions killers, increasing their reproductive success and contribute to the spread of the corresponding genes [134,135].In this case too, the nature and mechanism of biological selection varies considerably according to the «socio-cultural context».

Hence the remarkable conclusionthat the existence of socio-cultural module of SESH and socio-cultural inheritance as a means to the implementation changes

the meaning of biological interpretations of concepts «adaptability» and «selection», Socio-cultural inheritance makes the content of the terms «adaptability» and «selection» derived from the socio-cultural context, not only in the humanistic, but in itself objectively evolutionary significance. Thus, there is a translation of a complex adaptive significance of information fragments from biological sphere to the sphere of sociocultural inheritance. Cultural inheritance transforms acts of selection and extends it for a time frame of existence of selected genotypes and beyond their biological fitness. Saved in the cultural traditions of the «avatar» of individuals determines the trend of evolution of the population (in the biological and genetic sense of the term), or when the biological adaptability maladaptive of concrete individual genotype are no longer essential.

This thesis has long been considered a true in humanitarian conception of human nature. In recent fundamental research on history of human corporeality claimed that "fake" phenomena of consciousness, representation, beliefs, psychosomatic effects, change the meaning and direction of the historical process. Designed culture model becomes the internal laws subordinating himself corporeality and its evolution [136, p. 5-6]. Here are just broadcast the humanitarian impact on language of the biological component of anthropogenesis is not always easy. However, this does not mean that there are no such influences. Ultimately, they become a reality. This becomes evident as paid to the subject of technological progress.

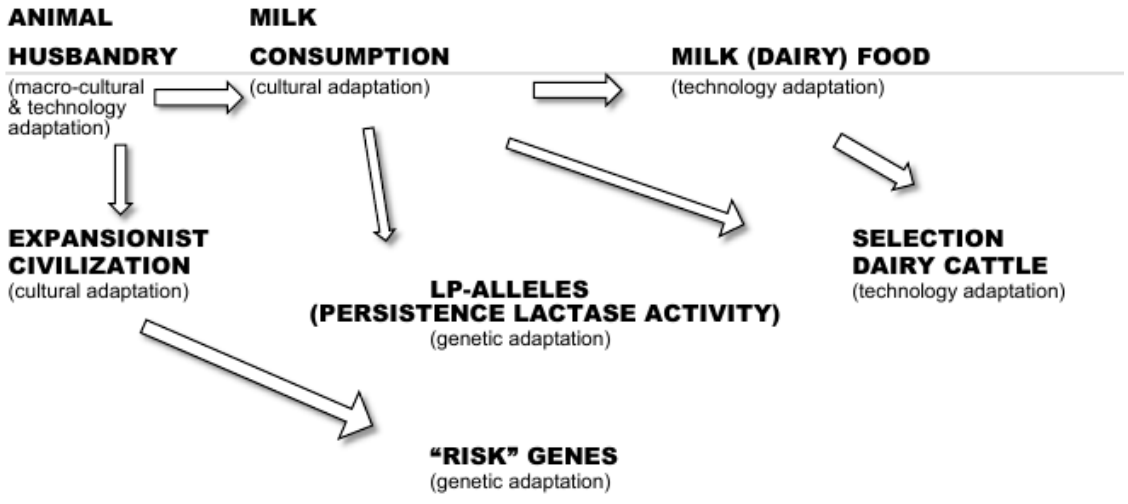
Returning to the theme of our investigation. Western (tehnogenic) civilization combines the features agricultural and ranching сгдегкфдand biological archetypeы. Obviously,Western civilization appeared as a result of the collision and integration into a single bio-social system of agrarian and pastoral cultures. Because of this could be qualitatively new adaptive strategies that can be called a strategy of sustained expansion. . The combination of the conservative protective elements of agricultural civilization with aggressively-assimilatory «mems»of pastoral tribes formed a socio-cultural homeostasis system, based on harmonization of opposite effects. This was the germ of the modern technological civilization. The logic of relations with other tribes and habitats in general became an invariant ensuring the survival of Western man in an environment where natural resources and opportunities for self-healing biosphere far surpass human needs. Under these conditions, natural hazards and social risks overcome because of the further expansion and deepening of cognitive-reform human activities in time and space.

The newversion of the adaptive system dichotomy, which combines ideas N.Moiseeff and modern adherents of theories of niche constructionand gene-cultural co-evolution is shown in fig. 1.6. We note, in addition to the obvious incompleteness that this scheme is diachronic in nature and some of its elements formed and fixed at different times and in different regions. However, a common feature of the mechanism of formation of an integral complex adaptive rather clearly marked. It consists in the fact that the source initiating the impetus for the formation of this complex stands macroevolution transformation that combines

elements of cultural, behavioral and rationalist nature. As result the transition to a new ecological niche and, at the same time, the formation of certain instruments for its survivaloriginated. Following that, a gene cascade (or rather several parallel in time but not in the multivariate adaptive landscape topos stages), cultural and techno-cultural innovation adaptation of lower rank. Thus is formed a number of functional modules. Based on the mathematical model of the process was concluded that such a system of interconnected modules in their organization and structure is holistic nonlinear complex of specific «programmed» by original macro-evolutionary transformation adaptations [76, p.9].

The evolutionary trend in the period between such macro-evolutionary innovations is strictly deterministic and forecasted.Sometimes as the macro-evolutionary innovation which its beginning, the trend represents a quantum racing from one vertex of the adaptive landscape to another (the concept of punctuated equilibrium of S. Gould). In other words, the mechanism of functioning SESH corresponds to more emergent model of evolution (Lamarck Modus) than the additive accumulation of micro-evolutionary adaptations of various nature (Darwin-Weismann modus). The following output appears unavoidable. Module-hierarchical organization of SESH combined with several autonomous systems generation and replication of adaptive information forming often a relatively long evolutionary trends reduce adaptability of one such module at the expense of growth adaptability of other ones. This conclusion is supported by the arguments of the theory of programming and computer science [137,138].This trend in the present study, as mentioned above, will be called the evolutionary risk.

Presented here scheme (fig.1.6) is broadly consistent with the concept of «Darwinian evolutionary medicine»of australian group of researchers [139, p. 78] (terms of genetic adaptation and biological adaptation in our study are synonymous). In their scheme, the parallel development of several cultural and technological innovation (cattle, farming, traditional and modern way of life) led to conflict within the individual genetic clusters SESH biological component and, as a consequence, to the formation of the evolutionary risk.



I

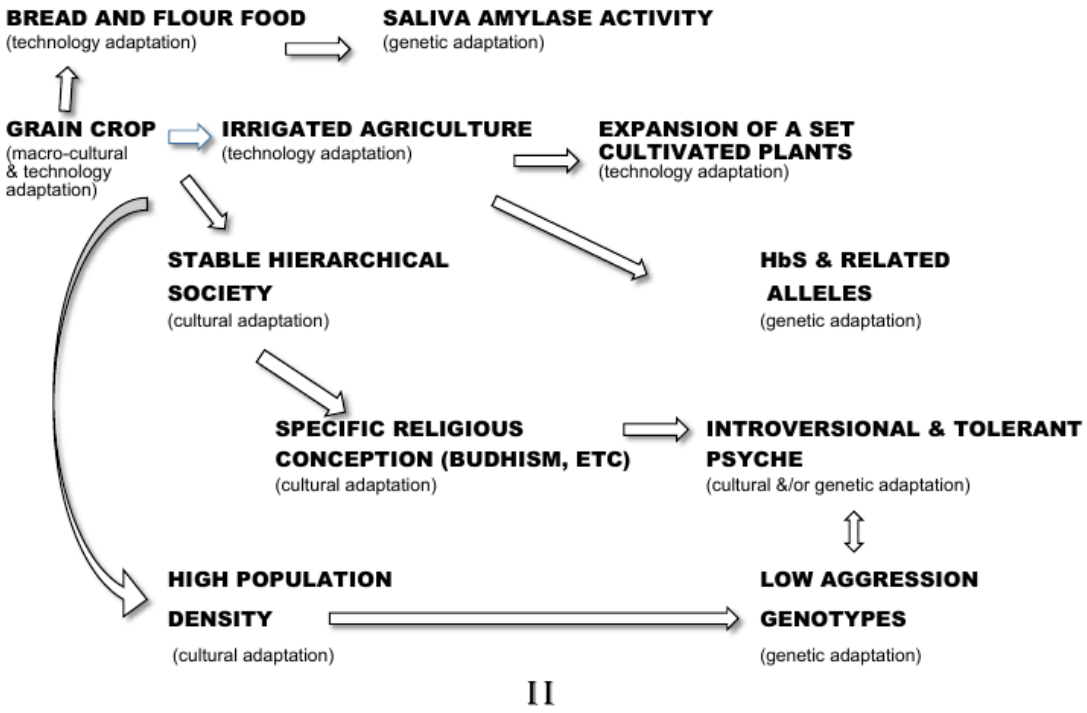


Fig. 1.6 – Formation of gene-culture-technology complex adaptive process of livestock (I) and agricultural (II) types as a result of the Neolithic (cultural) technology revolution.

We note in passing that these schemes provide for the possibility of alternative adaptive anthropogenesis trends – at the expense of the elements of the various modules of SESH. For example, the genesis of dairy farming (by the complex of socio-cultural and technological adaptations) creates a potential dichotomy in the subsequent course of adaptatiogenesis. The first possibility was connected with the fixation in the population of lactase enzyme variants with a constant level of activity in ontogenesis (genetic adaptation). Alternative adaptive trend consisted in the implementation of technological innovation, involving in one form or another the use of lactose fermentation products, especially cheese-making (technological innovation). Both evolutionary trend turned milk into a food resource and both were realized in the evolutionary history of Homo sapiens – with a time lag in the 4.000 years (cheese-making appeared earlier), and 5.000 years after the «livestock variant»of Neolithic revolution [140].

Long-term effects of genetic conflicts within the biological module of SESH and between biological moduleon one hand, and the technological and socio-cultural module – on the other stretched out on the millennium. For example, change the usual way of eating (diet), typical for the man to the Neolithic revolution, caused modifications in the metabolism of lipids, proteins, carbohydrates, which manifests itself in late- and postreproductive age. These effects are thus closed to action of biological form natural selection. As it is considered now an increase in the frequency of cardiovascular (strokes, heart

attacks, atherosclerosis), oncological pathologies, diabetesof type II, etc.,are linked to it. In addition to this, there is also an imbalance of sexual sphere, reflected in the divergence of the timing of the menstrual cycle and other components of puberty women. All of that is the apparent magnitude of the evolutionary trends of inherent in the type of Western industrial civilization risks.

Details of these issues are set out in a recent book by the Swedish nutritionist, adept evolutionary medicine S.Lindeberg [141];conjugate evolution of the human genome and culture, leading to the genesis of «diseases of civilization»investigate in the book of Daniel Lieberman [142].

Both researchers examine a deterministic cultural heredity transition to not fruit diet as a systemic factor reformatted the structure and significance of the relationship between biological and behavioral, and then extra-genetic adaptations. As involves the last of these authors (D.Liberman), most common in human populations currently pathologies is the consequence of «evolutionary errors», i.e. discrepancy between posed by socio-cultural and technological adaptations to habitats and pool of biological adaptations to notby culture has formed ecological environment. Added to this is obvious, in our opinion, culture-ecological ethnic differentiation. The importance of this differentiation with respect to the consistency of coevolution links between biological, socio-cultural and techno-rationalist modules of SESH repeatedly increases as result of the formation of «hybrid»socio-ethnic formations, the integration of immigrants in the new sociocultural adaptive complex, etc. Naturally, because of significant changes «Communication Code», which determines the adaptive significance of the biological, socio-cultural and technological elements in their complex. Positive adaptive correlation within specific constellations of elements of culture, technology and genetics are replaced by negative and vice versa.

With certain reservations, we can talk about the evolution of «semantics», «sense» of gene-cultural co-evolution and techno-humanitarian balance. . In the future we will try using argumentation of these researchers to justify semantic concept co-evolution as an explanatory model of gear mechanism between modules of SESH.

Adaptive reduction rating on this indicator on reaching a certain threshold zone values or a similar threshold changes of ecological-cultural environment capable of dramatic growth that requires immediate adaptive response (the solution to the problems of survival).Such races, in fact, is the evolutionary actualization of risk. One symptom of this actualization becomes systemic effect – spread beyond the initial module to the other components of SESH. Since the above-mentioned diseases of Western civilization over the departed twentieth century, transformed from a purely medical (i.e., related directly to biological module) problem on the sphere to guide the evolution of the socio-cultural module (including the area of the economy).

Thus, the transformation of socio-cultural impact on the frequency of the corresponding genes, and numerical prevalence of certain genetic determinants is

an additional condition for stability or instability of the overall direction of historical development.

Initially, social and cultural heredity provide ecological and biological balance of the genus Homo. Separating independent forms of adaptations– technological innovation, seriously transformed this function beyond the initial rate of the adaptive response. Actually, technological innovation creates many potential and actually existing socio-cultural adaptive complexes. First, the impact of technological innovation reflected in the progressive «filiation» social structure. The Neolithic technological revolution, in addition to the biological effects resulting primarily a change in the daily diet (the appearance of milk, carbohydrates and so on), has violated the «normal» sexual dimorphism. The male sex provided greater access to resources[143].Thus, the dominant trend of social and cultural evolution of the relations between the sexes was permanently predefined.

More complex, but especially the relief examples of this evolutionary mechanismarethe genesis of symbolic language and religion. The conditions and mechanisms of its genesis have become apparent in recent decades thanks to the synthesis of achievements of science and the humanities. Thus, the emergence of language and speech only in 2011-2012 devoted to the study of D. Bickerton [144], M.Tomacello [145] and S.Bourlak [146].Trigger that initiated the development of a modern symbolic speech, this hypothesis has become a proto-cultural (behavioral) adaptation to reduce the area of tropical forests and, as a result, − forage base. The adaptive response of our ancestors consisted of a change of power sources (the transition to eating the remnants of hunting of large predators) and, in turn, the transition (construction) of a new ecological niche. The evolution of pre-existing populations of hominids repertoires of morphological and ethological signs given a new direction associated with the activation of inter-individual progress and social communication.

Hominids have dual potential, and more specifically, projective (implemented in the result of a long evolutionary trend) competitive advantage in the new ecological niche. It consisted of, first, the ability to feed itself freshly killed prey of predators, bypassing the stage of «ripening» – a softening of the skin. Secondly, hominids. Both possibilities opened thanks to thetool activities.

Update of the potential of adaptability has been caused by the social organization and the ability to communicate effectively within the social group, i.e. the ability to «mobilize» and coordinate the actions of the members of the group for the safeguard and «utilization» of production. She played along with science and technology, the role of socio-cultural adaptation. All of it started branching cascade within the same component of SESH adaptations, one branch of which led to the replacement of the initially dominant – facial and gestural communication system marginal – soundcommunication. Features of the latest communication system contributed to the acquisition of the properties, which known american linguist N. Chomsky called the movable reference. By this term is meant the absence of a hard peg to the state of the individual, in which it is located, on an

objective description of the situation [117, p. 167-169;147]. N. Chomsky idea of binary structural and functional organization of the human voice becomes dominant in the modern theory of anthropogenesis.

As suggested in one of the hypotheses [148, p.2153], language is a communicator, which generates a code, the plan, outline the basic coordinates of sensual image used by the interlocutor as an armature for the construction of a parallel mental image in their own psyche. If you follow this assumption, the initial stage of cultural development was initiating («imposition», «provoking») in the psyche of the hominid imagery, correlated with certain behavioral acts or their complexes. The source of such images (thought forms) can be programmed genetically and epigenetically physiological processes [149, p. 3] (e.g., imprinting, impressing, [150, c. 79-81]), communications with others individuums [151, p. 489] and combinations thereof. The above mentioned hypothesis [152;149, p.2153], more precisely its original premise, is the third explanatory feature: language is an arbitrary conventionalistic innovation, an example of one of the first system actually rationalist adaptations (tools, using fire, crop and livestock).The adaptive value of symbolic-syntactic organization of human languages, with their inherent ability to recursion, in this case revealed a conjugate with the efficiency of tool use, social organization of social and cultural inheritance (the role of grandparents as custodians of cultural tradition and translators), intra- and interspecies communication. (On the role of interspecies communication in the process of domestication as a system-forming sapientation factor see: [153].)

In general, this idea is surprisingly consonant with the general conceptualistic scheme of the investigation. (Of course, at the moment – it's just a suggestion, its possible rebuttal will not affect the verification of our own theoretical constructs, although in the case of your confirmation may be seen as a beautiful argument in their favor). Thus, the subsequent evolution of the described causes the formation of thought forms of cultural inheritance, rationalist thought and language.

In the process of anthropogenesis conditions could arise for transformation (transcoding) initial outside-verbal emotional complex in verbal-logical form. As a result of rationalization of the adaptive significance of thought-forms, and the latter becomes a proper interpretant – thought-form, which is both a means of transferring adaptively significant information and mental (ideal) model of reality, a instrumentfor forecasting and transformation of not behavioral actsonly but reality itself too. This model doubles the contour of co-evolutionary interactions body-environment, generating adaptive innovation. Thus, it becomes part of our concept of a key prerequisite for the genesis of the rationalist component SESH.

In one of the last works of Japanese-American research team in the development of this concept postulates the existence of two systems of coding voice information – expressive and linguistic ones [154, p.1-6]. Expressive system, like the singing of birds, creating a holistic image of the emotional state of the individual and can`t be divided into separate fragments of information. Linguistic system iscomplex of relating to the type of subject − predicatecombinable

elements. Their combination creates human language, which is based, in such a way is a binarybunch/opposition of two ways of encoding and perception. In accordance with the quite plausiblehypothesis, two system module in the neurological organization of mental processes should existtoo. They may manifested themselves in the Organization and cognitive and structural-adaptive stereotypes.

The opposition of linguistic and expressive co-evolutionary subsystems is related to the process of becoming of SESH. The acquisition by its socio-cultural component of leading role in adaptatiogenesis mechanism, as already mentioned, is associated with the emergence of prediction of a future by individuals and social groups.The latter involves the generation of new knowledge about the world. In principle, the source of such knowledge can have a threefold evolutionary origin –

1. the instinct, i.e. genetically programmed behavioral response to an external stimulus;
2. reflex, i.e., the occurrence of acquired behavioral response, formed on the basis of recurring situational associations in accordance with the simplest cognitive algoritmom«post hoc, ergo propter hoc»;
3. explanation, i.e. cognitive model acquired by a verbal and logical abstract thinking.

This scheme is very clearly reveals not only a fundamental, indeed the substantial dichotomy that led to the ultimate isolation of genetic-biological and socio-cultural component ofSESH and mechanisms of adaptatiogenesis of Homo sapiens. This dichotomy has biological roots, preserved within the socio-cultural component, and served as a necessary and sufficient condition for the emergence of a fundamentally new in the latest mode of adaptatiogenesis – technological innovation. The essence of this dichotomy is the division of the original generation of adaptive type information into two – spontaneous (attribute of Darwin-Weismann module) and teleological (attribute of Lamarck module). The reason for the dichotomy in this aspect is to rationalize (implementation of verbal and logical form) of adaptatiogenesisof hominids.

As it is know, in neurology has long been diagnosed psychophysiological mechanisms dissociation between the loss of musical abilities (amusia) and the loss of already formed (aphasia) or congenital (alalia) verbal ability. The differences between them reach the level of those responsible for their occurrence anatomical structures. As result, the perception and reproduction of verbal and music due to the existence of two alternative ways of perceiving and processing information is a well-founded assumption[155;156, p. 7].

Another idea here cited studies on the inheritance of Homo sapiens [128, p. 7] speech and language from Neanderthals seem as extreme controversial one. The authors themselves note that most researchers incline to the idea that mutation, genetic basis of which the formation of the contemporary linguistic diversity, there was a 50-100 thousand years ago.Pushing this date to½ million years ago, we thereby added to the list of sociocultural adaptation, crossed the species reproductive barrier, the verbal capacity too.

However, the very appearance and subsequent discussion in the scientific discourse such hypotheses, symptomatic phenomen. The ancient concept of innate ideas of Plato and Descartes was not so much contradict to experimental data and theoretical constructions on our time. Anyway, in modern theoretical cognitive science, as in the modern technological training scheme, there are enough successful concepts emanating from the recognition of the existence of two forms of knowledge of objective reality, make possible the survival of the media in this reality [157, p.3]:

- the primary, biologically inherited by an individual as a result of earlier evolution, ideas and
- secondary, acquired as a result of rational organized and controlled cognitive activity of the subject, knowledge.

Obviously, it is the latter form of knowledge, so to speak, in its purest form, determines how to implement technological innovations, like the third component SESH.

However, a priori the adaptive value of knowledge involves removal of all possible behavioral acts except for one in each standard problematic task of survival. The existence of a greater number of potentially behavioral acts with equal opportunity implementation creates a situation known in logic under the name «Buridan's ass».

In addition, captured as a result of such breeding behavioral Adaptive stereotypes should not contradict the already acquired stereotypes that make up the pool of adaptive reactions within SESH. Thus, there is a need for a withdrawal mechanism of such conflicts by eliminating new elements, if they are not compatible with existing ones. In cognitive psychology, such a mechanism is called cognitive dissonance[158, p. 3].

This discomfort is proving sufficient psychological stimulus/motive for removing the newly arisen element explanation and prediction, if it contradicts a multitude of fragments of adaptively significant knowledge of genetic («innate ideas» of Plato and René Descartes) and socio-cultural (empirical and spiritualistic' experience) origin.The Elimination of such elements of culture and psyche occurs before the possibility of their selection for adaptability [159].

On the other hand, the existing ofsocio-anthropogenesis, scientific and technological progress and the growth of knowledge, etc. indicates that the progressive evolution of culture and science is still possible. And, therefore, there is a mechanism of "experiences" of cultural and cognitive (cognitive) innovation, making possible their fixationas elements of new adaptive complex.

The plausible explanation is that such mental innovation are preserved as elements of expressive communicatiional subsystem based on an emotional brain, as evolutionarily more ancient structures of the central nervous system.Informational complexes of this system not capable to linguistic articulation and reconstruction, allowing them to serve as a repository of potential social and cultural adaptations. (In the biological module of SESH this roleplay recessivity, linkage and similar genetic phenomena).

Similarly, religion is a consequence of the structural and functional organization of the human psyche and, on the other hand – the basis of socio-cultural daptation, ensured along with speech the progressive sapientation of Homo ancestors.

In the mind of man is present a number of concepts (the idea of God, including) the genesis of which is associated with the interaction of two information systems. The last act for each other as information substrates – figurative and emotional and verbal-logical (discourse) ones. The evolution of the trajectory of a mental image of having two nodal points corresponding to the dominance of religion or rationalism in the spiritual culture [47, c.439].

The problem of rationalization of religion in modern science is presented by two (evolutionary-epistemological and metaphysical-ontological)alternative methodologies. Both methodologies are incompatible in a logical aspect.

In evolutionary- epistemological aspect of religion and science are equal and alternative building blocks of a stable evolutionary strategy of mankind; their balance provides stability and plasticity of adaptive evolutionary trendof anthropogenesis.

For both social and cultural adaptation (language and religion) comments D. Bickerton apply equally [145, p. 117]: as originally behavior [add genetically determined and evolutionarily conditioned behavior – Ed.], which resulted in changes in the genes, it turned into a series of genetic changes that trigger the new behavior change. And finally, these behavioral transformation shall be exempt from direct dependence on the evolution of the genome, finding their own replicators and their own modes of evolution.

2. GENESIS OF STABLE ADAPTIVE STRATEGIES OF HOMO SAPIENS

As shown below, the general scheme of the genesis and development of the structural organization of SESH fits into two versions of general systems theory, separated in time ¾ century – «Tectology of Bogdanov (Malinovsky)» and «triple helix» model (about the last we have already mentioned above).

In accordance with the tectological concept [160, vol. 2, p. 208] the evolution of self-organizing systems is a regular alternation of two phases – conjugation (C) and demarcation (D). First (conjugation) phase is a cycle of disintegration – integrating external to the system or its component connections and relationships. The result is the expansion of the evolving system that is expanding the scope of its influence on the new elements and the complexity of the structure of the newly formed meta-system.

Demarcation phase is a process of internal structuring of the evolving system, accompanied by the differentiation of the functions of its constituent elements and the complexity of the connections between them.

In fact, as already noted, we are dealing with the description of macroevolutionary process involving complex systems, regardless of the substantial nature. So, here it is well within the scheme of theoretical scientific knowledge, Thomas Kuhn, where there are two successive phases in the development of science:

- evolutionphase– the actual expansion of the pool of objects that serve as the application of this paradigm (disciplinary matrix);
- revolutionary – potential expansion of the application pool object of scientific theory as a result of the change of scientific paradigm.

The result of this process will be pulsating expansion of the applicability of successive scientific theories, that is to say, the expansion of «environment nishe»of theoretical discipline.

Actually, the same patterns we observe in the genesis of SESH. The chain of successive ecological and evolutionary crises in anthropology has resulted in pulsating expanding the limits of ecological niches and areal of Homo sapiens. The transition from one expansion cycle ecological niche to another was associated with the transformation of the internal structure of SESH (transfer as a leading member of the adaptive strategy in the direction of biological adaptation to socio-cultural adaptation and after to rationalist innovation). The amplitude of the expansion of the boundaries of the human ecological niche is determined by the efficiency (speed of adaptatiogenesis) corresponding component of SESH. The separation of each from the existing members of the triad of SESH began with the expansion of controlled contact to the environment of hominids (complication of ecological niche (S-phase) and ends with a change in the internal structure (D-phase).

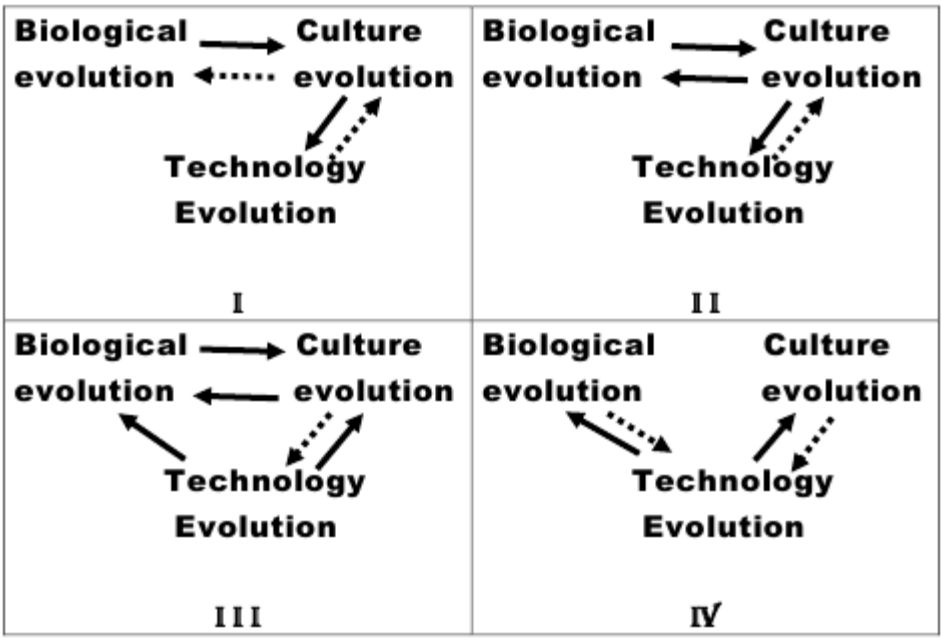


Fig.2.1.Four phase structure evolution of hominids stable adaptive strategy and mechanism of the genesis of the phenomenon of evolution of risk

Most modern scholars – anthropologists and evolutionary psychologists believe that individuals belonging to the biological species Homo sapiens, are born with a built-in system of gene modules that provide the ability to assimilate the reproduction of social and cultural components of the adaptive information – learning to tools and ways of **inter-individual** and intergroup communication. In other words, social and cultural heredity uses as elements of the maintenance and reproduction of their own organization «building blocks», that are biological components of SESH. An alternative view postulates that the genesis of social and cultural inheritance, provided exclusively own – internal mechanisms (more two hypotheses set out in article of Cecilia Heyes [161]).In this case, the absorption of the encoding system and «instrumental support» (language, reading, writing) of a communicationare accompanied and, at least – in part, provided by biological component of epigenetic transformations of SESH.

Time of occurrence of a second(sociocultural), parallel to biological (genetic system itself) system of the generation-replication-implementation of adaptive information is now a fairly complex problem for theory of anthropogenesis. In scientific publications circulate the three most commonly used hypothesis about the place and time of this event [162, p.1298; 163, p.1060]. First, attention is drawn to the synchronicity appearance of anatomically modern human constitution and the explosive spread of the techno-cultural artifacts, suggesting major changes in the cognitive mechanisms. This refers to the clear and recurring symptoms of symbolic thinking – works of art, musical instruments, various decorations (beads and necklaces), means for applying the paint on the skin and tattoos; stone tools, including committing ritual acts, etc. etc.

According to the first hypothesis focuses on the biological component of SESH the reason for this is the kind of macromutations genome, essentially on the

functional organization of the nervous system and the psyche of anatomically modern typehuman. This event dates back to 50 thousandyears ago and «tied» to the African region of modern areal of Homo sapiens.

The second hypothesis is based on the socio-cultural determination of cognitive processes, tying them with cultural innovations occurred 60-80 thousand years ago.

Finally, the third hypothesis suggests that in fact the process is stochastic and cumulative in nature. The emergence and spread of the same cultural innovation happened many times, and repeatedly interrupted. As expected, the proto-cultural and technological innovation at this stage were distributed within their social group. Fixing these innovations carried out by intergroup competition and selection, leading to an increase in the number and range of the fittest social groups. «Transfer» of innovation and intergroup communication has little effect on the course of adaptatiogenesis.

The initiating factor, to change this situation, was the demographic growth[164]. As modeling shown, on reaching the population size at 10^5 individuals intergroup exchange and cross-group communicationbegins to take shape. Adaptatiogenesisprocess even further straying from the proper Darwin-Weismanmodule mechanism. Under these conditions, the the actual socio-cultural inheritance (transmits socio-cultural adaptive innovation «vertical» – from their ancestors to descendants) is complemented by the diffusion of the same adaptations for «horizontal» in the **inter-individual** and intergroup communication.

In any case, the ability to perceive and ability to actively disseminate of relevant information through adaptive communication (learning and pedagogy) is an initial comprehensive adaptation during human evolution [165]. It led to the transition to the exponential growth in the number of socio-cultural adaptation and, accordingly, the adaptive capacity of hominids. «Germs» forms of over-group social communities become the unit of evolution. The same factor (increase in the share of horizontal diffusion intergroup social and cultural adaptation) may have become the main reason for the differentiation of intra-system communication (speaking and writinglanguage) and initiated the genesis of intergroup exchange of products means rationalistic adaptations (proto-commerce, proto-market). Both ones in this interpretation act as system group adaptationsof «2-nd queues», initiated a total restructuring of the bio-ratio, and techno culture of their adaptations in the integral anthropogenesisof hominids toward Homo neandertalicus and H. sapiens.

The first of these adaptations (conventionalist linguistic diversity intergroup) in accordance with this hypothesis [166] served as the immune system, i.e., safeguardof cultural and technological adaptations pool from«leakage» outside the group. Thus, the adaptive advantage of each group is relatively protected from erosion and leveling relative to other groups.

The second adaptation (ancestral form of the modern market) provides the appearance over-group adaptive communications and formation of over-group

social structures. Thereby, while maintaining inter-group differences in the specific adaptations of the value of adaptability of each of them in the framework of inter-group associations increased.

A keyand irreversible point of the genesis of SESH – Neolithic Revolution, when, strictly speaking, there were preconditions for the idea of Making man the God-Creator role and of the threat posed from acquired human knowledge. («One of Us» (Genesis, 3:22) – God says about Adam, eated fruit from the tree of knowledge). Likewise, the first global technological revolution dooms him to tireless work for the transformation of this world: «... Cursed is the ground because of you in sorrow shalt thou eat of it all the days of thy life; thorns and thistles forth it to you; and you shall eat the herb of the field. In the sweat of thy face shalt thou eat bread, till you return to the ground from which you were taken; for dust you are and dust you shall return «(Genesis, 3:17 – 21). With the advent of industrial civilization 17-18 century a.d. finally formed a two-tier system of balanced homeostatic co-evolutionary relationship, where the role of balancer controller plays a culture (phase III). SESH at this time is a dynamic homeostat of gene-cultural co-evolution and techno-humanitarian balance, focus on the socio-cultural component of adaptive complex.

(Practically identical scheme of this phase (if not to take into account the replacement of the techno-rationalist social module offered W.Runsimen [45, p. 224]).

Now it becomes apparent already prospect in the near future to the last transition (IV-th) phase of the cycle. Action externalities factors of the evolution of culture (ecological environment, biological and ratio-technological modules of SESH) is equivalent to the displacement techno-humanitarian balance towards predominance of technological component. Ultimately, it leads to the socio-cultural gap, the transition from configuration SESH Phase III to phase IV. It determined the technologization evolution of biological (genetic engineering), and socio-cultural components of SESH. Adaptive fractal of SESH forms uncompensated loop forward and backward linkages between the individual modules. Hinge forward and backward linkages between culture and biological adaptation (genome) disappears, which is fraught with the global socio-cultural discontinuity, i.e. violation of the continuity of evolutionary transformations of cultural types. This, in turn, means the destruction of both genetic and cultural co-evolution, and techno-humanitarian balance. Thus, coherent continuum series of evolutionary transformations conjugate genome (the system of biological adaptation), culture and technology converts a sequence of discrete configurations of the triad of the same elements. Transition of one configuration to another will be determined exclusively by the laws technogenesis, is co-evolutionary relationship with the biological and cultural genesis.

A characteristic of this is the initial reaction of the cultural unit SESH, which can be reduced

- Firstly, to finding objective perspectives for prospects for completion ofevolutionary history of Homo sapiens (the concept of trans-and posthumanism (the concept of trans- and posthumanism of Julian Huxley, 1957 [167]);

Secondly, to develop conceptual frameworks and social institutions of cultural management (it would be more accurate to say – sewage) of the process of implementation of new technological innovation (Bioethics, Ronseller Van Potter, 1971) [168];

- Thirdly, to the statement of the role of modern High Hume as a leading system-determining factor of formation of self-identification and structuring of interpersonal relationships (technoself, Rocky Luppichini 2013) [169,p.25].

We have led the transformation of the contemporary socio-cultural module of SESH in chronological order, to identify the main trends of these changes. The problem of technological predetermination of human identity, his belonging to the subject-object set (community) is the key here.

The sentence «subject-object community» underlines the fact that the identity of a person means to relate to

(1) the set endowed with reason and system of values subjects, and also
(2) the set of homogeneous objects (now – the individuals of the same biological species).

In the first aspect of this community is allocated on the basis of subjective-ideal uniformity in the second – objectively-substrate uniformity.

Thus, content analysis of philosophical and humanitarian knowledge allows to confirm the conclusion of the transition SESH in IV-th phase previously made exclusively within the framework of the theoretical constructs of formalized evolutionary models SESH.

We have already mentioned that the genesis of SESH include adaptive inversion as a key component. Latter resulted in the transformation of the habitat of the causes of the evolutionary process became its product. Representatives of the genus Homo emerged from an object to a subject of adaptatiogenesis.This inversion is only the first link began conversions. In accordance with our scheme it can be further called «direct adaptive inversion» (adaptive inverse 1). The instability of the modern phase of evolution of SESH, mentioned above, is associated with the genesis of «recursive adaptive inversion» (adaptive inversion 2). As a result, it initiated a new cycle of adaptive (and not just adaptive) changes of the actual genetic component of SESH.

At this time, these changes have not stochasticity and spontaneous, but the teleological, technological – rationally organized and constructive, are determined by culture (or rather the mentality as a component of culture). It should only take into account that culture itself is also under the direct and indirect influence of technology. That is why the term recursion in this case will be more accurate than the reverse. It is not reversing the evolutionary trendbutan acquiring an evolutionary landscape the new dimension, which when projected at the source landscape looks like a return to the previous trend of global evolution.

The basis of both adaptive inversions are two alternative psychological predisposition that can be called introversively-projective and extraversively-projective ones according to their influence on the dominant values in a given culture's priorities.

The source of the adaptive inversion 2 can be recurrent cycles of relationships within the contours of gene-culture co-evolution and the techno-humanitarian balance. In cultural module,it manifested in increased reflexive components with respect to environmental and cultural components of adaptatiogenesis. . Refers to the periodic amplification of orientation of mentality to spiritual life, the process of «spiritual self-improvement» compared with projective-activity intension to transform the material world.

Previous historical development cycle of this trend was observed in the history of Western civilization in the Middle Ages. Limiting the sustainability of Middle Ages predecessor of adaptive inversion 2 factor was, in our view, the lack of efficiency in translation and replication of group social and cultural adaptations through purely pedagogical tools. For this reason, the gradual weakening of the (intro-versive, aimed at transforming the mentality) branch of the techno-humanitarian balance, and then her replacement extra-versive(aimed at transforming the material reality) happen. This led to the creation of the technological prerequisites for the formation of the mature form of adaptive inversion 2.

As a result of recursiveness in this cycle of adaptaciogenesis number of newly generated evolutionary innovation no longer limited to the original set of most slow (genetic and biological)co-evolutionary component of the SESH triad. So far, this transition was realized only within the culture and implied multiplication of «world proper»,his bundle on a lot of potential, but not necessarily technologically implemented scenarios for the future, that relied on a fixed «world of things» genetic-biological substrat ofsocialandculturalevolution). There was this discrepancy is probably due to the peculiarities of psychophysiological ensure epigenetic plasticity of cognitive processes of the psyche and recursive linguistic organization of human language. Human language as a tool for mental description, forecasting and transformation of reality had to get rid of the immediate determination of initial emotional images. (The last are, as already mentioned, to express the subjective state of the individual, not an objective reality of the situation). As clearly noted by one of the modern evolutionary linguists, precisely because of recursive speech communication human psyche acquires the ability, based on fixing and combining a limited set of «innate ideas» (emotive images somehow evolutionarily determined) to create an infinite number of thoughts, phrases and expressions (cognitive models of reality) [77, P.5].

The evolution of culture according R. A.Bentley and M.J. O'Brien [77, P.1-14] has gone through three key points.Each key pointis radically reduced dependence culture on the genetic mode of generating replication-implementation-fixing of adaptive information.

The new coding system for communication between individuals(language) provides the exchange of information, which has an objective value, independent of the emotional and physical state of the source and destination information. Add thus was created techno-cultural ability to store such information, created specific "information drives" (the elderly). The establishment of such living «information drives» was initiated by forming the first morality as «socio-cultural ensuring their functioning» (care of the elderly and the weak members of the social group).

The emergence of written records and systems, storage and retrieval of cultural and technological information, do not require biological mediawas the next stage formationof SESH.

Further,creation of computer information systems capable of managing the information flow to generate and implement a lot of information without the biological mediahappened.As a result, new evolutionary landscape formed. Evolution of culture and reasonable life in general reassigned on not biological but technological substrateaccordinglyto the already apparent evolutionary trend.

Self-reflection culture the own substrate base (the genome) as something extraneous, located outside, and does not form a binary system integrity, has a long tradition in Western civilization. Itsconceptual-logic stage it reaches René Descartes. The possibility of technological manipulation of genetic and mental processes turns human biosocialsubstantionality to another sphere of external accessible technological (rational) control and management environment.

The value of the active system-forming functions of culture as a factor of harmonizationof three components of the adaptive strategy included in the mentality of the technological civilization long enough too. However, it happened only undirectly. «Liberation»of socio-cultural organizations from the power of human biological constitution is consideredas a measure of social progress. A classic example of this is the famous saying of Charles Fourier. According to him, «freedom of women», going beyond the boundaries of the «natural» (genetically determinate sexual dimorphism) division of social roles is a basic principle of socialJustice.

The reason for this lies in the organization of the adaptive complex known as the technological (technological) civilization, whose appearance was identical to the global evolutionary bifurcation. Its evolutionary potential is determinated by precisely «confrontation and overcome» by culture of the pressing of enviroment and biological substrate predisposition.

Autonomization of sociocultural component of SESH from biological foundation (while maintaining its adaptive significance of culture in general) can occur as a result of not only direct influence of the rationalist components, but also spontaneously. In last case, the initiating or catalyzing factor is the ambivalent role of biological adaptations in relation to the adaptive effects of a particular socio-cultural adaptation.

For example, at last count the statistical norm of social (mostly emotional)intelligence and rationalist intelligenceof female more shifted to social and emotional components and the male – to rational one. The physiological basis

of the law is a shift of balance between the neural connections into and between the cerebral hemispheres[170, P. 823–828].

Interhemispheric communication facilitate emotional intuitively and imaginatively understanding of the behavior of members of numerous social groups, but based on a clear and unambiguous logical modeling of individual behavioral acts such as goal – intention – action. The initial distribution of social roles between male (hunting and safeguard) and female («keepers of the hearth») gender was associated apparently with it.

However, due to the complexity of the social structure, the differentiation of relationship between of the individual members of society as result increasing social group volumeadaptive significance of social intelligence increased. Therefore, the relative contribution of males and females in the functions of production, safeguard and control began to change in the opposite direction. The socio-cultural transmutation, mentioned above, combined with the technological possibilities of separation of sexual and reproductive functions initiated and supported the processof dichotomies of sex and gender social roles.

Thanks to embodied in trends of finding technological tools transform nature intention and predisposition, humankind has reduced significantly the amount of risk that occurs from the effects of natural disasters and unexpected action of natural forces, outside the spherecontrolled by mankind socio-cultural environment.

Human nature and its substrate (in the modern theory of evolution they are called the «evolutionary(adaptive) stable strategy») can no longer be accepted as a global constants that you can«make for the brackets» equations for the future evolution of civilization.

On the one hand, directed (controlled) evolution is the natural result of the implementation of a SESH – as the factor that determines the main direction of evolution of the universe. On the other – the «natural», not subject to human intervention for the global evolutionary process suddenly finds signs of intelligent design. Available to our observation and knowledge of the world becomes an objective fact in the artifact becomes a theological sense.(Like the famous optical illusion «Persons or bowl».) Adaptive Inversion 1 and adaptive inversion 2 integrated with each other and form the evolutionary cycle. The latter operating until it is not destroyed the central element of SESHconfiguration on phase IV (culture) or its functional basis − gene-culture coevolution (as in this case, self-destructs and the opposition culture─technology).

Already from the above, it is clear that it is about achieving the level of existential evolutionary risk. Now, evolutionary risk as an invariant organization SESHon the verge of irreversible evolutionary theological transformation – the transition to the directed evolution, and in particular, managed socio-culture-anthropogenesis. Phase IV of SESHdevelopment, in accordance with our scheme, characterized by the dominance of technological innovations in the common organization of co-evolutionary interactions.

This transition through the evolutionary bifurcation point of will mean a radical transformation of the actual economic organization of technological civilization too. Last in line with our concept of advanced (partly resulting from the A.V. Chayanov research phylosophy) is based on the interaction of two homeostatic industrial and agrarian sub-civilizaions. Each of them is based on the alternative evolutionary-economic mechanisms to search and production resources [171, 4].

A prerequisite for this dichotomy is the dichotomy of civilization process: the specificity of the economic functioning of the subjects of economic activity in the agricultural and industrial sectors,

Both sub-structures performing the necessary and complementar functions in ensuring the viability of society. The essence of the so-called Neolithic revolution can be reduced to some of the first high-tech innovation: direct (actually agricultural civilization version) or indirect (pastoral civilization version) the production of organic matter by photosynthesis and solar energy. Hence – the two fundamental characteristics of the type of agricultural civilization posed by dependence on solar energy and the nature of the «bioreactors» (plant organisms): the spatial constraints on the effectiveness of specific agricultural production in the technological context and the cyclical nature of the production technological processes. Both these features are not applicable to the industrial segment of the industrial civilization. The above dichotomy is also subject to radical and irreversible erosion and deconstruction because of the biotechnological revolution.

So, in a general way the evolutionary landscape that formed SESH, is the result of simultaneous or sequential occurrence of several evolutionary trends:

1. Extrversively projective-activity behavioral intention (adaptive inversion of 1);
2. group Mimesis, marked an opportunity to generation and distribution within the social group of adaptive behavioral and tools innovation (socio-cultural heredity);
3. Social (Machiavellian) intelligence expressed in the ability to predict and manipulate by communicative structure of social groups and the behavior of its members;
4. Expansion of inter-individual communication outside own social group and biological species [57];
5. Symbolic system of communication − it through mimetic|/gestures and sound code and then written language (symbolic heredity);
6. Spiritualistic transformation of emotionally-imaging components of thinking, leading to the internalization of social control functions and the development of religiosity;
7. The dominance of rationalist components of thought to catalyze the development of science and technology (enhancer adaptive inversion 1).
   During the formation phase IV of SESH evolution them to add some more.
8. Recursive distribution of projective-activity intention of human genome, mentality and culture (Adaptive Inversion 2).

9. Introversively reorientation of the trend of cognitive activity with a scientific explanation of the world in the scientific knowledge, which led to the stratification of the latter on the risky (classical) and warns science and socio-cultural initiation of Internal controls realization projective activity-behavioral intentions (adaptive inversion of 3). Initialization and integration in the life of society and political sphere in particular t social institutes (bioethics and biopolitics especially), that carry out humanitarian control for S&T developmen are manifestation of the mentioned control mechanisms.

In this list the largest share have four points 1, 8, 9 and 7. The first three points (adaptive inversions) play the role of Driver macromutations and determine the direction of common future evolutionary trends of a Homo sapiens (trend of socio-culture-anthropogenesis).The latter (the rationalization of mentality) dramatically accelerates the globally evolutionary transformations, and extremely rapidly expanding the boundaries of the ecological niche of humans and raising the risk to evolutionary existential level. (This thesis will have to go back).

3. EVOLUTION RISKS: NATURE, ORGANIZATION AND STRUCTURE

«If scientific and technological progress will continue and will not happen improvement of human morality, the probability of survival of civilization not only in the modern era, but also the next century will steadily diminish»
Ingmar Persson and Julian Savulescu [172, p.126].

The term «evolutionary risk» has recently become one of the key in the disciplinary matrix of the general theory of systems and areas that examine specific types of such systems (in medicine, genetics, economics, management, sociology. However, as history shows, most modern examples of anthropological and technological risks are associated with collisions of biological adaptation, socio-cultural norms and living conditions and technological innovation. In an extensive, numbering 746 pages, the report of European Environment Agency analyzed 27 specific events related to the sharp jumps of magnitude of environment (evolutionary in its phenomenology) risk that's just cover almost all aspects of social and anthropological reality:

- Bodily health;
- Environmental human environment;
- Human-made (technological) threats:
- Economic and social stability;
- Scientific and technological development policy.

Significantly, all versed in this study [173;174] examples observed suddenly reaches a value comparable to the existential risk, long-term effects with mild (though observable) early diagnostic «precursors» disaster. Namely it is allows us to say that in all these cases, it is an evolutionary risk becomes a reference parameter and a key element of the mentality of modern civilization, andis recorded in the structure and composition of modern discourse[175]. (The last point made by us as a starting postulate subsequent research of methodology techno-humanitarian balance of risk-taking technological complex).

The emergence of industrial civilization is the transformation of SESH, more precisely – its socio-cultural component, which is characterized by the dominance of technological innovation in adaptatiogenesis, and then in socio-anthropogenesis in general. Such a trend includes hominid evolution as a by-product of valueescalation of evolutionary risk.

As a result, for 350-400 years of existence of this type of civilization in principle an important milestone was reached. With the advent of information and genetic technology evolutionary level of risk (destruction of a stable evolutionary strategy Homo sapiens) reached an existential level, as both co-evolutionary

ligament replaced by a system configuration where the status of technological innovation clearly defines the status of human genome and human culture as carriers of intelligent life.

Pairing process of sociocultural genesis and technogenesis occurs under partial overlapping mechanisms of generation and fixation of new information, as well as coding systems. In other words, along with the actual co-evolution cultural and technological innovation between them a priori may be a direct exchange of information too. Mainly for this reason, we believe that the concept of techno-humanitarian balance proposed A.P.Nazaretyan, in this case is more correct. So, high enough level «techno-humanitarian balance»is it necessary tothe survival of humankind in general and technological civilization especially: higher energy output of technologies required more efficient use of their socio-cultural adjustments [102, p. 39].

In this sense, as the Darwinian «survival of the fittest», the techno-humanitarian balance appears unavoidable logical tautology – societies that are characterized by low values of this parameter, so to speak, can`t exist for a long time «by definition». However, the hypothesis of techno-humanitarian balance can still lean on some empirical evidence.For example, as the author mentions, the level of uncontrolled violence, defined, on the relative number of violent deaths and (relative) level of military losses remains approximately constant from century to century and even tends to some reduction. These facts described in the publications of A.P.Nazaretyan [102, p. 39], regardless of the support on calculations of the American psycholinguist S.Pinkler [176].

The contrast between continuously increasing ability of Homo sapiens to kill their own kind and the ability of the sociocultural module of SESH to prevent release of the scale of individual use of murder technology outside the Adaptive norms amazing. It sounds cynical, but social control tremendously increased intraspecific (inter-individual and intergroup) competition technology tools inspires some evolutionary optimism.

However, the humanistic component described tendency should not be exaggerated, and the essence of the process will not interpret in terms of ideological bias (Steven Pinkler himself from the pressure of ideology in our opinion is not free). We are talking about evolutional, that is, adaptive (ensures the survival of the society), and not on humanitarian (increasing the value of individual human life as such) progress. This confirms the growth of the absolute values of human losses in the same period. Reducing the relative magnitude of violence in society rather is explained by a progressive increase in the size and differentiation of society. Threshold of the obvious adaptive value parameters, has gone beyond biologically determinate norms, and maintenance of techno-humanitarian balance, ensuring further improvement of organization of society, took over the sociocultural module of SESH. It is characteristic that in S.Pinkler analysis major role in reducing the level of aggressiveness is given to socio-cultural and economic transformation:

1. Appeasement − the emergence of agriculture, requiring of numerous, living together and agreed operating people and therefore reduce their mutual aggressiveness (biologically driven norm of groups volume does not exceed a few tens of individuals).
2. Civilization – the formation of large national or supra-national states in place of the previously fragmented collections of ethno-tribal or feudal territories.
3. Enlightenment and Humanism – uphold the principles of individualism and self-worth of individual human life.
4. Lasting peace between the great powers (from 1945 to the beginning of the XXI century at least) – as a result of the creation and dissemination of nuclear missile weapons, increase the value of the risk of global military conflicts to the existential level.

Further given S.Pinkler elements formed the foundation for reducing the role of violence in our view relate to the tendencies of socio-cultural evolution. These tendencies are its infancy now, and assessment of their reality is excessive and unavoidable ideologically. This whole list submitted by ensuring greater stability of large societies or employes manifestation of this stability factors. To valid macro-cultural mutations of this kind not only the ideology of humanism and the Enlightenment, but most religious systems, including all three world religionswould have to be attributed.

Another observation. Accordance to the hypothesis of Pinkler balance of violence and non-violence rests on the inherited from the biological stage of evolution of hominids behavioral stereotypes («demons» and «angels» of human nature ─ S. Pinkler uses the metaphor of Abraham Lincoln, but expression «better angel»in the same context is found in the works of Shakespeare, already – Ed.) . By the «demonic» promoting violence as a manifestation of aggression human attributes author refers, for example, the physical aggressiveness during extraction and safeguard of resources, the intention to hold the highest possible status in the group (dominance), the ability to remember and to eliminate hostile individuals, the ability to get positive emotions from suffering such individuals, etc.

(Algorithm social behavior of hominid, supported by the biological evolution of form: «Do unto others as they do unto you». Biological algorithm social behavior of hominid is opposed to the ethical rules, maintain a culture: «Do unto others as you wish them to do unto you»)

Accordingly, Machiavellian intelligence based on its basis, consciousness and self-control of their behavior dedelayed on the circumstances and values, altruism, rationality. It concern to the «angelic» behavioral empathy [150, p. 631-639].However, this fact is not clear, its manifestation depends on dominance («angel») and individualistic («demonic») adaptive components. Once again, all these manifestations have origins in the evolution of hominids and meet at close of systematically of primates (see the review: [177]).

So, techno-humanitarian balance and reducing violence (as it is a particular manifestation) is an integrative system characteristics of SESH, dedelayed on the interaction of all three of its modules.

Similar to described above model of SESH made recently denoted by the term «System of System» (SoS) in systems theory and computer structures [178].Such systems consist of relatively independent modules. Its communication provides a mechanism for managing evolutionary risk, and ensures overall stability of integral adaptability values. The co-evolutionary interactions of the individual modulesis basis of this stability. However, since the rate of evolutionary transformations (or rather, generation, replication, and fixation/elimination of adaptive value information) in different modules different modules does not match, between them imbalances and inconsistencies is not excluded. They, in turn, entails the possibility of a general reduction of adaptability (evolutionary risk). Thus, the risk is an attribute of the evolutionary multi-level self-organizing SoS, arising from escalating into a conflict imbalance between the adaptations of different levels of the organization of such systems.

Let us formulate this thesis as applied to the theory of stable human adaptive strategy: evolutionary risk is the system characteristic of SESHand values of riskperiodically reaches existential level.

The evolutionary path of the biological and socio-cultural forms of adaptation, as is commonly believed [179], located the so-called Price equation:

$$\Delta \acute{z} = cov(v; z) + E_v(\Delta z) \quad (3.1),$$

where v –adaptive value of trait$z$, $\Delta \acute{z}$ – the average in population change in the trait values in one generation; the first term of equation $cov(v; z)$ reflects the change in trait due to its influence on the adaptive value of its carrier, the second term $E_v(\Delta z)$ – altered distribution characteristic in the process of communication between individuals. Obviously, the first term describes the process of selecting (removing) individuals with different characteristics. The meaning of magnitude $Ev(\Delta z)$ comes down to the impact of specific variants of trait on the distribution of carriers on the various traits in the population. For example, the genes of altruism, increase reproductive success of individuals related by reducing its own adaptability. Thus, $cov(v; z)$ describes the process of selection, $E_v(\Delta z)$ – direct or indirect communication between individuals.

As mentioned above, the effect of communication (social and cultural inheritance) the better, the higher the density and size of social group. In other words, socio-cultural and technological evolution is faster in large heterogeneous populations. This acceleration is selectively adaptive nature, since the effect of communication spreads available to the action of natural selection innovations, we emphasize.

In the case of cultural inheritance (Lamarck module) the effect of communication significantly increases its share, and takes the form of direct infection (contagion). The rate adaptive (and also non-adaptive) evolution unconditionally increases with the size and population density. In the case of genetic inheritance adaptively significant characteristic, this same effect is mediated by kinship participants of communication.

This is another difference between the socio-cultural inheritance – Lamarck modus – from biological – Weismann-Darwin modus. For the biological inheritance effect of communication (i.e. in this case, systems of crossbreeding), associated primarily with, genetic drift (is nonselective). In other words, the adaptive evolution of the biological unit at a fixed value of adaptability/maladaptive of any genetic element is defined by adaptability and population size. With the population growth a specific weight of adaptive selection grows, but its speed drops. With a decrease in the size of the population increases the proportion of non-adaptive components – genetic drift – and the total rate of evolution can be carried out with greater speed.

Thus, the first conclusion from the above is the growing importance of the Lamarck modus in adaptive evolution – as result of different speeds and a close correlation between the value of the coefficient of selection, population size and relative contribution of each mode of adaptatiogenesis in the process. (To the same conclusion reached by the American specialist in evolutionary genomics E.Kunin [180, p. 312].

According to him the Lamarck modus (the term he does not using) or quasi-Lamarckian inheritance is possible because of epigenetic canalisation/genetic modification programs. However, his approval feature ofLamarckianevolution model is a postulate about the reality of a mechanism ofdirection of the generation adaptative information process [181, p. 297]. «Fortunately», in the case of socio-cultural and technological modules of SESH nature of such a mechanismisa combination of intentionality (goal-setting) of human consciousness and the ability the ability for objective ideal reality modelling (epistemology). It allows for a purposeful design of adaptive innovation, and excluding or at least restricts the role of the selection from there arose a pool of mutations in the adaptationgenesis process. The imbalance of gene-cultural co-evolution is another risk factor for evolutionary SESH. Below we look at this issue in more detail.

So, the Price equation, in relation to the socio-cultural component adaptatiogenesis takes the form [180]

$$\Delta \acute{z} = cov(c; z) + E_c(\Delta z), \tag{3.2}$$

where***c*** – sociocultural component of adaptability. The authors of the cited article does not consider the rational (*t*) component SESH, but by analogy it can be represented a

$$\Delta \acute{z} = cov(t; z) + E_t(\Delta z) \tag{3.3}.$$

Note due to the indivisibility of the system of generation and replication of adaptive information in the Lamarck module component ***E(Δz)*** plays a much more significant role in adaptatiogenesis compared with the biological component of SESH. At the individual level ***E(Δz)***nonselective trends reflect biological, technological and socio-cultural components respectively. However, at level of competition and selection of social grops, they become a factor evolutionary success or failure of the respective groups, i.e. anyhow, have adaptive value. In this

interpretation, communication between individuals leads to change of the adaptive significance of the trait as a result of its inclusion in the adaptive landscape of other modules. This is from our point of view, the most correct interpretation of recent data [181, p.89] the high value of the selective propagation velocity of technological and cultural information in terms of intergroup competition.So, in the Price equation ***cov(v; z), cov(c; z), cov(t; z)*** corresponds to the amount of adaptive information and ***E(Δz)***describes semantics adaptive changes as a consequence of integration in holistic SESH system.

As result, some researchers have proposed to divide it into two (constitutional and induced) sub-component [182, 146]. The first of them corresponds to the «innate» ability culturetoself-replicated by imitation and learning (the phenomenon of cognitive preferences). As a result, the dominant cultural stereotypes in society are reproduced with greater efficiency compared to their minor forms. Second one – the ability of individual cultural or rationalist innovations serve as attractors for the behavior in a social group due to correlation between social status and the carriage of certain cultural stereotypes.In essence, the same two sub-components, and for the same reasons also present in rationalist (technological) component of SESH.

A priori seems obvious that a stable evolutionary curve is based on the positive correlation between the three components (modules) of SESH. It is this conclusion in relation to socio-cultural co-evolution is done in the publication of a group of European researchers [180, p. 236]. However, just as intuitively obvious conclusion is that such a configuration is a relatively rare event caused by an introduction to the Third (technological and rationalistic) component.

Amplifier rationalist adaptations (especially the use of various tools) projects an increase of stochastic fluctuations or a stable trend of high-c hanges of enviromental situation with regard to the source of life support resources. This hypothesis explaining the evolutionary dynamics of the development of tool is called in modern anthropology hypothesis of environmental risk [37, 183].

Conditions of high efficiency rationalist module of SESH serves high number and density of the population, providing a sufficient intensity and reliability of social inheritance and a relatively high intensity of the process of generation of adaptive significance of culture and technology innovation [184, 185].

In conjunction with each other, they create the effect of a delayed risk associated with the release of risk-taking factors beyond the existing cultural and ecological niches. Eliminating potential (delayed) forms of evolutionary risks associated with «pulling» more slowly evolving biodiversity module to a new evolutionary landscape (fig. 1.3, a branch of $T_{n-1} \rightarrow T_n \rightarrow C_{n-1} \rightarrow C_n \rightarrow G_{n-1} \rightarrow G_n$). With the passage of stochastic fluctuations or steady trend to changing environmental conditions and the rate of adaptive evolution rationalist and socio-cultural modules of a threshold stage of $G_{n-1} \rightarrow G_n$ falls or very late and replaced by adaptive changes of adaptatiogenesis other participants:

$$\boldsymbol{T_{n-1} \rightarrow T_n \rightarrow C_{n-1} \rightarrow C_n \rightarrow T_n \rightarrow T_{n+1} \rightarrow C_n \rightarrow C_{n+1} \rightarrow} \quad (3.4)$$

(An example would be later – for four thousand years, compared with the appearance of cheese-making – fixing a permanent level of enzymes milk sugar digestion in populations of tribes of Central Europe [141]).

However, upon further technogenesis speed growth loss of stage adaptive cultural transformation also occurs. In this case (because of the smaller difference between the rate of evolution of technology and culture evolution compared with the biogenesis) general scheme of evolution SESH is dualistic ones:

$$T_{n-1} \rightarrow T_n \rightarrow T_n \rightarrow T_{n+1} \rightarrow C_n \rightarrow C_{n+1} \rightarrow \ldots \quad (3.5)$$

or

$$T_{n-1} \rightarrow T_n \rightarrow C_{n-k} \rightarrow C_{n-k+1} \rightarrow T_n \rightarrow T_{n+1} \rightarrow C_n \rightarrow C_{n+1} \rightarrow \ldots \quad (3.6)$$

As a result of the «great divide»triple structure of SESH, i.e. (breach of system integrity, supported by closed-loop forward and backward linkages between all modules) the connection between the modules is broken.There is a redistribution of balance deterministic, functional and limiting the composition of exist adaptive repertoire linkages.Balance of more slowly evolving modules and faster modules, changes in favor of the latter category.

Date of the transition leading role in the biogenesis of adaptive evolution to sociocultural genesis and loss of communication between them is a very difficult problem to be solved only ad hoc to each of the adaptive phenomenon. Allow only one assumption: in relation to inter-individual communication and social organization of this transition has occurred at the beginning of the formation over-group (social) structure, since the origins of intragroup cooperation can be traced even in the framework of biological behavioral adaptations of great apes. (This is evidenced, for example, data and arguments about the biological origins of morality in a book by F. de Waal). Within the inter-relations of the evolution of morality it claims is a «bottom up», from elementary genetically programmed behavior patterns to the cultural norms of a reproducible relationship between individuals within the group, and even more so – to the verbal and logical systems of morality justifies [178, p. 317].

If individual members of the group are related by kin, at the stage of integration of groups of individuals into a single society, the ability to maintain social structures and ensure the viability of the group as a whole is supported by classical examples of sibling selection, sibs-selection and similar models of micro-evolution.When combining unrelated common genes originally groups of this mechanism is already insufficient. An socio-cultural innovations (religion, ethics, etc.), formed on the principle of «top-down» (from common rational postulates formulated to specific standards of conduct),appearas enhancer. There is a network or cloud emotive images (thought forms) associated with the initial logical-verbal design and with each other. At least some of them may overlap thought forms that trigger genetically determined behavioral patterns, not necessarily clearly defined and isolated. Then themselves culturally determined images and the original verbal-logical constructs, transformed into significant sociocultural or rational

adaptation. This is the first gear, which may explain the appearance and fixation of the rationalist and socio-cultural adaptations, especially religion and morality.

Alternative transmission between rationalistic, cultural and biological SESH modules can be initiated by the culture and based on cognitive (ideally) modeling the reality technological innovations, affecting the survival of Homo sapiens.

In any case, the adaptive windows between the individual modules of SESH arises network co-evolutionary relationships. Its structure and composition are variable and not always unambiguous. By this surface three adaptive windows are displaced relative to each other and do not coincide completely.

As a result, the value of the delayed risk is equivalent to evolutionary risk. It tends to be a permanent increase over time, since the above technological development become autocatalitic process, stimulated not only culture, but also by the cognition and technogenesis.

Accelerated development of socio-cultural and rationalist modules of SESH leads to increased stress at gene-culture co-evolutionary ligaments and techno-humanitarian balance (growth discrepancy between techno-cultural enviroment for Homo sapiens, and genetic and psychophysiological adaptive norm). The situation of delayed evolutionary risk allowed a sharp increase in the of all kinds of elements of biological variability of adaptive module, which in turn is accompanied by an increase in the frequency of genetic and epigenetic abnormalities («diseases of civilization»). Delayed environmental risk becomes relevant, evolutionary form.

In the future, we understand the term evolution of «existential evolutionary risk». Thus, this term will be denoted as a first approximation:

- In terms of the disciplinary matrix of biological (physical) anthropology – the likelihood of long-term evolutionary trend, ending an irreversible decline in the number (extinction) of biological carriers of stable adaptive strategy (in this case – SESH);

- In terms of culture (philosophical) anthropology it is equivalent to a judgment about the loss of cultural self-identity of the bearer of the mind;

- Finally, from the viewpoint of technology (Anthropology of technics), this point is recorded as offensive posthuman future. (If the technogenesis process continues, we may to speak an era of post-humanism in the technological or noospheric evolution, – depending on the original system of values and attitudes of the researcher).

All three aspects, in explicit or latent form, are appealing in permanent and cumulative imbalances accumulate individual and group adaptability, but latterafter reaches a certain threshold makes them incompatible. Upon reaching this bifurcation point, there is a sudden (catastrophic) disintegration (irreversible decline adaptability) of the SoS. Further evolution can develop in accordance with one of the three mutually exclusive scenarios that we present below.

- The extinction of Homo sapiens – complete elimination of the carriers of SESH – $(SoS) \rightarrow 0$.

- Posthumanity – replacement of one strategy by another strategy, with the removal of one or more components – N_1 (SoS_1) → N_2 (SoS_2). «Troubleshooting» component of SESH in this context refers to the inability of evolutionary transition between the component SESH-predecessor and the newly formed adaptively strategy. In a sense, this feature corresponds to the known model of «irreducible complexity of the system» according to which the object can`t arise through incremental evolution of the original building;
- Divergence (irradiation) of intelligent life – the collapse of the original set of carriers of the SESH for several $SoS_1 \rightarrow \Sigma$ (SoS_i). In terms of design niches and evolutionary ecology theories this case is equivalent to the fragmentation of the original ecological niche. If at least one of the newly emerging forms of intelligent life carriers remain actual or potential intention to unlimited expansion evolutionary reduction of the third to the second scenariois inevitable.

Technology makes our genetic constitution The result of the development of both types of information technology turns out to be a single: mind control (socio-cultural change code)technology and controlled the genetic code technology are both technology of driven evolution [186;36, c. 337].

By reducing the degree of evolutionary risk generated by uncontrolled (stochastic) microevolution, rationalist component SESH thereby raises the value of the risk to the next level – the meta-evolutionary risk from the destruction of the organization has the ability to actually SoS homeostatic ensemble. Consider the general mechanism of evolutionary risk in relation to the possibility of disintegration because of the destruction of co-evolutionary relationship and communication between the components of SESH.

Probably the most obvious example of the evolutionary actualization of the risk in accordance with one of the most reasonable hypothesis is the process of carcinogenesis [187].The development of all cancers, regardless of origin (hereditary, infectious, or sporadic), subject to the dynamics of Darwinian selection in a heterogeneous cell population. The necessary conditions for a self-sustaining process of carcinogenesis are the instability of the genome of the cell in combination with the heterogeneity of physiological parameters such as hypoxia, acidosis and active presence of molecular oxygen.

All of them together form a cycle with positive feedback, and provide progressive tumor growth, very quickly adapt to the selective action of the environmental factors that can potentially slow down the multiplication of cells (cytotoxic substances, ionizing radiation, and so on.). It is assumed that such a system is a system of biological adaptation to environmental stress of very ancient origin. The effect of this system – the complex of cellular anti-stress adaptation in a multicellular organism becomes a source of risk to the evolution of cell populations, because ultimately destroys the conditions for their existence (the death of an individual). By the same scenario developed any evolutionary process of actualization of risk.

Thus, the source of the risk of evolution are any inherent contradiction between the elements of a stable adaptive strategy that may lead to its destruction and, consequently, extinction its (SESH) carriers. The sources of risk are the evolutionary multi-trend adaptatiogenesis process, which involved a certain set of parallel elementary adaptations affecting more than one feature at a time adaptive significance (pleiotropic), evolving in different directions and at different speeds.

Partial empirical manifestations of evolutionary risk are the evolutionary load growth and an increase in the scope and depth of the environmental crisis of civilization. Evolutionary load will be denoted by the accumulation reduces the overall adaptability within each of the three modules and the entire SESH. Thus, the components of the evolution load are:

1. genetic load – accumulation of reduce adaptability mutations in population, whose action is compensated by other elements of the genetic module of SESH;
2. sociocultural load – the accumulation of cultural elements, reduces the stability and viability of this type of culture or its competitiveness in relation to other socio-cultural types (anti-humanism). A textbook examples are human sacrifice in Aztec civilization, Khlysts and Skoptsysects in Christianity, etc. All of them were either side and/or excessive results of sociocultural adaptation, or adapting to no longer valid socio-cultural or environmental conditions;
3. techno-rationalictic load – the accumulation of elements of theoretical and technological knowledge, the possible negative consequences which society can`t currently control (risk knowledge);
4. the system load – a general accumulation ofimbalance between of self-replicating enviroments and Homo sapiens as a result of a spontaneous evolution of SESH. In other words, evolution of SESH increases energy, material and informational cost to artificial maintenance of original ecological niche of hominids (global environmental crisis and post-humanism).

Systemic evolutionary risk of SESH, as you can see, the output is the evolutionary path of hominids outside the zone of effective functioning of SESH. Like any evolutionary strategy of a taxon, SESH may also be in conditions inevitably lead to the extinction of their carriers not only as a result of a catastrophic change in living conditions, but also due to internal (system) restrictions. In both scenarios, the ecological system is incompatible with the existence of this evolutionary strategy. Enviroment nishe disappears(environmental crisis) or adptively strategy is replaced by a new one (post-humanism).

However, the linear approximation implies acceptance one of alternative risk components (environmental crisis versus post-humanism) equal to a constant. It is not possible to adequately assess the evolutionary risk value. In addition, both options, although characterized by an integrated population-adaptability, but are determined by the individual (genetic load) and group (environmental crisis) adaptability – by virtue of the mechanisms for the implementation of the biological and socio-cultural component of SESH. And, finally, in addition to genetic load

individual adaptability is result not only genetic but also socio-cultural heredity (lifestyle).

For these reasons, in consideration of the need to introduce a new concept – an adaptive differential (D_a), which in this context means the influence given evolutionary innovation adaptability to other existing and fixed in a population innovation. Adaptive Differential of individual adaptations of this complex can have different signs and different amounts in relation to other adaptations, regardless of their nature. So

$$D_a = \frac{|\Sigma(A_k - Ai)|}{N}, \quad (3.7)$$

where$\boldsymbol{A_k}$, $\boldsymbol{A_i}$ – relative adaptability of the inherited (biological, cultural or rationalist) innovations and the rest of their set of innovations $\boldsymbol{N}$. The value D_a lie from zero to one with the approach of D_a unity, it makes a relatively larger contribution to the final value of adaptability. Taking into account the hierarchy of speeds of individual components of SESH, adaptive differential of rapidly evolving (socio-cultural and technological) innovations increases.

However, the more slowly evolving components deliver the substrates for more rapidly evolving components. Consequently, the tensions in the overall system of SESHgrow, and this process continues until a disintegration of the meta-structure ofadaptive complex. The complex provide operation and the possibility of further transformation of socio-cultural and technological components.

Obviously, the risk is an evolutionary feature of any self-organizing (evolving) systems. For example, according to the theory of «cognitive load» in cognitive science and evolutionary epistemology assimilation of new non-hereditary in the biological sense information fragments is only possible, if their number does not exceed seven elements.

With all the differences of these situations, we are talking about similar information processes, because the acquisition of new adequate reality knowledge is equivalent to the generation of adaptive information by living organisms After that there is an avalanche removal or replacement of components of the adaptive strategy. The end result will be a complete elimination of the carrier SESH, or the emergence of a a new stable evolutionary strategy.

Explanatory model of inclusive inheritance of adaptively relevant information found in the scientific literature, are based on the principle of the validity of the linear approximation of this process (see [188] et al.). Accordingly, the total phenotypic variance can be decomposed into individual components that in this case both are separate systems of heredity (genetic, socio-cultural, and so on.),and various forms of Homo sapiens adaptation

$$\sigma^2 = \sigma^2_p + \sigma^2_g + \sigma^2_c + \sigma^2_m + \sigma^2_s + \sigma^2_t + \sigma^2_e + \sigma^2_r, \quad (3.8)$$

where σ^2_p – «advanced» phenotypic variance (advanced phenotype includes all stable transformation of morphological, physiological, biochemical, psychological and other symptoms caused not only genotypic factors, but also the culture and technological interventions. The latter category includes, for example, such diverse phenomena as surgery, pharmaceuticals, prosthetics and technical correction of hearing and vision, the results of pedagogical and psychological adjustments, etc.); σ^2_g, σ^2_c, σ^2_m, σ^2_s, σ^2_t, $\sigma^2_e$are components of the general variation, caused by genetic factors, cultural inheritance, the parent effect, social environment, technological interventions and environmental factors, respectively. Components σ^2_m, σ^2_s(influence of parents and the social environment) can be seen as the result of cultural and genetic factors, and σ^2_tas mediated by cultural inheritancetechnological modification of the phenotype. (Culturally defined process modification phenotype believe those who initiated and/or supported by the system of value priorities, defining the status of self-esteem and carriers of certain traits in the population.) The latter statement is true, at least in respect of the III-rd phase of evolution of SESH. Component σ^2_r in the linear model – «residual», determined solely the action is currently unknown factors. The relative contribution of the different types of inheritance in the overall determination of the genes corresponding to the equation

$$\sigma^2_g/\sigma^2_p + \sigma^2_c/\sigma^2_p + \sigma^2_m/\sigma^2_p + \sigma^2_s/\sigma^2_p + \sigma^2_t/\sigma^2_p + \sigma^2_e/\sigma^2_p + \sigma^2_r/\sigma^2_p = 1 \quad (3.9)$$

Componentsσ^2_m/σ^2_p, σ^2_s/σ^2_p, as already mentioned, it can be distributed between genotypic and socio-cultural variance. Technological component with the other hand and autonomous mechanisms of generation, and the way of realization of adaptive information. Therefore, SESH applied to the above equation can be simplified:

$$\sigma^2_g/\sigma^2_p + \sigma^2_c/\sigma^2_p + \sigma^2_t/\sigma^2_p + \sigma^2_e/\sigma^2_p + \sigma^2_r/\sigma^2_p = 1 \quad (3.10)$$

From our point of view component $\sigma^2_r$is heterogeneous in its composition, since it involves a fairly significant result of the nonlinear interaction of co-evolutionary elements of different levels of complexity. Then, when it comes to adaptability, the linear approximation is no longer correct, due to the systemic nature of the interaction of components SESH. For this reason, the evolutionary risk phenomenon occurs, as well as the need for a transition from micro-parameters (selective advantage, adaptability etc.) of separate fragments of adaptive information (genes, memes, culture-genes, etc.) to the system of macro-parameters. Below you will find the data and arguments that suggest that

1. During socio-culture-antropogenesisσ^2_r/σ^2_p increases with acceleration. Initiation and compensation of this increase carried out to date, primarily due to further technological innovation of High Hume (NBIC) complex;
2. In the course of the IV-th phase of SESH evolution evolutionary risk (the projected growth of the parameter and its relation with the technological

innovation process – in this equation) becomes a critical factor in assessing sistemoformiruyuschim problems both biological and social security.

The concept of «risk» is the subject of «warning of science», and, therefore, a key category concept field of post-academician science in general. The very transformation of the social institution of science in the modern – post-academician phase of its development in our opinion, based on a systematic assessment of the previous sections of the study material, due to the cooperative action of the qualitative and quantitative (in the instrumental aspect) factors of evolution.

1. First (quality) system-evolutionary factor of socio-culture-antropogenesisis evolutionary dominance of risk in the overall structure of the hominid evolutionary landscape.
2. The second (or metric marshallable) evolutionary factoristhe transition integral value through an existential risk threshold.

The concept of evolution of risk in this study suggests the need for synthetic model, which abstracts (1) and (2) will be present in the formulations as a definite two initial parameters of the conceptual model, and subsequently, the algorithm and the general scheme of risk assessment NBIC technological innovation.

The concept of «Evolutionary risk» first came into use in the socio-humanitarian disciplines, the first time it has used Niklas Luhmann.

It is also necessary to mention the name of the Italian philosopher and sociologist Danila Zolo. In his book «Democracy and complexity: a realistic approach» (1992), he argues quite convincingly that the main source of increase in potential instability of modern Western democracies is their excessive complexity of the structural and functional organization. Suddenly turning into the actual form of potential instability and diagnosed him as «an evolutionary risk» [189, з.179]. The long-term political preferences of the majority of citizens are largely formed under the influence of pressure on them the information. It is thus often a subliminal overwhelming critical faculties of the audience using irrational techniques of persuasion, – wrote Zolo [189, c. 9-10]. There is an inversion of the causal relationships between the subjects of the political process. New political actors no longer are a party but the narrow circle of elite entrepreneurs from election campaigns that come with each other in advertising competition. They appeal to the masses of citizens-consumers, offering them under the revised strategy of television marketing its symbolic foods, – he says further [190, s.10-11].

If you clear this tirade from emotional and axiological painting, the «bottom line» verification of the available empirical evidence is as follows. One of the leading causes of the stability of the socio-cultural module of SESH ((in his West-technological variety) has been the emergence of political and social engineering technologies (varieties of technology of managed evolution). Inversion occurs explanatory links and functional dependencies self-organizing social systems, violation of the integrity and autonomy of its separate elements. There is an inversion of the causal relationships and functional dependencies of self-organizing social system, a violation of its integrity and autonomy of its individual elements.

(Similar examples inversion loop forward and backward linkages as a result of adaptive processes mismatch between modules of SESH considered previously in relation to the development of the crisis in relations between the state and social institutions of science (genetics) in the former USSR in 1920-1965 [190]. With all the differences of the social phenomena underlying the genesis of their evolutionary mechanism shows a surprising analogy even more precise homology).

The reason for this imbalance in favor of rational-technological and other modules SESH. In fact, this definition is consistent with theNiklas Luhmann concept (see. [47, pp. 52-53]), and with our interpretation of the phenomenon of evolutionary risk (see above).

Once again, we emphasize that any interpretation of the concept of «evolutionary risk» and «system complexity» postulate bilateral, adaptive significan(correlative, functional and causal) relationshipsbetween elements within the adaptive module and between modules. Between the individual elements within the module can be observed conflicts as their adaptability/maladaptive defined with respect to various environmental complexes or to provide oppositely directed survival functions. Maladaptationwithin the same unit can be used as a substrate for formation of adaptation in another module. With the increasing complexity of internal structural and functional organization and external ecological niches such conflicts are becoming increasingly important – the magnitude of the risk of evolution is growing. After reaching the existential risk (R = 1) ensuring acceptable risk values (R << 1), paradoxically, will mean total destruction SESH and the birth of a new structure of evolutionary strategy, that is impossible to get a change in the configuration of its previous stage. The removal of evolutionary risk in this case would be tantamount to its actualization.

Conceptual-terms apparatus to create the concept of evolution of risk can be virtually unchanged borrowed from studies on the economic theory of innovation processes.

Structure evolution of risk can be assessed on the following parameters:

• probability of success/failure of adaptive evolutionary innovations that amounted to the ability to solve the key problem of human (the survival and expansion of the ecological niche of Homo sapiens);

• the probability of generating the evolutionary innovations that can potentially solve/aggravate the imbalance of SESH with the environment and gene-cultural co-evolution and the techno-cultural balance;

• presence/absence of sufficient resources, ecological and cultural environment, necessary for the implementation of updated by the evolutionary innovation evolutionary trajectory (scenario);

• projected decrease/increase the probability of generating and recording new evolutionary innovation, i.e.plasticity/sustainability of SESH and all its components. We can assume that in this case the role of the controller, capable of ensuring maintenance of the parameter plasticity/stability SESH within adaptive norm playing member of with an intermediate evolutionspeed (its speed of

evolutionary transformations lies between the fastest and slowest modules of the SESH triad). In doing so,the range of possible rates of at least two such modules overlaps with the thirdmodule. As is clear from the above, it is currently the only contender for the role culture acts. Hence the following option:

• compliance/noncompliance of predictable evolutionary scenario `to some basic system options. These options are recognized not subject to review under the system of human values.

(«In order to change human nature, too, we must first be aware of the ideal to be pursued, and then use all the means presented by science for its existence» [100, p.245]).

Stable intention of Western (man-made) socio-cultural type, as well as all the set of (Judaic, Christian and Islamic) cultures that belong to the same branch of the evolutionary tree, it focuses on the individual and society is a constant search for means of improving the environment and psychological comfort. Achieving this goal it is accompanied with strengthening the adaptive capacity of human nature. Physiological abilities complemented and increasing technical devices, and psychic abilities − technological artifacts. Technical artfacts in this context consider various adaptations that increase physical abilities of the human body (replace the morpho-physiological biological adaptation). Technological artifacts in the same contextconsider various rational behavioral algorithms (for example, calculation methods, schemes of production and interpersonal communication and coordination as a whole), replacing spontaneous cultural adaptation.

Verbal expression of this intention can formulated as a technological imperative. In its simplest form, it is as follows: All that can be changed to a common or individual gain must be changed [191, p.9]. This ensures a permanent process of generation of adaptive technology innovation.

As the mathematical analysis demonstrated [192], in general, in their existential threshold values of risk monotonically approaches to 1. Potential evolutionary risk as an reverse side of this intention is balanced by the oppositional intention. Phenomenological consequences of its existence is known in cognitive science as «Knobs effect». In accordance to the effect the perceptions of positive and negative effects of new knowledge and technologies are asymmetrically – assessment first underestimated and overestimated the second ones. Or, as russian vaccinologist Michael Phavorov said, «we have good news does not happen» [193]. It creates a certain socio-cultural effects of inhibition of growth of evolutionary risk. In general, the binary opposition intentions mentioned alternative functions as homeostat preventing the disintegration of hitherto SESH.

Referring to the latter at the time of writing, the results of studies of evolutionary and adaptive mechanisms of genesis of a role of psychological bias (bias estimates of the possible evolutionary risks and adaptive benefits) of technology and socio-cultural innovations. The most interesting hypothesis seems here Johnson and Fowler conception [194,195,196].Their concept is known as «Theory of management errors», they argues that the mechanisms of perception, decision-making and assimilation/elimination adaptive innovation principle are

asymmetrical. This is different from the classic turn-based strategy Bayes scheme of decision-making.Accordinglly methodology of T.Bayes the overall assessment and the trajectory of continuous innovation is corrected in accordance with the previous results. This scheme is generally consistent with the model resulting from the Darwin-Weismann modus: in every generation, natural selection by an independent act of comparing the adaptive value of competing innovation, resulting in the changes of evolutionary innovation frequency in the next generation.

The existence of a hierarchy of autonomous generation and replication mechanisms of adaptive information changes the algorithm, and bring it closer to Lamarck modus. In general, these transformations are reduced to «memorize» and summarizing the results of previous acts of the selection of adaptive innovation. Thus, the act of selection – integration or elimination of innovationceases to be entirely self-contained, and is integrated into the hyperframe «adaptation (enhancement)of adaptatiogenesis». A precondition for this is an asymmetric distribution of evolutionary risk (multiplication of the probability of an error by the degree of possible damage).

The built in SESH mechanism for implementing the evolutionary risk management process, obviously has a social and cultural nature, as is the choice of statistical quantification correction in stereotypical problem situations (optimism, pessimism, self-confidence, care, etc). However, at the same time it is based on individual and group dynamics of changes in the perception of reality too. In other words, the outcome of the innovation process not only affects the system of social and cultural value priorities and physiological characteristics of the human perception and thinking. It formed during the previous evolution of biological and genetic component of SESH.

Then,Knobe effect is a special case of a set of strategies for decision-making, which arose in SESH dedelayed on macrocharacteristics problem situation (the availability of resources, the relationship benefits and risks, etc.). The reason for its activation is passing the upper threshold of the allowable rate of evolutionary transformations, as in the evolutionary history of hominids too rapid changes in the parameters of ecological niches were potentially dangerous to the survival of populations and social groups, and demanded the presence of excess (insurance) conditions. Quantitative parameters (speed of the innovation process) are correlated with quality – complementarity morpho-physiological organization, spiritual culture, social and ecological environment of Homo sapiens. Obviously, there is another, the lower barrier –drop resources to ensure individual and group survival below the threshold value. Below of threshold the upsurge of social (hardly a technological) innovation processes comes (nothing to lose). All these arguments have introduced a subjective component of the theory of evolution, one of the parameters of spontaneous evolutionary process objectified. And, oddly enough, in both aspects have in mind the same − evolutionary risk.

3.1. Evolutionary load and evolutionary risk

In the case of the linear reduction category evolutionary load – evolutionary risk associates by deterministic attitude: evolutionary risk represents the potential (projected) form of evolutionary load, evolutionary load is update (materialization) of evolutionary risk. The asymmetry of the relationship between them is determined implicitly postulated presence of a rational subjectin the definition of «evolutionary risk». In fact, the very existence of the phenomenon of evolutionary risk already needs in accordance with any version of the theory of evolution, if the latter is based solely on genetic mechanisms adaptatiogenesis. The category of «evolutionary risk» means rationalization of the evolutionary process and, therefore, the existence of technological control over it (technology-driven evolution).

Generalizational evolutionary risk corresponds to a predictable drop of SESH effectiveness as an integrated system of survival of Homo sapiens.Specific evolutionary risk corresponds to a predictable drop in adaptability of the individual components of SESH, if the drop normally is compensated and/or assimilated by other components. (The term «assimilation of risk» in this context means the transformation of maladaptation generated by one of the SESH components, to a substrate base of adaptive innovation of SESH.During this study, we look at a few genetic on nature examples of this kind). By far namelybiological component SESHwasthe most risk-taking ones.

Let to comparable evolutionary risk and two fundamental postulates of neo-darwinism – Fisher's fundamental theorem [197, p. 22] and the principle of minimal genetic load**[**198,p. 171].

In accordance with the Fisher theorem adaptability of nonequilibrium population will continue to grow with a speed proportional to the variance of the individual adaptability. In the absence of complicating circumstances, this process should result in a stable equilibrium genetic structure of the population with the maximum adaptability. From this thesis, we can deduce the principle of minimal genetic load: the result is always the evolution exists a structure that is characterized by a minimum value of genetic load, i.e., the smallest discrepancy between the average value and the maximum value of population adaptability under given environmental conditions.

When the value of the evolutionary load and evolutionary risk is determined by biological components of SESH only, evolutionary risk is defined as, the number of acts of genetic elimination needed to achieve the highest possible level of population adaptability («pay for the selection»). In this case, the existential rate of evolution of risk is determined exclusively by the speed and regularity of environmental changes on the one hand and efficiency of selective transformation on the other. The latter factor is determined by the provision of genetic variation, the reserve of genetic variability, speed selection, wide norm of reaction and so on. It is intuitively obvious that the existential risk (extinction) occurs after reaching a speed of environmental change threshold, equal to the rate of selection of a given population. This threshold in the case of Darwin-Weismann module is relatively

small. As a long time calculations of Moto Kimura, selection is effective if the number of alleles, under its action does not exceed 10-12. Although a variety of amendments, strictly speaking, this conclusion has not refuted in the classical theory of evolution.

Meanwhile, in the mid 1960s. R. Lewontin et al. had drafted the so-called paradox of the balance of the genetic load, and then the extremely high level of genetic variability in human populations (and not only) repeatedly was discovered and confirmed. The most recent data [199] argue that the level of genetic load in populations of hominids of the order of 2 mutations per genome per generation. Mathematical calculations show that compensation is equal to the fall of adaptability in this case, about 16 children per pair of parents during the reproductive period.Given the characteristics of the ecological niche and physiological organization of the reproductive system of hominids (the period between successive births in women approaching to 3 years), it seems quite unacceptable. Possible explanations are the interaction of individual mutations on the level of the genome and the interaction of different carriers of mutations in a social group. Potentially, such a mechanism of adaptive compensation can significantly change the value of evolutionary risk or even invert the process of falling adaptability.

Accounting for epigenetic mechanisms and, in particular, the socio-cultural inheritance (Adaptive Inversion 1) significantly increases the speed adaptatiogenesis and raises the threshold of acceptable rate of change of enviroment. In fact, talking about change of enviroment in the old sense of the word becomes incorrect. The source of the risk of change becomes only the inaccessible to the rationalist prediction, monitoring and control environmental factors. Adaptatiogenesis speed is limited by the rate of constructing socio-ecological niches (noosphere or the techno-sphere). However, this process already is controlled by two or even three systems generate adaptive data, and the relationship between them is supported by co-evolution rather than a direct exchange of information.

Thus, there are several components of the system evolution risk (as opposed to purely biological form of evolutionary risk):

- The substantial genetic loadoccurs because of the mismatch between the direction and magnitude of selective pressure caused by the influence of environmental and sociocultural factors of selection. Sociocultural form of adaptatiogenesis has a much higher rate compared to the biologicalform. As a result of this discrepancy trends of selection not occurs adaptation of the genetic structure of the population to the socio-cultural environment. Instead, the most frequently observed commit compensating some biological maladaptive element, but generating new maladaptive ones cultural innovation. So-called epigenetic or genetic «diseases of civilization» are an external manifestation of this component of the evolutionary risk actualization. Actually, substantive load will take accumulation in populations of maladaptive geno- and phenotypes. The reason is the accumulation of socio-

cultural and technological adaptive innovation, leading to a change in the socio-cultural environment, and make possible the social adaptation (survival) of relevant biological defects carriers. The existence of substantial load stems directly from the concept of «disharmony of human nature» by Ilya Mechnikoff. The first sketches of this concept were expressed as early as 1871 in its final form formulated in his classic publications«The etudes of Human Nature» and «Etudes of optimism» in the early twentieth century [200, p. 8-9; 80].

- Epigenetic load. Socio-cultural innovations increase overall adaptability, but will affect the biological reaction rate and as result creates an increasing stress on the system of mental physiological homeostasis of human body. Thereby afrequency of various pathologies significantly increasing. Perhaps the increase in the number of cancer and cardiovascular disease, mental illness, etc. attests to mainstream this evolutionary form of risk. Typically, epigenetic mechanisms modified negative manifestatins of pleiotropic gene in such a way that their phenotypic expression moves beyond childbearing age or outside the parameters of the ecological environment. The socio-cultural determination of the quality of life is able to return the phenotypic expression of such genes. Thus, an epigenetic load is represented pool of adaptively neutral or beneficial genes, transforming to maladaptive elements in the genome. Any well-known diseases of civilization is the actualization of one of these two trends of evolutionary biological risk. Cultural and technological development of components made possible huge increase in the value of genetic and epigenetic load (biological evolutionary risk), the main trends of which were already outlined by composition of the hominid triad. Its biological adaptationadvanced in conflict with existing basic biological functions, and overcoming of conflict occurs within the other two componentof SESH only.
- Balance genetic load (in the broadest sense of the word). Genetic compensation of negative manifestations of other genetic adaptations not only, but system socio-cultural adaptation too is achieved at the population level. It is accompanied by decrease in the number and genetic death of somethe individuals in population (sickle cell anemia, diabetes and so on). The growing imbalance in the biological and socio-cultural adaptation as a result of different forms of evolutionary risk actualization has been seen since the 1860's. But the conceptualization of the idea of such an imbalance was carried out primarily in an ideological and philosophical or socio-humanitarian form (Nietzsche, Freud). The share of natural knowledge was negligible. Most strongly influence the actual evolutionary theory and the creation of its explanatory models of this phenomen can be traced at Ilya Mechnikov works. Translate his theorizing in the empirically verifiable constructs has become possible only in recent decades. An example is the publication has repeatedly cited herein Bernard Crespi [201].

- Socio-cultural load. The removal from the gene pool some reducing the overall adaptability genetic factors may deprive the culture module from (bio-genetic) substrate for some system-forming elements. Their preservation and replication in this case will continue to be exclusively the systemic nature of the culture of resistance and cultural tradition.
- Technology (anthropological) load. Erosion of the biological adaptations complex, which provides the basic system of biological reproduction of Homo sapiens, can be a secondary result of the accumulation of cultural load. The elements of this set now largely supported by culture and adopted previously cultivated expressions. In other words, only this formalized by culture expressions of biological adaptations now has clearly realise the anthropological aspect of human self-identification. Currently, this form is so far largely a potential, but not actual yet. Provided and supported by culture disunion of sexual and reproductive functions is some example of this kind of technology (anthropological) load. The origins of this trend go back to the Middle Ages. But now, thanks to the development of reproductive technologies it has become a system-formating factor of SESH. This kind of evolutionary riskis reflects, especially in the philosophical tradition of existentialism, and did not yield the theoretical and experimental analysis of the natural sciences.

You could say bydifferently way: «adaptation», «survival» and «humanity» are not always compatible concepts not only on an individual level, but also at the level of the whole of humankind. As a conclusion, Homo sapiens existantion as an evolutionary phenomenon cannot invariably occupy space at the top of the pyramid of values priorities. («There are things more important than life», even if life on Earth means. - It is slightly modified the statement of Ronald Reagan).

Perhaps this is the greatest paradox, and the most important source of existential evolutionary risk of technological civilization, which entered the a of technology-driven evolution (NBIC- or High Hume technologies). The emergence of rationalist components in the evolution of human leads to irrational results. The evolution of Homo sapiens, controlled by him, can actualize the final result directly enlarge the chances of humanity extinction [202, p. 512].

In the past decade, the thesis about the integration of intra-and extra-scientific factors in a single complex, defining the form and content of scientific theory, becomes the basic principle of a pragmatic methodology of scientific research and theoretical socio-and bio-politics.

Firstly, it concerns the areas of scientific and technological development, which directly create a real or mythological ability to control the evolutionary process, and, therefore, there is a source of evolutionary risk. At present, biotechnology and especially genetic engineering are examples of sich scientific areas.

It is these scientific sectors create evolutionary existential risk in all the above aspects. The most important significance of the problem of acquired genetic and environmental aspects of evolutionary risk– as the most obvious and easily diagnosed empirically factors. European risk managers are now faced with

considerable difficulties in assessing the risks of genetically modified (GM) crops on biodiversity. These problems occur primarily not due to the lack of scientific evidence (data are abundant), but rather because of the lack of clear criteria for determining what constitutes environmental damage. The establishment of criteria to determine the [evolutionary] risk is not a process of scientific knowledge, but the review process and implementation of policy requirements. Politicians and bodies of administration is necessary to define what constitutes damage, based on the current legislation. It is wrong to believe that when enough a large amount of scientific data will be collected, the choice of political purposes becomes obvious. Scientific analysis of the data in the risk assessment cannot determine the policy goals. In other words, the scientific analysis cannot answer the question «What is to be considered harmful?» Political objectives must be defined by politicians before determine the magnitude of risk. Although science can`t determine what is good or bad, science can determine whether a particular activity is good or bad, as just a «good» and what is «bad» will be determined. – This is the initial premise [203, p.82] of VERDI (Valuating environmental impacts of genetically modified crops – ecological and ethical criteria for regulatory decision-making) Research Project of the European Union to establish a science-based (objective) concept model for calculating the risk degree of genetic technologies [204].

Overall pattern of integration of S&T innovation is represented as follows. De facto social control applies only to the risks of their implementation, while the benefits and advantages remain exclusively in the spontaneous market regulation. Socio-cultural, legal and political institutions determine the general contours of risk-taking landscape and final configuration of the social organizationas a result of innovation. Politically and ethically desirable ideal vision of the future is a base for scientific and commercial sectors of society are based to developing social acceptable means of actualization of this image. Thus, the scope of competence of the rationalistic and socio-cultural components of SESH is clearly demarked and cultural-humanitarian normative domination (even more so – hegemony) over a technological «superstructure» is provided.

However, this looks quite logical and consistent scheme collapses during the transition from a static slice relationship between culture (ethics, politics) and science to the evolutionary dynamics of the same social institutions. Determination of purposes, the choice of means for achieving them, and evaluation results, firstly, in the complex occurs (interdependently from each other), but some of its components and the phases are not synchronized with each other. Because of this, the functioning of co-evolutionary ligament of sociocultural adaptation (scientific and technological innovation) describes a rather complex trajectory in time. In other words, the amount and composition of the base of empirical evidence and theoretical concepts, as well as socio-cultural landscape, influencing these parameters, drift, making a to-and-fro movement. If the effect of scientific and technological development of a socio-cultural complex is corrected, latter (correction) becomes a powerful stimulus, change the direction of future theoretical and applied research.

Reverse is possible too. Development of scientific direction can acquire too powerful inertia, and any trend towards revising the axiological priorities (what is «good» and what is «bad»') for a long time remain marginal members of the «pool of cultural innovation».

In this sense, the present quote more interest from the point of view of comparative research of evolution rates for different components of SESH. In our opinion, it is more likely indicates a sharp jump in the rate of changes of the socio-cultural (and therefore political and ethical sub-systems) components and of corresponding braking effect of the rationalist module by of socio-cultural components of SESH.

We see this process as a system adaptation, reduces the evolution risk. Until now, this mechanism provides an acceptable balance of adaptability and sustainability of our species. In this sense, the result of this project can be considered as appropriate within a relatively narrow zone of anthropogenesis near approaching evolutionary singularity. In the scheme of gene-cultural co-evolution of techno-humanitarian balance (fig.1.3), this stage corresponds to the transition operation $T_{i+1} \rightarrow C_i \rightarrow C_{i+1}$.

VERDI project was dedicated mainly technological methodology and components of risk, but its general scheme, in general, is applicable in the calculation of all forms of risk at all. In any algorithm for calculating risk is necessary to determine the possible damage that [204, p.83]:

- The resources needed to ensure the existence of human and of humankind, the availability of which may be substantially reduced or disappear;
- Changes in the limits of availability of this factor, which should be higher than the natural stochastic fluctuations and not to approach the existential threshold;
- Predicted probability and magnitude of harm.

In the coordinate system of natural science core transdisciplinary concept of evolutionary risk key resource is the adaptability of the species Homo sapiens, but in coordinate system of axiological component of the same concept of evolutionary risk such resources is the adaptive capacity of human nature, that is, antropological preservation of self-identity. And self-identity has to determine such a subjective intentional and poorly controlled by quantificational interpretation indicatoras identity category «humanity» in different generations. The main problem of evolutionary risk and is to find unambiguous connotations between the two criterions of evolutionary risk.

The criterion compliance/noncompliance the human evolution trend to certain system of values priorities (see p. 96 of this investigation) appears on one side compared to the other subjective, since it reflects perception of «human nature» by human own at this time and at the culture type. On the other side its valuation looks more labile and prone to manipulation by the carriers of marginal value systems. However, as closer analysis shows in post academic science this indicator in the strongest degree able to influence the evaluation of the remaining criteria of evolutionary risk. It determines the evolutionary landscape, decide the fate of the adaptive/maladaptive innovations. Moreover, it is the key in terms of the

calculation of integral parameters of the evolutionary risk assessment – the evolutionary correctness and evolutionary effectiveness.

3.2 Evolutionary efficiency

Evolutionary efficiency*E* is defined as the geometric mean of the relative adaptivibilityW of all the members of the evolving configuration, in our case – of the genome (g), the culture (s) and technology (st):

$$E = \sqrt[3]{W_g W_c W_{st}} \tag{3.11}$$

The latent form is the definition of this parameter contains a logical paradox. Adaptability is known to have a relative value, and is defined as the proportion of homogeneous self-replicating objects-carriers of the trait or stable complex transmitted to the next generation traits. It, therefore, lies in the range $0<W<1$. Thus, in the case of stable existence of a plurality of participating in the evolutionary process of the objects of their average adaptability must be unity. Any other result means their progressive elimination. This conclusion applies to the evolutionary efficiency: its value as a derivative of the three componentsof adaptability may not fall below the unit.

But if the deviation from the evolutionary efficiency unit of any components of evolutionary efficiency must be compensated (obviously, really compensated) by excessive quantities remain components of SESH. In other words, the virtual component values of the parameter E must exceed the unit, that contradicts the definition of W.

The solution to this paradox is as follows. Adaptability of biological module calculated for individual genes and individuals in the population, adaptability of socio-cultural a module – for individuals and social groups, and adaptability of rational module – for social groups mainly. Since at equation of the evolutionary efficiency this fact is not reflected, the value of $E \rightarrow 1$, but does not reach the latter.

The evolutionary significance of these mathematical reasoning boils down to this. Socio-cultural and techno-rationalist adaptation translate biological mal-adaptations in a hidden from the selective factors of the evolution state. But these biological mal-adaptations manifests suddenly upon reaching the border $W_g=0$. Upon reaching this point evolutionary trajectory only two versions of the same evolutionary scenario: an immediate extinction of the species Homo sapiens and technological reconstruction of its genome is equivalent to the destruction of the three-member structure of SESH. The same arguments apply to co-evolve a bunch of rationalist and socio-cultural module. In this case, the boundary condition is defined as the achievement points $W_c = 0$. At this stage of cociocultural compensations of biological maladaptations replaced by technological innovation. Given the 4-phase evolutionary history of SESH, the consequence would be the

elimination of the genetic foundation of co-evolutionary relationship between modules of SESH.

As an illustration we cite the following example. (By necessity approximate and incomplete so that is not a basis for accurate prediction or evaluation). In the literature circulated attributed to Norman Borlaug (one of the «founding fathers» of the Green Revolution) the following calculations. According to based on knowledge of the laws of classical genetics and the chromosome theory methods of selection, provide food 6 billion of human beings [205, p. 43]. Earth's population at that time was about 2-2.5 billion. The possibility of hunger in the developed world, which these technological innovations are available, exclude. Their «adaptability» is equal to one.. If you count on the potential to feed 3.5 billion more, «virtual» (uncompensated biological and socio-cultural factors) individual adaptability of the technology sector amounted to 2.4.

However, during the most successful green revolution starvation in many countries has not been excluded. Thus, the compensation effect of techno-humanitarian balance reduced the effectiveness of the evolutionary technological innovation almost 2.5-3 times.

Similarly, the development of medicine and improve the quality of life, saving the lives of people, contributes to the accumulation of genetic load.Latter k is seen as the result of imbalance in gene-cultural co-evolution. But at the same time the same difference illustrates the evolutionary riskvalue (if appropriate adaptive innovations are exhausted). Thus, to achieve evolutionary success, achieved through the elimination of at least one component of SESH, equivalent to a drop in the evolutionary efficiency to zero. In other words, biological and evolutionary aspect of this option is in relation to the evolutionary risk is $R_{gen} = 1 - E$.

Justification for this thesis connects indicator E with quality parameter − systemic (consistency) S: the presence of mutual coupling (co-evolution)

- between three (biological, cultural and technological)«mega-components»of SESH and
- between elements within each component.

The first type of systemic will be called integrative consistency second – internal consistency. Both types are provided by pleiotropy(multiplicity of manifestations) and partial overlap of functions of a set of individual adaptations.Thus, the fall of evolutionary efficiency to zero can be subject to integrity effect: one of the components induces breakdown of SESH induces breakdown of relationships between other components. The breakdown spread to co-evolutionary relationship between the individual types of adaptations. The adaptability of the some controlled by elementary adaptations parameters may continue to grow, but outside channeled effect of influence of remaining although the influence of the rest. SESH is transformed into a set of independent adaptive significance elements, and evolutionary trajectories of elements wil be completely autonomous from each other. The selective effect on each of them takes place ad

hoc (zugzwang or slippery slope). This process began, completes elimination of specific characteristics of Homo sapiens genome of.

This megatrend of anthropogenesis flow very clear and metaphorically describes by Russian publicists N.Yutanov and S.Pereslegin who consider it not only a natural and inevitable evolution of internal inconsistencies in the law reasonable species[206, p.335]: «The natural history of the Homo species leads to this kind of failure on a number(if not all) of mammals signs. [...] Human evolution – is the first example of a natural sapientation, leading to the creation of beings charactreristic by outer pregnancy, a form of organization of social life, polymorphic, capable of creating their own habitat. It seems natural to attribute such иуітпі to the new biological class – the class of reasonableness».

However, if the process of «natural sapientation» (we follow the authors' terminology) is spontaneous, it is equally objectively spontaneous and caused SESH systemic will be braking and channeled «innovative resistance» (again, we following the author's terminology) of culture. Therefore rants about the irrationality of the green movement (as well as other alarmist anti-technological social movements) seems illogical in comparison with the previous fragment [205, p.292]: «Mass actions of «green» public lost seeming hysterical character, and for their wall became visible steel political technology calculation. Concerned government and obedient parliament rubber stamp the decision aimed at protecting the environment. The lawyers defending the interests of «Wildlife» in the Supreme Courts. There is a whole industry that satisfies the requirements of environmental movement, its turnover is now billions of dollars. With those dollars, you cannot relate any real values produced. It is an administrative control over financial flows, the possibility to reallocate the money earned by others.

Negativity authors perception does not have sufficient logic-empirical justification. «Innovative resistance» of culture (or more precisely resistance to cultural innovations), which the authors describe as emotionally, there is quite understandable adaptive response of SESH, aimed at the saving of identity of Homo sapiens in his concrete material embodiment, not civilization of intelligent life, and so on. The follows from our model conclusion, of course, needs tothe theoretical and empirical verifications.

3.3 Evolutionary correctness

At the socio-cultural (humanistic) aspect evolutionary risk is initiated by the discrepancy between the most effective (E_{eff}) and optimal (E_{opt}) evolutionary scenarios (trends):

$$\frac{dR_{hum}}{dt} = \frac{d(E_{eff} - E_{opt})}{dt} \tag{3.12}$$

So, unlike the evolutionary strategies of other biological organisms it proves necessary to incorporate in the descriptive model evolution of SESH a subjective parameter. Evolutionary correctness (K) will be considered

$$K = (1 - dV/dt), \quad (3.13)$$

where V – the temporary difference between the real evolutionary scenario and the recognized best (correct) under a certain set of criteria evolutionary scenario. Its value can be determined as the sum of the parameters (f_i), based on which there is (self)identification of human(establishing an individual's affiliation to humanity («human») or failure («dehuman») from such identification). In order to translate this value into a dimensionless form it relates to the total number of factors humanization/dehumanization – *N*:

$$V = \sum (f_{human} - f_{dehuman})/N \quad (3.14).$$

Within the framework of the statistical concept of risk [207, c. 70] this difference can be expressed as a function of generation frequency (p_i) ofsome evolutionary (spontaneous or/and initiated by technological modules of SESH) innovations and their implications (d), evaluated in terms of identifying their bearers as belonging to humanity (human versus dehuman).

$$V = \sum p_i(d_{human} - d_{dehuman})/N \quad (3.15)$$

For techno-rationalistic interventions in the biological and socio-cultural modules, this value can be calculated by the difference of the validity and reliability of their scientific justification and emotional perception by«public opinion» (mentality). The first indicator corresponds to the number and content of scientific publications, the second – the number and content of (positive/negative) reviews in the media, web, opinion polls, etc.

The initial metaphysical predisposition on teleological anthropogenesis after the advent of technology-driven evolution has become quite compatible with the concept of the objective nature of the evolutionary process. Moreover, the statement of the simultaneous existence of several conjugate systems evolving generation and inheritance of adaptive traits, provided the inequality adaptatiogenesis speeds in each of them makes teleological quite «natural» one.

The mechanism of influence of each module on the evolution of the two remaining modules of SESH a priori can be ambiguous:

1. Direct selective pressure, i.e., adaptive changes in the values of individual controlled or maintained by genetically, technologically, or by training traits-innovations,;

2. Semantic co-evolution, i.e. epigenetic change in qualitative or quantitative expression of a particular trait in the course of its implementation as a result of contact with adaptive elements of other modules of SESH.

As follows from the above, biosemantic communication is understood as the presence of a certain system of rules of compliance (semantic code) between the adaptive significance of the elements belonging to different modules of SESH and reproducible using independent systems of inheritance. The value of this form of co-evolutionary interactions increases as the difference of

adaptatiogenesis rates between autonomous members of the communicative pairs. In this case, more rapidly evolving element becomes sense-factor for your partner. Therefore, the most essential are the semantics of the dual evolution of the socio-cultural and biological modules (genetic and cultural co-evolution), on the one hand, and socio-cultural and techno-rationalistic (techno-humanitarian balance) modules, on the other.

With respect to gene-cultural co-evolution examples of selective pressure that is change gene frequencies in a population to a change of a socio-cultural environment, and cited repeatedly in this study. Semantic co-evolution in this case involves epigenetic modification of the process of realization (implementation) of genetic information under the influence of socio-cultural factors (ethical imperatives, rituals, beliefs, behavioral acts, etc.). All such factors can potentially cause psychosomatic response and, over time, become self-perpetuating cycles.

In a sense, the mechanisms of interaction of genes and culture of this type are similar to the placebo effect. The latter, as we know, is the psychosomatic therapeutic action of a certain kind of acts of communication, rituals, physical operations, not directly pharmaceutical value. According to the latest, yet hypothetical constructions, the placebo effect may be due to changes in the activity of the nerve centers of the brain activation and various neurotransmitterssynthesis. Under the influence of the latter the synthesis of specific information molecules (RNA, proteins)is activated or inhibited[208].As a result, it established a functional link between the act of behavioral and physiological response, which is based on the original psychological predisposition. Introduced by the authors of the cited work the concept of «placebome», in our opinion, may be a more general description of the a special case of a general phenomenon of epigenetic transmission mechanism, and latterestablishes an adaptive interaction between biological and socio-cultural module OF SESH. It is important to note that in this way co-evolutionary connection between genes and elements of cultureformed, but also to each of them «assigned» specific adaptive value.

Thus, semantic, co-evolution captures not the frequency of specific genetic determinants, but a pattern of epigenetic variability. This pattern resulting from the establishment of evolutionary correspondences between a systemic adaptations (eg sociocultural) SESH module and the individual elements of the other modules.

If selective value of such elements and lifetime of systemic adaptations are sufficiently large semantic co-evolution transformed into informational co-evolution, and frequencies of adaptive significant individual elements fixed in the population. With respect to gene-cultural co-evolution it described for determinants of sickle cell disease after a transition to a tropical irrigated agriculture and a constant level of lactase gene in ontogenesis after the approval of dairy farming in the relatively cold climates of the European regions. Gradual

replacement induced epigenetic genetic variations culture (Baldwin effect) is a mechanism for the implementation of phenomena.

If the same selective pressure is not sufficient, and system adaptation more rapidly evolving (social and cultural) module, often in rapid succession, patterns of semantic association sociocultural and biological modules are layered on top of each other. As a result, less variability of slow (biological) module increases parallel sociocultural genesis of the structure of DNA variation ─ supported consigned cultural types, coexist with emerging as relics.

The increase of genetic variability in culturo- and technogenesis is тnext accessible empirical falsification argument of the concept of Three-modal SESH. At the same time, it must be observed in respect of both the Homo sapiens and on domesticated (drawn into the scope of sociocultural predisposition) animals and plants.

Actually, a similar phenomenon should be observed in the evolution of techno-humanitarian balance (see below).

Evolutionary correctness, in our opinion,allowsto translate into empirical verificatinatinality the semantic co-evolutionconcept. According to the ideas of the author (Steven D.Cousins) the integrity of the co-evolutionary binary oppositiongenes – culture supported by information correlations andsemantic correspondences [209, p. 160–191]. If the first (information) aspect of the co-evolutionary relationships between the two arrays, adaptive information (modules in our terminology) is provided by the correspondence between the information arrays (adaptation), supported by the biological and socio-cultural inheritance, at second (semantic) aspect, we are talking about the rules of such correspondence .

The nature of the links between different elements of the adaptive window dedelayed on the binding of the trend can be divided into two sets.

The first set of communication links arise if within the same module and the inherent adaptability of his window there is a powerful system-forming adaptation that tells the individual elements of another module high selective advantage. Hen the elements of such informational connection of different modules forms a co-adaptive self-support link.

In the second case, the communication between the modules are created inter-modular links to some system-forming adaptation. Latter is chsracterized by the high adaptability w orextremely low coefficient selection s ($w = 1-s >> 0$). In addition, the systemic adaptation correlates or functionally linked toset of elements at other module, and each of such elementhas weakly expressed adaptability.

In this case, after the disappearance of the systemic adaptation set of elements becomes adaptive neutral ones and persists or stored. Such communication can be, as opposed to first identify the semantic connotations.

Co-evolutionary semantics is interpreted as an analysis of changing of information code during human evolution. The code provide inter-modular interactions within an integrated system of SESH. It is, therefore, the evolution of

the double reciprocal connotations between the elements of the biological and socio-cultural, socio-cultural and techno-rationalmodules.

As a result of changing during evolution interactions specific pattern of substantial relations is folded. Elements of a biological module are substrate foundation for the exist pool of socio-cultural adaptation; elements of socio-cultural module are selective filter, accelerating or retarding the development of technological innovation.

By gear system adaptational module preform selective topos others ones. S.Cousins (because he concentrate the attention on culture as a set of psychological intentions and predisposition) calls it «intendant»[210].From our point of view, more appropriate and lexically neutral in different language context designation would term «operator». In any case, the content of this term is revealed through the appearing by spontaneous or rational way ideal image of the targets aggregate. Latter pre-empts further self-replicated structure of relations adaptability/maladaptive of elements at each module. This structure further indicates the direction of the evolution of SESH a whole and its separate elements in particular.

So refined three-modal model of SESH organization includes

- Three information module (bio-, culturo- and techno-rational ones), each with its own system of generating, encoding and inheritance of adaptive information;
- Three semantic operator (transmission mechanism) connecting the modules to each other, and the semantic connotations of the members of co-evolutionary bundles vary in time.

At socio-humanitarian and scientific conceptually-categorical frame of evolutionary theory meta-semantic matching categories of paradigmatic significance set, and evolutionary efficiency corresponds to the objective interests and evolutionary correctness corresponds to value priorities. Thus, two pair categories series provide the intersection of social-imperative and descriptive parts of trans-disciplinary theory matrix of anthropogenesis (due to the overlap of their content).

The configuration of the semantic code is determined by the system of values priorities and the system of rational legitimate interests. A priori as we can assume the semantic code inter-module interaction is experiencing a period of relative stability followed by periods of radical transformation and latter initiated by the reconstruction of the system of values (socio-cultural module) or objective knowledge and its practical application (techno-rationalistic module). (Semantic code is set of the correspondences between the status of individual modules. Changing of semantic code, by definition, is initiated by the module, the rate of evolution which is great.) The restructuring of semantic connotations fraught with sharp intensification of adaptive evolutionary conflicts, and increase the value of evolutionary load and the evolutionary risk. At this time a magnitude of the risk of reaching an existential level, the trends of evolutionary efficiency and evolutionary correctness are incompatible (antiparallel).

Semantic analysis, therefore, is applicable equally to all co-evolutionary cycles (operators) in SESH. Among the cycles are gene-cultural co-evolution, and techno-humanitarian balance, and only forms a techno-biological transformations cycle. The study of semantic differences between the elements of binary techno-cultural and gene-cultural ligament serves as the basis for determining the current value of the evolutionary trend and of the current evolutionary risk of Homo sapiens.

Phenomenologically changes of evolutionary correctness determined by the dynamics of humanization/dehumanization. Dehumanization defined as intuitive or rational comparison of individuals with aself-identifying itself as «humans» community. «Weakening» phenomenon of dehumanization is the perception of the members of the broader social community (out-group) as having incomplete or poorly quantified set of homuan traits (infra-humanization).

Significant importance is the following fact. The act of humanization or dehumanization is realized intuitively, unconsciously for most of humanity, and is supported by emotional reactions. We can assume that the mechanism of biosocial recognition human/nonhuman integrated into SESH, more precisely, in its biological and socio-cultural modules.

As the findings of social psychology, dehumanization is a common social phenomenon. Factors that initiates and supports dehumanization, are quite varied and may have ethnic, cultural, economic nature. One of the major factors causing infrahumanization, and in extreme cases – dehumanization is the own belonging to the social elite, i.e., to the ingroup with high social status on any criteria (power, civilization, education, welfare and so on)[211].

For our study, it is important that de(infra)humanization have a two-way process and related terms have dual content:

• On the one hand, dehumanization is determined by the existing system of criteria of humanity ingruppy.

• On the other hand, it is driven by the advent of dehumanization at the outgroup new attributes, that can be regarded by ingroup as dehumanization signs.

Thus, in the case of the complementarity of a binary system of alternative criteria of belonging to a certain multitude of reasonable beings (humankind) dehumanization becomes self-sustaining evolutionary (within each social community) process. Its result is in this case the divergence of the species into two or more taxon. A prerequisite of this scenario becomes fixing of accumulated within social groups changes. Thus in- and outgroups transformed into evolving in different directions populations. Otherwise (luck of evolution-driven technologies) balance oppositely directed to the human entity intentions and predispositions in mentality, on the contrary, stabilizes SESH structure as a whole and its sociocultural and biological module in particular.

Evolutionary correctness, thus depends on the specific criteria of «optimal» evolutionary process. This system is equivalent to the above-mentioned basic system parameters recognized irrevocable within the system of human values.

Under this system, a set of parameters of the evolutionary process is/looks as uniquely identified set. (This belief may turn out to be inadequate, but only in retrospect, post hoc). In other words, a distinctive feature of the SESH is, in particular, the presence of rational component in generation of adaptive information. Rationality implies the bundle of the ideal model of reality in the «world of things» and «world proper» This entails not only the existence of an objective criterion (evolutionary efficiency), but also axiological, can`t be reduced to a purely objective parameters of the evolutionary process (evolutionary correctness). The process of evolution is introduced, therefore, an additional parameter – free choice (within the culture) of selection criteria or criterion ofsurvival (adaptability).

In this context, the selection criteria and the criteria of adaptability are conceptual field of the humanities, and science and, therefore, are not always identical to each other. Just, if they do become equivalent (synonymous) concepts («survive at any cost»), the equation 3.13 takes the form, fit into the neo-Darwinian mathematical theory of natural selection:

$$K = (1 - dL/dt) \quad (3.16)$$

where $L = \sum_{i=1}^{t} (\hat{z} - z_{opt}^{2}) / \gamma$ – evolutionary load, defined as the difference between the average value of the adaptability of the population ($\hat{z}$) and its optimal value (z_{opt}), γisrate of adaptability distribution (associated with the responsiveness of the fitness of the population on the selective pressure parameter – the higher γ, the less adaptation changes in time under the influence of selection).

3.4. Objective and subjective components of the evolutionary risk

The theory of risky assumed the possibility of strict demarcation objective assessment and subjective perception of risk [208, p. 86]. The second methodological postulate of the theory of risk is the possibility of operational separating the content of these two categories and, accordingly, the parameters of the transfer of risk from the potential in the current form.

Unfortunately, SESH represents the most obvious subject of post-academic science: the subject and object of research form a coherent system, andits evolution is a series of direct and inverse mutual influence of objective and subjective components. The perception of evolutionary risk at a great extent affects the frequency distribution of possible evolutionary scenarios. The human-dimension of transdisciplinary scientific knowledge because of the presence of the dual (descriptive natural sciences and axiological humanitarian) structure of the central nucleus of the disciplinary matrix.

In sociology and political science this is manifested in the simultaneous existence of two parallel systems of argumentation – the objective interests and

ideal (and therefore, by definition, subjective) values. Ideal (spiritual) component (accessory sociocultural module of SESH) is equally necessary for the existence of the species Homo sapiens, as ensuring its viability (latter is affiliation of biological and techno-rationalisticmodules simultaneously). At the time, Pitirim Sorokin argued that each type of civilization based and supported by a system of values. The values complex civilization creates, develops and embody throughout the life cycle, and they becomes a cause-and-semantic unity (cited by: [212, c. 54]). Thus, the optimal level of techno-humanitarian balance and balance of gene-cultural co-evolution is achieved only when the coincidence is of both subjective and objective criteria for the evolution of risk. But it is the relationship of values and perceptions rather complicated social and psychological process whereby the subjective component of risk is not constant.

Implementation of specific evolutionary scenario, in turn, in the strongest measure affects not only the distribution of individual risk perception, but also in their composition.

Probably, evaluation and prediction of the dynamics of evolutionary risk in relation to the subject of our research, serves as an example of a boundary complexity threshold of self-organizing systems, for which the accuracy and meaning of the description are mutually complementary and mutually exclusive parameters. (The so-called principle of the incompatibility [208, p. 230]).

It makes the forecast of further evolution SESH extremely difficult, of necessity – situational short-term in this socio-cultural type, requiring offsetting of objective (mental) components of evolutionary risk in their systemic unity. The reflected in the parameter «evolutionary correctness» perception of risk is just as important as the objective value at risk (evolutionary efficiency). In other words, the presence of epistemological dual descriptive and axiological systems in explanatory model explanatory model to streamline the process of human evolution implies ontological duality. The evolutionary trajectory and the value of the evolutionary risk of culture-techno-anthropogenesis is determined not by one - objectively spontaneous parameter (adaptation, adaptive value), but by two - spontaneously descriptive (evolutionary efficiency) and creative-teleological (evolutionary correctly) ones. Combined both options cannot reduce to each other. This thesis we propose to call the principle of evolutionary complementarity.

We will try to substantiate this assertion.Size evolutionary efficiency by definition lies in the range $0 < E < 1$. The value of evolutionary correctness (by definition also) lies in the range $-1 < K < 1$. However, in the latter case to assess the risk of evolution we can restrict three characteristic values -1 (ethical unacceptability), 0 (ethical neutrality) and +1 (optimal).But in the case$K > 0$, the evolevolutinary trajectory will be defined solely by the technological feasibility only.So,the virtual value of the risk of evolution corresponding evolutionary correctness equals $R = 1- K$.

The range of values $R < 0$ means the irreversible passage of the evolutionary singularity point, and offensive posthuman era of global evolution, when the existing humanistic value system now replaced by another alternative ones.

Normally for this, a new system of values priorities as a foundation of evolutionary correctness is referred to as posthumanism. Passage of the point of singularity would mean an end to the existence of Homo sapiens in the framework of the paradigm of physical and socio-cultural anthropology,

Thus, the value of the objective component of the evolutionary risk (R_{obj}) is determinate by evolutionary efficiency, subjective component (R_{ideal}) – by parameter of evolutionary correctness, and the resultant evolutionary risk components (R_{int}) – the system of equations

$$R_{obj} = 1 – E \quad (3.17)$$

$$R_{ideal} = 1− K \quad (3.18)$$

$$R_{int} = 1 – EK, \quad (3.19)$$

where R_{int} − characteristic value of the evolutionary risk EK member corresponds to a change amount of risk parameters evolutionary interaction efficiency and accuracy.

The objective component of the evolutionary risk can be determined based on the decomposition of the components of each SESH module contribution to the overall of evolutionary efficiency. The communication between the modules are co-evolutionary in nature and are based on autonomous mechanisms of generation and transformation of adaptive data (the mechanisms of inheritance). Becouse this contribution can be divided into create own modules contribution and the arising as a result of direct effects of the other two modulescontribution. First (actually module) component owes its rise to direct the adaptation module to the ecological environment *(W_{ec})*. A second component adaptability turns neutral or maladaptive elements of this module to adaptation.

The obvious examples of this kind repeatedly referred in this paper (sicle cell anemia, lactase, RD-4, etc). Similarly, the survival of the carriers of hereditary diseases (diabetes, for example) and so-called «diseases of civilization»(myopia, flat feet) associated with epigenetic modification of the genetic determinants, andinitiated by the technological and socio-cultural features of their compensation.

Thus, adaptability of biological module can be divided into environmental (W_{ec}), cultural (W_{cult}), and techno-rationalistic (W_{tech}) components. The value of the contribution of the biological module consists of a relatively stable internality (W_{ec}), and labile «externality-induced»(W_{cult}+W_{tech}) component. With the development of technology of driven evolution the value of the stable component progressively decreases. Given ranked sequence evolution rate (technogenesis >> sociocultural genesis >> biogenesis ≥ cosmogenesis) the value of the evolutionary riskis equal

- biological module R = 1 - $W_{ec} = W_{cult} + W_{tech}$;
- social and cultural module R = 1 - $W_{ec} \approx W_{tech}$ (in modern age $dW_{bio}/dt << dW_{tech}/dt \approx dW_{cult}/dt$);
- techno-rationalistic module R = 1 - $W_{ec} \approx W_{cult.}$

As you can see, at calculation of components of an evolutionary risk clearly for biological and techno-rationalistic modules or implicitly for sociocultural

module present W_{cult}, i.e. evolutionary correctness. The latter includes as an integral part of the system of value priorities, i.e. setting magnitude in Table 3.1.

As the table shows, the existential risk is a situation where the evolutionary dynamics of the evolutionary efficiency andevolutionary correctness is antiparallel, i.e., vary in opposite directions. In this case, the intrinsic magnitude of the risk extremely rapidly crosses the boundaries of the «physical» sense (R_{int}> 1). Reaching this point means the irreversible destruction of value priorities. Its central core of are concept of humanity and human nature (see below).

It seems logical to make two clarifications. The first concerns the epistemological origins of the concept «evolutionary correctness», whose binding to the humanities, in particular, axiology and ethics, there can`t be doubted. Indeed, the thesis of overcoming the biological and genetic bases of human nature substrate formed primarily in the framework of philosophical anthropology and epistemology. At the same time, it is based on an analysis of the transformations inherent technological civilization mindset, mentality. By the end of the 20th century, the assertion of parallelism between the dominant mentality of technological civilization and, for example, system-anthropological characteristic cultural type was common.

Table 3.1 – Characteristic parameters of the evolutionary point of interaction efficiency (E), the evolutionary correctness (K) and the evolutionary risk (R_{gen}).

E	K	R_{int}	Characteristic parameter
1	2	3	4
0	-1	1	Singularity (existential risk)
	-0.5	1	
	0	1	
	0.5	1	
	+1	1	
0.5	-1	1.5	posthumanism
	-0.5	1.25	
	0	1	Singularity
	0.5	0.75	high value of the evolutionary risk
	+1	0.5	average value of the evolutionary risk
1	-1	2	posthumanism
	0	1	Singularity
	+1	0	no risk

Civilizational transformation here considered as associated with inherited from biological evolution distribution of social roles, male and female, etc. («Today, we are experiencing something very similar to the death of the modern,

Western human. Maybe near the end of «human». But the human did not have a goal. Human is something that must be overcome and complete reunion with femininity», –R.Tarnas wrote in the early 1990s [213]).

The radical transformation of the Western civilization, is linked not only to the transformation of the world, but also to the transformation of human nature in general (whatever is meant by this term). Actualized extending the «human nature»urns out as we can see, the equivalent change in the angle of socioanthropogene sisvision – from the epistemological to the ontological and anthropological ones. As a result, the narrative theory of evolution included uniquely compelling axiological reflected in the term «evolutionary correctness»elements.

The second reservation is a consequence of the first one.It is reduced to the acquisitionby an evolutionary process (since its object is a human) rational teleological (updated cyclically) orientation, realized by the technology component of SESH.

This idea also arose earlier in humanities and philosophy. Most close to the developed here concept of evolutionary risk approached Mark Coeckelbergh in his recent monograph[2, p.203-205; 214]. On notions Coeckelbergh human continuously produces rational technological tools for actualization of some evolutionary scenario, that corresponding to the dominant system of value priorities (and, simultaneously, the system-objectified interests). The purpose of this scenario is to eliminate exist evolutionary factors of risk, i.e. increase adaptability. (M. Coeckelbergh uses the term «eliminating of vulnerability».) Thus, Homo sapiens produces new maladaptations (vulnerability) – as a side effect, an inherent technological schemes used, and a cycle of Risk 1 – Removal Risk 1 – Risk 2 closes.

(M. Coeckelbergh uses a successful in our view model-metaphor for the relationship between technology, adaptation and evolutionary risk – the myth of Achilles [2, p.203-205]. The invulnerability of the hero was due to apply the magical «technology», but each such technology creates apotentially making a new vulnerability new factor, their Achilles' heel. Replacing a technology other just changes one such vulnerability to another, but absolute invulnerability (as absolute adaptability) does not exist – they always have meaning only in comparison with other).

Each phase of this cycle is initiated as a result to the prevailing value priorities. As long as they are powerful enough, the subjective determination of the objective of the process of human evolution persists. In short, the process of anthropogenesis is the artifact. The concept, however, remains outside the intent to establish a system of formalized empirically verificated risk criteria, and in the framework of a purely philosophical and anthropological interpretations. In our study, it is proposed to achieve the target and using the criterion of evolutionary correctness. It is assumed that criterion of evolutionary correctnessis proportional to the divergence between the thematic composition of scientific publications and patents and publications of mass media, because

- the first, ones to a greater extent correlated with the disciplinary matrix of knowledge of the relevant field, and
- the second ones – with the emotional andvalue perception of same scientific and technological innovation.

If both of these arguments justified the correctness of evolutionary correctness can be estimated and forecast based on a content analysis of relevant data sets. Thus, the problem of comparing the subjective and objective components of the evolutionary risk of SESH.

The situation of choosing the optimal (correct) the evolutionary scenario is a moral in nature. Therefore, the «subjective rationalization» of the evolutionary process in general, and the evolution of human as the subject of evolution,raises, of course, the chain of logical paradoxes. The paradoxes related to the heterogeneity of the system priority values.

Translation of this uncertainty of evolutionary process from the humanitarian sphere to the sphere of natural science (objectified) knowledge carried out by means of the parameter «evolutionary correctness». However, absolutely unambiguous results obtained in this way, obviously, will not succeed.Of course, the divergence between the circulating in the scientific community views and images of the mentality of the mass consciousness can be considered a trivial truth. But as in psycho-social research recently received compelling empirical evidence this discrepancy cannot be resolved as a result of simple education.

Thus, in a series of studies of Australian psychologists S.G.Wilson and N. Haslam [215, p.375;139, p. 175-190] it shows that the mentality of the modern civilization of the western type is characterized by the existence of two mutually exclusive basic predisposition or intentions regarding the prospects of improvement of the biological and socio-cultural modules of SESH.

That is the conclusion the authors come on the basis of socio-psychological analysis of the three main components of human behavior: emotional, mental and logical. In the experiment, respondents asked to assess the significance of signs, which determines the range of self-identification and the identification of other individuals as belonging to the category of «human», «humanity». As it turned out, these attributes in the minds of recipients clearly fall into two clusters. The last translated into two conceptual designs, and its central categories have the concept of «human nature» (HN) and «humanity» or «humanity» (HU).

Human nature (HN) emphasizes the understanding of the essence of human as a complex set of fundamental genetically determinate signs of Homo sapiens, partially shared with other species. These symptoms are seen as imperative innate, universal for all types of cultures and favorable (positive valued) society.

Cluster features HN respectively estimated the parameters of a positive emotional response to the possibility of extending certain signs among mankind:

(1) Positive («how desirable or positive, this feature in human beings?»);

(2) Prevalence («How common is this feature among human beings?»);

(3) Universality: («How universal is this peculiarity in human beings belonging to different cultural and social community?»).

The correlation coefficients of these parameters human nature of the respondents ranged from 0.66 (prevalence) to 0.90 (prevalence). According to the authors, this complex of mass consciousness is characterized by a holistic (systemic) and selective and mosaic technological modification will entail dehumanization, an increase of evolutionary risk. Last diagnosed for violation of the criterion of evolutionary correctness.

Dehumanization (updated evolution of risk) in such a perception and such an interpretation appears as a manifestation of the weakening of the emotional life, their replacement by rational manifestations of mental processes. The human in this model risks losing its essence, turned into a in automatic, a machine whose behavior is entirely determined by external circumstances. (Recall, we consider the structure of the images intentions of the mass consciousness, not logically consistent scientific or philosophical concept).

«Humanity» emphasizes the uniqueness of human, the occurrence of its features and attributes can`t be explained by biological evolution module of SESH, but are fixed by social heredity. Judging by the results of the same test, cluster HU positively correlated with evidence of ability to learn ($r = 0.65$, $p < 0.01$), age ($r = 0.34$, $p < 0.01$) and learning disabilities ($r = 0\ 81$, $p < 0.01$), but, strangely, not a morality ($r = -0.04$). Dehumanization (updated evolution of risk) in this perception and this interpretation appears as a weakening of the «high» emotional manifestations of life, such as love (in all its forms), conscience, patriotism, etc. Dehumanization in this model is equivalent to increase of animal origin.

Further analysis of the results of these observations in the context of our study can be carried out in two complementary aspects –

- particularly psychological aspect (process of formation and modification of identification/self-identification of individuals by their belonging to the human race), and
- globally-evolutional aspect (as elements of the techno-humanitarian balance and gene-culture co-evolution affecting the outcome of macroevolution Homo sapiens).

Socio-psychological perspective allows us to estimate not only the reliability and significance of the binary opposition intentions HN and HU as factors

- of the perception of the prospects of High Hume technologies and, consequently, the prospects of the evolutionary destiny of our species, as bearers of a certain type of evolutionary strategy, and
- humanity as a carrier of a certain system of values defined as humanism (in the philosophical sense of the word).

Within the framework of psychological concepts the component in the describe the personality diagnostic system of coordinates is the type of character [216]. D. Shapiro describes the so-called «neurotic style» emerging as a result of decompensation of adaptive capabilities (i.e. beyond the norm styles of thinking, perception and emotional response). It isways of working that are typical of

neurotic states [217].Membership of the individual to a particular type, determined by a combination of drives, passions and temperament. The repertoire of psychological defenses and specificity of flow adaptation processes, to a large extent can influence the assessment presented in the experiment of S.G.Wilson and N. Haslam signs as «animalistic» and «robot».

The highest probability of deviation from the average index in the direction of reducing the share of performance rated as robotic, can be expected in the case of the responses obsessive, compulsive and schizoid personality rated as «animal-like personality» – in the case of psychopathic and hysterical personalities. Thus, as we can assume research results can vary depending on the distribution of personality types in the sample, due to the predominance of one type or another in a population. Due to the culture of «demand» for a certain cognitive style contributes

1. to an increase in the prevalence of obsessive-compulsive disorders (for example, a clear adaptive advantage of obsessive-compulsive style at the present stage of civilization);
2. to evaluation of its obvious differential characteristics (rigid thinking, attention to detail at the expense of the perception of the whole, violation of feelings of autonomy and others.) as the advantage over less productive in achievements, but more harmonious and full of perception and experience of reality.

Act (process) the refusal of another individual in recognition of his human largely depends on the level of empathy and projective-introjective balance, and latter may change the predominance of projection or introjection, depending on the current status of the psyche.

Obviously, there are facilitate its flowexternal factors, for example, the experience of trauma. Scenario of «dehumanizing» process, in all likelihood, can`t be individualized in each case. Take into account, however, the trend towards increased narcissistic and border personality disorder, increase in the level of depression related to a breach of the maintenance of affective homeostasis. According to some experts (Rudnev, 2001), the greatest depression brings a person closer to the animalistic state, so we can assume some of the trends of dehumanization is predominant. Lack of ability to subjectivity due to the underdevelopment of identity leads to a specific violation of interpersonal relationships (another individual is perceived more as a regulator of the narcissistic homeostasis, rather than as an independent person). In combination with the characteristic depression actualization primitive senses, the reduction of the ability to semiotization and loss of the ability to experience human emotions, such state of the individual can contribute to the distortion of perception and failure to recognize the other, above all, its unique related to the cluster HU characteristics. If short-term (covering a maximum of a few decades), on necessary, socio-psychological prognosis would be justified, in the society of the Western type will be a strengthening of the braking biotechnology sector of NBIC-complex and relatively less mental resistance to various types of social-engineering «humanitarian»

(advertising, political, etc.) technological schemes for control over cognitive, social and cultural codes.

The theoretical foundation of the model is described by the concept of primary and secondary emotions [218, p.817]. In accordance with theory cluster of HN is based on the define the source of adaptive-behavioral programs primary emotions, and cluster HU – one motional complexes to ensure social adaptive programs(secondary emotions).

(Binary bundles of adaptive responses and ensure their primary emotions include [219,p. 270]: needs food and water – adoption, pleasure; reaction of rejection − disgust; eliminating obstacles meet − anger; reaction to the threat of pain − fear; ensuring reproduction, reproductive behavior − joy; reaction to loss of pleasure-producing object-mount deprivation; reaction to contact with the new (potentially dangerous) object − fear; stochastic aimed at studying the environment activity − curiosity).

The dynamics of the process of humanization/dehumanization determined by the perception of activating primary emotions and transmitted by biological inheritance traits. The secondary emotions are emotional complexes of the primary emotions as response to an emotional stimulus. They activates multiple adaptive programs, resulting in a qualitatively new adaptive response. The socio-cultural association supports the formation of secondary emotional complexes [47]. The lack of differences between the attribution of traits as a member of the corresponding cluster within the socio-cultural predisposition and within verificated disciplinary matrix is equivalent to the minimum discrepancy between the evolutionary correctness and evolutionary efficiency (1), and minimum magnitude of evolutionary risk.

Note yet another complicating factor. Overlapping spheres of various biologically and culturally replicated and related to clusters of «Humanity» and «Human Nature» adaptations leads to evolutionary conflict. Explicit mainly adaptive group predisposition face mostly hidden individual adaptation. An interesting example is the so-called «dark triad» of personality characteristics (narcissism, manipulativeness and psychopathy). In mentality, they are usually associated as dysfunctional states, i.e. (in the framework of the scheme) are definitely related to the diagnostic complex of dehumanization. However, as show the researches, they can play a positive role as factors of personal success and are a side effects of some attributes of humanity. This effect is positively correlated with the living conditions and presents the individual challenges of modern technological civilization [220;221].

Integrate reasoning of S.G.Wilson and N. Haslam in the logical and terminological scheme of SESH concept. It seems clear their adaptive evolutionary significance. The first concept (the Human Nature) (and behind it tpsychological intention) is stabilizing the biological module system adaptions, and the second concept (humanity) is stabilizing sociocultural module system adaptions. In general, they are a bunch of homeostatic opposing intentions, and stabilize the level of techno-humanitarian balance and, therefore, the organization of SESH. At

socio-humanitarian interpretation, they are a means of ensuring individual self-identity in the process of technogenesis. In other words, the adaptive significance of both concepts is maximized during the development of technology-driven evolution in its biological (genetic engineering) and sociocultural (social engineering) versions.

However, the paradox of technology of controlled evolution for improvement of the psycho-emotional, mental, and moral spheres of humankind is to transmodular nature of anthropogenesis at system (synthesis of bio-, culture-, techno-components of the process) sense of the term. The technological fix or enhance of humanity attributes makes them (bio) species and not sociocultural characteristic of Homo. In terms of social psychological attributes of humanity are transferred to the attributes of human nature.

This paradox identified Ingmar Persson and Julian Savulescu. They formulating it with transhumanist position, and used it to justify the admissibility of the moral bio-improvement of human by argument to the contrary [222].However, since it is the logical core of ideological antinomy of «human nature» versus «humanity», in fact, the paradox does not solve logical way.

The logical antinomy of human nature – humanity as a representation of the corresponding binary opposition of sociocultural pre-dispositions within the module is not unique. Besides it, there are other antinomies. Brian Terner, for example, in his classic study of the sociology of human physicality, rightly, in our view, indicates the antinomy (biologically reducible) Needs versus (cultural reducible) Desires. This antinomy stabilizes the socioeconomic evolution of modern society, acting in this context as a consumer society [223, p. 31-32].

Both sectors of technology-driven evolution are interconnected cycle with positive feedback. As a result, the advanced development of humanitarian technologies in the presence of economic stimulus will cause a secondary wave, in which biotech schemes are perceived as being more appropriate to the cultural and ethical point of view. In turn, genetic engineering «improvement» opens more opportunities and improves the efficiency of «humanitarian» technological sector.A priori overlay of socio-cultural and techno-rational cycles (bio- versus humanities technology of human design) creates a self-oscillating, minded autoresonant circuit. As a result of its functioning the probability of transition potential evolutionary risk in actual form (SESH destruction and the loss of the basis for the identity of mankind in time).

Even more striking, and therefore early example is found antinomy «Sex versus Gender». The first term corresponds biological component, and the secondmember – to socio-cultural counterpart of antinomy.

Michel Foucault argues rupture biological phenomenon and the socio-cultural analogies and subsequent autonomization of gender as follows. «The term» sex «will allow, firstly, to regroup, in accordance with some artificial unity of anatomical elements, biological functions, behavior, senses and pleasure, and

secondly, allowed this fictitious unity act as causal principle and the ubiquitous sense everywhere requiring detection of secrets. Sex, thus able to function as a unique signifier and as a universal significance» [224, c. 261-262].

Finally, we note another interesting, but so far exists only as a hypothesis fact. The results of psychological tests, constructed in the form of gaming economic behavior, suggests that in the human psyche at the same time there are two predisposition and, accordingly, the two behavioral stereotypes. First stereotype provides for the extraction of maximum personal benefit (individual adaptability), and the other stereotype– a group (group adaptability). In the latter case, the effect extends beyond one generation. How can judge the role of providing switching behavior trigger, play a decision-making– individually or in the process of communication between individuals [225].

Above (in the description of the phenomenon of «Genghis Khan haplotype»), we have already talked about this phenomenon: ability of adaptive genotype to exist beyond the life of the individual carriers, as we believe, is the indication of an association between poligenic biological and socio-cultural transmittedtraits (information fragments). In other words, such an association is an attribute of gene-cultural co-evolution at all.

Generalizing these examples we we can obtain the following chain of logical arguments and draw the conclusion. In anthropology there has been a evolutionary split of initial adaptative complex of biological module on the proper biological and socio-cultural counterparts. This co-evolutionary binary bunchperforme identical or overlapping adaptive function and represents acommon pattern of SESH evolution. The reason it can be considered the emergence of a number of parallel coding systemsfor generation and inheritance adaptively significant traits.

Since both the concept established in mentality long before the creation of the technology of controlled evolution, they have the pre-adaptive origin, and their mechanism remains unclear. Perhaps, of course, that in their totality they originally were in the internal homeostatic system of integrity of socio-cultural module, and prevente the spread of destructive innovation. We call the «destructiveness» of co-evolutionary conformity gap between cultural and biological modules of SESH. Examples of such destructiveinnovations can serve the spread of extreme versions of «mortification of the flesh», or, on the contrary, a complete denial of independence and self-worth of the spiritual life (cynicism). In this regard, we recall that the religious concept of the a carnal and a spiritualdualityof human nature – (the famous Derzhavin afolrizm «I am aKing, I am a slave, I am a worm, I am God») has a very ancient history.

The effectiveness of the optimal evolutionary scenario as a result of social choice, it is easy to notice, may not exceed the maximum possible for the type of SESH and ecological and cultural landscape, $E_{eff} \geq E_{opt}$. The total value of the evolutionary risk is defined as the sum of the biological and cultural components,

$R = R_{gen} + R_{hum}$. The third component of the adaptive strategy – technology adaptive innovation (R_{tech}) enters into this equation in a hidden form, because they are derived from the social order (social and cultural adaptation), and the latter, in turn, formed a divergence of techno-humanitarian balance through dysgenesis of genetic and cultural co-evolution. Thus, the technological evolutionaryrisk is the derivative function of its biological and socio-cultural components. The above equation assumes the risk of the value of the evolutionary final appearance

$$\mathbf{R = R_{gen}(R_{hum}) + R_{hum}\,(R_{gen}) + R_{tech}(R_{gen}\,R_{hum})} \quad (3.20)$$

SESH system integrity is defined as the systemic of each of its components, and preserving and continuity configurations direct linkages and feedbacks between these components. However, transformations flows within the socio-cultural component of SESH are the key processes here. The organization and composition of the value priorities determines the trends of the future spontaneously irrational (biological) and rationalist (technological) evolution of humankind. Formation of value priorities, by definition isinternal. It takes place within the culture, its self-reflexive as a «moral choice» priorities (its own attributes «humanity»).

Resolution of the situation of moral choice can go according to the three alternatives ofsupporting structureof following the course of anthropogenesis:

genetic (biological) reductionism (biocentrism) is preservation of the genetic constitution of Homo sapiens («the human genome there are the heritage of humanity») as a substrate of continuity of humanistic foundations of culture at evolution;

culture-centrism is direct preservation system of universal (humanistic) values provided by streamlining and technologization replication culture;

technocratic (technology) imperative (tehnotsentrizm)ispriority technologies as a means of solving all problems of existence (survival) of intelligent life.

The first two alternatives accentuate the conservative-protective (bioethical) trends of anthropogenesis thirdalternative – progressors (transhumanist) tendency leading to the inevitable disintegration SESH. Actually this scenario means the achievement existential evolutionary risk, as in this case, the elimination of the two components of risk (R_{gen} and R_{hum}) depends entirely on the technological potential (R_{tech}).

«Visualization» of the third (technology) component of evolution would mean the risk of destruction of the integrated organization of SESH, and its total reduction to technological innovation and optimizing the environment in terms of adaptation of intelligence carriers to support the effective implementation of the same tecbhnologies. (As stated in the commentary to the Russian translation of the book Forrester's «World Dynamics» [226], «post-industrial society meets only «post-industrial» human. There is no reason to believe that educate and nurture«carriers of post-industrial culture» easier than the notorious' «builders of

communism » [207, s.355]. It isobviously due to a conflict between the complex biological, cultural and rationalistic adaptations).

In this case, the equation radically simplified since only includes technology components: $R = R_{tech} = 1$. The first two components $R = R_{gen}$ (R_{hum}) and R_{hum} (R_{gen}), reflect the mutual coupling of biological and socio-cultural components of SESH and in this case cease to have an impact on each other and on the integral value of the evolutionary risk. It can be equated to zero). Thus the co-evolutionary triad of SESH ceases to exist and can be reduced to a «posthuman future» or technogenesis. The same conclusion we made on the basis of purely conceptual analysis of the role of socio-cultural component in the structural transformation of SESH earlier.

The potential for such evolutionary scenario is determined by the relative autonomy of cognitive (theoretical science) and the projective-activity (actual technology) subsystems of technology module. And tecbhnological (not theoretical science) subsystemdirectly affected by changes in lifestyle and social environment to socio-cultural component of SESH.

«The first attempt to» implementation of the transition of the organization of SESH from homeostatic relatively stable structure of the third phase of evolution to the uncompensated contour direct linkes and feedbacks of fourth phase occurred in the first half of the 20th century.However, eugenic scheme of technologizing biological human evolution did not pass the sieve of selection. This is caused not so much an innovative cultural resistance (incompatibility with e value priorities of humanistic Western culture) how low efficiency of classical genetics technologies in relation to the enhancement of human populations.

At the same time initiating impulse was, after all, the evolutionary transformation in culture and mentality, using technological schemes as a factor in the expansion of social and culturaltypes. Actualization of schemes ofevolutionary transformation of the human gene pool in Nazi Germany, but also in a number democratic countries (Scandinavia, USA, etc.), was associated with a parallel progress antagonistic political doctrine, and this doctrine was remarkably similar in some organization features («education of the new man» and Michurin genetics atformer USSR).

Insufficient balance efficiency and maladaptive effects in association with already existing socio-cultural adaptation predetermined the elimination of these two nominees for the cultural adaptation. Modern genetic therapy and genetic engineering schemes have a much greater potential efficiency, which increases their chances of integration into existing socio-cultural adaptive complex. The results of this integration will be destructive to the internal coherence of the existing system of values priorities, and will extend to the genetic component of SESH.

On the other hand, in the first half of 20th century in the social and cultural spheres were formed two competing innovations, the differences between them are not concerned itself technologizing of evolutionary process.Today the situation is different. In modern society a clear systemic innovation on priority sociocultural

normsversus technologyhas been formed. In the mental-rationalistarea this innovation was constituted as the bioethicsconcept. Bioethics actually introduced the preservation of biological substrate foundations of human existence in the number of basic human rights. This biosocial human nature has been included in the basic system of universal values of humanistic world to be the safeguard and preservation of «optimal» scenarioof future anthropogenesis mainstream. In sfere of social organization formally came relatively efficient biopolitical mechanism of actualization of these value systems. In other words, in recent decades, the final trajectory of global evolution of more corresponds to culture-centricfocused on preservation the continuity of the existing cultural traditions) rather than technocratic scenario.

The next factors of the possible destruction are the mechanism of generation of elementary adaptations and their integration into the overall system of adaptatiogenesis. For the most part, as the emergence and selection of a new «nominee» place of the mosaic type, solving evolutionarily adaptive problem ad hoc.

The integration of the individual adaptations in a unified system is realized only a posteriori – by further adjustment, selectionand differential modification of the original (usually pleiotropic) effects. As not so long ago an American psychologist, cognitive scientist and popularizer G.Markus wrote adaptive products of evolution in general and the organization of the human brain in particular represent a set of a sequence of relatively inefficient individually adaptive or technical solutions («cludge») which combine to form an extremely efficient Adaptive complex. This conclusion the author refers to the biological (genetic) adaptation[227, c.5], but in the same way it applies to the socio-cultural adaptations too.In both cases, adaptions or maladaptions formed as an attribute of the discrete pieces of information.However, it occurs only in conjunction with other similar fragments in the context of particular environments. Therefore, should not, in our opinion, a surprise given explicit roll of evolutionary-psychological ideas of G. Marcus, and, for example, the key provisions of the functional theory of culture ofB.Malinovsky [228].

This is a consequence of the internal mechanism of evolutionary process in general and of progressive evolution (increasing system complexity), in particular. Elementary adaptive transformation are formed because of the actual pool of informational fragments. The latter are formed not only by existing socio-ecological environment, but by previous evolutionary history (in the case of biogenesis – by genetic drift) too. In turn, the specific adaptive «innovations» may be based on value, ecological and developmental plasticity (the width of the reaction norm) and population variability of individual features. Finally, the point of application of specific adaptations can be either an individual or a social group. To this must be added the pleiotropic manifestations of individual structural genes, further increases due to various epigenetic modifications [229, p. 368].

In both co-evolutionary ligaments (gene-cultural co-evolution and techno-humanitarian balance) more slowly evolving binary opposition member initiates

the adaptive-innovative process in a more dynamic partner. Last either become self-sustaining cycle generation secondary, tertiary, etc. innovation within their own components SESH, or return back the evolutionary impulse. It is important to note that in this cycle conjugate acts adaptatiogenesisthere are direct links between synchronous phases partners and recursive (made some lag) feedback. Such a system has as its main attribute that can be formulated as «imperfect coordination and relative order» [102, c. 39]. Maladaptation constantly overcome by a single parameter, and generated on the other parameters.

In this way, formed gear coming out of the scope of the actual biological (genetic) adaptation to the socio-cultural and technological modules of SESH.Adaptive and non-adaptive evolutionary history of the laws of feedback outlines the boundaries of sensory and cognitive processes, behavior, and other attributes that have adaptive value in potentio, as well as their genetic variation in the future. This, in turn, opens up a new cycle of reciprocal influence on the future evolution of individual and group (social) adaptability.

So adaptatiogenesis in each case solves the problem of the local evolution – the optimization of the parameters of the evolving interaction between specific (self-organizing) system with the environment, that at this time and in this place are a priority in terms of the continued existence of the system. Themselves «problematic situations», and received the evolution of their decisions are generally autonomous and touch, stand-alone, often mutually exclusive or conflicting system parameters.

Thus, the generation and fixation of adaptive innovation, as well as their total intermediate at this time result is built as a modular fractal. The very organization of SESH is, as we have shown, an example of such a modular organization.

Clearly, the same principle applies within each element SESH. The simplest case of the generation of the evolutionary risk is the generation of binary oppositions (current)adaptation – (potential) maladaptation. Fixation in a population self-replicated information fragmentoptimizes integrated adaptability of population on one of the fitness /survivalparametersand can later become a reduces integrative adaptability for the option previously former inconsequential factor.

So, for example, occurred in the genome of primates about 3.5 million years ago point mutation resulted in the replacement of фт arginine at position 332 inpolypeptide chain protein TRIM5α on glutamin. Carriers of mutations were immune to the virus (PtERV1), that now leads to the development of leukemia in mice and is likely to represent a serious threat and then for human ancestors. Apparently, the protein functions as a trigger of resistance to one type of retro-viruses – HIV and PtERV1 only. Over time, the virus lost virulent and there is now an element of the genome of siome taxa of primates[230].Changes in the epidemiological situation and its socio-environmental «context» is now radically modified the genetic components of the evolutionary risk of SESH.

A adaptive triple fractal clusters are presented more sophisticated and capable to«progressive» (increase the amount of risk) development.

Thus, the resistance to HIV infection in primates is controlled by three groups of related genes [231, p.2870].At the level of the genome (biological adaptivemodule of SESH) arises triple modular structure.The latter includes three sets of functionally independent but overlapping in the software and information aspect genetic clusters. This clusters serving to development of intelligence, the sexual process and feeding of juvenile ageindividuals. (The latter feature is even more significant in comparison with other species of mammals due to the extremely long period of childhood and puberty. In turn, the importance of the latter factor stems from the combination of adaptive cephalization on the one hand and difficulties of reproductionin conditions of bipedalizm, on the other hand). This conflict forms one of the main gradient of evolutionary risk in biological module of SESH – increase the likelihood of developing cancer tissue degeneration versus accelerated aging and loss of regenerative capacity. («Genetic axis of evil» in the terminology of some modern evolutionists [202, p.96]).

In accordance with the described algorithm of of evolutionary risk genesis this option with respect to sociocultural adaptation module (the «cultural axis of evil», if we adopt the metaphor) is formed along the gradient of social stability versus progressionizm/expansionism, or (for «phenotypic» expression) closed society versus open society.

«Technological Axis of Evil» (if we follow the metaphor) is formed by the existing imbalance between the power of technology and the ability of society to control their consequences, (by not strong enoughtechno-humanitarian balance). However, «social control ability», in turn, is determined by the imbalance between ingdividual and group behavioral adaptability.

This imbalance is determined by the conflict of socio-cultural and genetic-biological modules of SESH. During Phase I of the SESH evolution dominated behavioral patterns formed as a biological adaptation to the survival of small social groups and low or almost absent level of technology. The main trend of behavior adaptations as a result of volume growth and steadily increasing complexity of communicative structure of social groups and technological progress was formed and provided cultural module adaptatioigenesis (phase II-III SESH evolution).

At the time N.Moiseefffound very successful in our opinion the metaphor for

- «non-compliance of attitude and genetic heritage of mammoth hunters (primarily aggression),
- inconsistencies power of modern civilization and common sense of society,
- inconsistencies infinitely growing human material needs and the planet's limited resources, and
- the lack of understanding of the responsibilities of each person for the fate of the planetary community».

He called this whole contradictory complex «Pithecanthropus genericlabels» [232, p. 62]. Modern ideas about the composition of these «labels»formulatedbyI. Person and J.Savulescu, authors of ambiguously perceived, but caused a huge surge of interest in the issue of the necessity of human evolution technologisation

book. Title of the monograph already sounds shocking «Unfit for the Future».The authors are referring to *Homo sapiens* and a list of his behavioral imaladaptations [173, p.19] surprisingly echoes the N.Moiseeff passage:

- Human increasingly motivated to achieve of adaptive success in individual competition than cooperation with other individuals;
- emotionally controlled liable for damages inversely proportional to the number of participating individuals;Rational calculation of the consequences of their actions focused in the near future and ignores the long-term results («live for today»);
- the degree of empathy and altruism extends to the immediate family members and members of the middle range of communicative related personalities, andparallel to growth of physical and communicative distance these emotions and their behavioral acts motivated weakened.

Since all of these features are adaptive only in relatively small groups and weak technological power; this idea can be considered as trivial. It is also obvious that overcoming the «generic labels Pithecanthropus» was carried out by socio-cultural module of SESH.

However, socio-cultural adaptations and regulatives own social and socio-technological developments (morality, ethics), providing a group adaptive advantage, leaned through a system of epigenetic transmission mechanisms on the same genetically predetermined behavioral stereotypes (individual or small group on the merits).

Thus, there is a «systemic axis of evil» as the main source of evolutionary risk at Phase IV of SESH evolution: individual behavior – group morality – the technological possibilities. In fact, it is the result of a genetic mismatch of cultural co-evolution and techno-humanitarian balance. The inevitability of such a discrepancy arises from the different speeds of adaptatiogenesisat biological, socio-cultural and rationalist modules of SESH.

In our previous publications [47, p.288] has argued the hypothesis that in the history of this conflict is associated with adaptive interaction in the mental life of two information systems. They acting for each other asfigurative-emotional (images) and verbal-logical (discourse) information substrates. As a result, the evolution of a mental image of a trajectory having two assemblies points. These assembliescorresponding to the dominance of religion or rationalism in the spiritual culture.

Pleiotropic effects forms awaveof adaptive evolutionary transformations in multidimensional topos of adaptatiogenesis. These transformationsapply to all components of adaptive strategy, as well as on sociocultural and ecological environment. Number of dimensions in the case of evolutionary landscape Homo sapiens proportional in first approximation only $N_{gen}N_{hum}N_{tech}$. As a result, a two-dimensional diagram of the evolution of a single innovation entirely not fit into the binary bundle moving and stabilizing selection.Vice versa, it takes the form of an extremely complicated pathon trajectory projections on a multidimensional graph of frequency distribution of a set of an innovation. In practice this means that the

adaptation of the basic staying in relation to each other in a state constantly generated and overcomed conflict.

Unlike elementary acts adapt to changes of ecological environment such Inter-adaptiveconflicts develop in co-evolutionary mechanism, and conflict outcome is inherently open and continuing significant on evolutionary masšabam time [202, p.84]. Author captures this feature anthropogenesis metaphorically, but in general, in accordance with the extensive empirical generalizations of other researchers: the human mind and brain are developing progressively on the edge of the abyss, calledschizophrenia and latter is the phenotypic expression of differential dysfunction of specific adaptation [202, p .85]. Similarly, autism is also a result of the adaptive conflict – this time of social intelligence and cognitive ability to sistematization.

Even more stable and unpredictable in its trajectory and dynamics of the conflict have to be inter-module adaptation – because of significant differences in the rate of evolution between the individual modules.

Conflicts between the elements of the generate and are generated byinter-module conflict. An example is the conflict between biological adaptation to cyclical or stochastic successive hunger and abundance of food. Such intra-biological conflicts make biological module of SESH sensitive to factors that have origin a socio-cultural, inter alia, to the economic and political contexts. As a result, the population of passing through a period of social modernization has increased genetic-metabolic risk as accumulation of excess weight in adulthood and old age, and is not sufficient for rapid weight gain during periods of childhood and adolescence. This dual risk has a unified socio-cultural determination, due to adaptive changes in the quality and lifestyle of modern society [47, p. 245].

The present stage of evolution of SESH determined by the appearance of technology-driven evolution (or more precisely, a proto-technology of this type), and these technologies capable carrying out the rationalistic management or manipulation of genetic, socio-cultural and cognitive codes. Prior to that Gordian knot of co-evolutionary oppositions (gene versus culture, culture versus technology, gene versus technology) are allowed through cultural transformation. Now «superposition» of biological, cultural and technological adaptive SESH modules may used only in a metaphorical sense. It loses some of its main attribute of conversion (superposition) of elements.

Linear extrapolation of the evolutionary risk imbalance of socio-cultural and genetic-biological SESH module reduced risk source to different rates of adaptatiogenesis at each modules, and its fenomelogical result reducedto the phenotypic expression of the so-called «diseases of civilization». Their occurrence within linear aproxymational model is considered as a permanent adaptatiogenesisincompleteness in its biological form(because significantly higher rate of sociocultural evolution). Then the speed of accumulating genetic load in a population is a measure of evolutionary risk. Within the framework of the linear model of evolutionary risk removal solution is achieved automatically by the emergence of created by genetic engineering additional feedback loops

«technology−genome». In fact, as we will try to argue in the future, thus the linear model becomes invalid, and the risk level of evolutionary approaches close to the existential level.

Moreover, this conclusion is not only concerned with a particular adaptive module, but the entire system SASN in general and can be extended to any anthropogenic ecological systems of any complexity level, including technological and noosphere. Or, as is written in a recent review of the global economy evolution in the journal «Nature»: «Today's strongly connected, global networks have produced highly interdependent systems that we do not understand and cannot control well. These systems are vulnerable to failure at all scales, posing serious threats to society, even when external shocks are absent. As the complexity and interaction strengths in our networked world increase, man-made systems can become unstable, creating uncontrollable situations even when decision-makers are well-skilled, have all data and technology at their disposal, and do their best. To make these systems manageable, a fundamental redesign is needed. A 'Global Systems Science' might create the required knowledge and paradigm shift in thinking»[233, p.51].

From the point of view of the author of the cited article, a member of the Risk Center of Swiss Federal Institute of Technology Dirk Hedling, the new configuration of the network environment of mankind is characterized by a high probability of cascade processes. Such processes have the fundamental feature that initiates a impetus is not comparable in magnitude with the magnitude and duration of the process. It is only necessary to add that from the perspective of evolutionary theory the core of this network of interconnectedtechnological, anthropological or noosphere systems are stable adaptive strategy of its «information carrier» and, at the same time, the «operator» – a human.

The discrepancy between the elementary adaptataions influences on the resulting scale of adaptive efficiency is, therefore, growth and convergence – the reduction of the evolution risk degree. In other words, the risk is an evolutionary byproduct of adaptatiogenesis. Itarises from co-evolutionary (stochastic) but not functional and causal relationships between its autonomous elements.

In such a system, the association between the individual elements of the genome, culture and technology, which have a clear tendency to spread (increase in the number of carriers and/or strengthening of expressiveness) is the arguments for the existence of these phenomena:

1. intra-genomic co-evolution (intragenomic conflicts) as a result of the stochastic mechanism of generarating of adaptive/maladaptive genetic information between the individual pleiotropic fragments in accordance with the Darwin-Weismann modus;
2. gene-cultural co-evolution, during which elementary fragments of genetic information used as a substrate base for the socio-cultural adaptation, regardless of their own biological adaptive valu;
3. inter-cultural co-evolution between the elements of culture, whose occurrence is due to the different aspects of bio-social life, or

appeared in a different ecological and cultural environment, but is retained as a result of semantic association with the supporting elements of the adaptive overall system of cultural values and mental stereotypes;

4. techno-humanitarian balance (culture-technology co-evolution), based on the spontaneously occurring associations between new technological developments and socio-cultural resources to support them;
5. conflicts between and technologies (technological traps)caused by mutually exclusive or hard-compatible technological innovations needs to the social and cultural environment, or by imbalance of the requirements of different social communities to technological developments.

All these five types of destructive co-evolution (evolutionary risk), it is easy to notice, are reduced to a conflict between adaptation to the effects of different factors, or between adaptatiogenesis trends inherent differentiated population genetic and socio-cultural structures.

Assessments integral indicators evolutionary risk for all the above components are not found in modern publications, and it is understandable, taking into account the undeveloped concept of evolutionary risk in general. However, there are some indirect data to assess the particular manifestations of the evolutionary risk in relation to the genetic (biological) component of SESH. These data are an increase in the frequencies of various molecular genetic patologies.

In accordance with the calculations of Canadian-American researcher in the field of evolutionary biology Bernard Crespi percentage of associated with structural genes of hereditary diseases or individual haplotypes with clearly diagnosed selection pressure during the last 10 thousand years of human evolution is 17-21% for neurological disorders and 15-21% for other etiology diseases. In the control group (gene pool whose positive selection during the relevant period of anthropogenesis was not observed) angalogous index fluctuated between 21-25%. As Crespi comes to the obvious, in our view, the conclusion, on no evidence of accumulation of genes inherited abnormalities during the study phase of human evolution so far been received.

However, in the same way as quoted researcher argues that among the genes that have been accumulating for the past periods of evolution of Homo sapiens, found more often than usual determinants associated with neuro-psychiatric disorders. These include schizophrenia, manic-depressive psychosis, depression, dyslexia, autism, Alzheimer and Parkinson, epilepsy [202, p. 300]. Seems is that expression of specific «human» traits involved in the development of speech, symbolic thought and social and emotional intelligence is excessive in relation to the biological norm. Many «sapiens» signs human largely overlaps with a plurality of psychotic affective symptoms.

If this conclusion is not to be reviewed in the course of further research, it is quite adequately fit into our concept of stable adaptive evolutionary strategy and

evolutionary risk. In essence, an association between genetic maladaptation and cultural adaptation should be observed more often than binary bundles of genetic and sociocultural adaptation, and this hypothesis is directly corresponds to the to our conception.

It follows in our view the conclusion of the transformation of culture in selective factor[234]by reorganizing the combination and expression of genes duringontogeny to provide novel variants for selection. Therefore, fixing or elimination of specific fragments of genetic information takes place according to their adaptability or maladaptive in the sociocultural context, and the importance of culture is much higher than Even with all the strong selective stimuli by the proper environmental evolutionary landscape. It is, in fact, gives the impression of «decay» of biological form adaptatiogenesis in human evolutiondue to too large in comparison with the biogenesis speed evolution.

However, this set of possible mechanisms of gene-culture co-evolution is not exhausted. In addition to the selective pressure on the gene pool of a man having two effects [234, p. 406], those are diagnosed and quantified with great methodological difficulties. This refers to the transformation of existing functional significance in the population (orin social group) of genetic variation in accordance with the newadaptive socio-cultural landscape. The essence of this phenomenon is determined as the evolution by the change of function.Sometimes it is call exaptation with a view to distinguishing this phenomenon and classical adaptation.

Exaptation (genetic evolutionary correctness of our terminology – Ed.) is (becomes) an adaptive significance in the genetically adaptive cultural complexonly. Potentially selective advantage given to those genetic and cultural co-adaptations, which then converted biological maladaptationto basicadaptation as part of the integrated gene-cultural complex. Phenomenologically this effect creates the impression of a direct genetic pressure on the general trendby cultural evolution and its elementary components. In other words it provide empirical material for genetic reductionist interpretations of anthropo- and ethnogenesis.

A correlation between phonetic features of the Italian and some African tribes languages and genotypic variability in the structure of the vocal apparatus respective ethnic groups serve as curious, although highly controversial example. A hypothetical explanation is the pressure of the previous population genetic differences in the general direction of a particular language phonetics [235, p. 153-154] (genetically drived co-evolutionary semantics in the «pure» – Ed.). An alternative hypothesisisthe selective pressure on the population structure of linguistics (culturally and social drived co-evolutionary semantics in the «pure» – Ed.). But last assumptionis faced with some difficulties.It seems unlikely that minor differences in pronunciation can have a marked selective value.

The third mechanism of evolutionary cultural and biological interface (obviously, humanitarian and technological as well) of SESH components linked to cultural stagnation of adaptive modular differentiation of genome. More rapid cultural and technological adaptive response to problems of survival makes redundant development of a similar adaptive evolutionary transformation within

the genomic cluster. (Although biological adaptation would have been possible to solve the same problem).

As a result, firstly, adaptive evolution of genome is replaced by stochastic processes (genetic drift) and, secondly, there is a gradual erosion of adaptive components of SESH (increase in genetic load).

So, three original type of culture and genome co-evolutionary relationship can be reduced to two types – coadaptation (Darwinian adaptation and exaptation) and disintegration. A priori the same types of convolution relations apply to a pair of culture – technology. So, as we can say, the organization of SESH always allow system growth complexity and disintegration as two alternative scenarios of future human evolution. The last scenario involves loss of individual elements of co-evolutionary triad of SESH. The ratio of the probability of actualization of both evolutionary scenarios is changing with the emergence of each particular genetic, cultural and technological innovation. The magnitude of the resulting effect for the total amount of SESH adaptability determined by the configuration and ranges from 0 to 1, and therefore requires constant monitoring.

Establishing association biological maladaptation and socio-cultural adaptation is equivalent to the establishment of co-evolutionary relationship between them. Maladaptive manifestation of the individual elements of the genome and its derivatives (proteinom, metabulom, etc.) offset associated with them elements of culture, and become elements ofculture themselves. Obviously, the next phase of development of co-evolutionary relationship becomes the integration of genetic-biological component in the overall system of socio-cultural adaptation as its biological (substrate) prerequisites.

However, the emergence of co-evolutionary ligament of cultural elements with a biologically maladaptive traits and genes can be installed without going through the first (compensatory) phase of its genesis. In this phase, the negative individual selection is replaced by positive selection at the group level. A textbook and the alreadyrepeatedly here mentionedexample is the spread of genes of sickle cell anemia and other gematopaty spread in areas of irrigated agriculture.Selective factor in this case is the spread of the pathogen and malaria vectors. The resulting adaptive efficiency is determined by the aggregate balance of the two maladaptive, but antagonistic effects of sickle cell allele on one side and adaptability of the techno-cultural balance in the rice-growing areas on the other. (Note that there is the presence of cultural and technological complex associated with the development of irrigated agriculture and the choice of rice as the main cereal was not the primary cause, but only the amplifier processes of accumulation of genetic load associated with sickle-cell anemia).

From newly discovered examples of this kind can result in fact a high concentration of increase ofprobability of excessive accumulation of cholesterol and cardiovascular disease in populations of northern Siberia genes. The transition to life in the North has been fraught with determinate culture and it is reproducible change in living conditions, in particular the reduction of the share of crop products in the diet, and the almost complete displacement by the meat diet. This

led to the replacement of the previously dominant «glucose-centric» metabolic type by «lipide-centric»metabolic type. This metabolitic type led to the accumulation in the organism of ketone bodies (the assimilation products of lipids and lipoproteins). Distribution of these mutations in the population served to neutralize harmful consequences of this process. Thisis secondary effectof the biological coadaptation to sociocultural coadaptation.

Initiation of a new set of social, cultural and techno-rationalist transformations in the 20th century led to a revival of the original lifestyle and «glucose-centric» diet and returned described mutation (CPT1A) in the category maladaptive ones [236]. There is a cycle of mutual coadaptation of three elements of SESH, and the gene-cultural conflict isinitiated and evolutionary risk is updated but is not reached the existential level.

Obviously, similarly elimination of genes of lactase deficiency in adulthood develops in European peoples populations. The inability to ferment lactose after the end of breastfeeding period in children occurs at no more than 2% of the Dutch and other Western Europeans and at 98% of Chinese and Japanese [237,c.41-43]. The inverse relationship must obviously be seen in the ability to absorb and neutralize the soy protein contained in soy saponins. Genetic differences in this case, social and cultural transformation causedby lifestyle«mutation» – to select a diet that can solve the problem of the body's protein food.

Another exampleicurrently a hypothetical evolutionary mechanism [238] of fixing and geographical distribution of genetic variants of the enzyme alcohol dehydrogenaseasa key element in the metabolism of ethanol (alcohol) in the body. Initially, this enzyme catalyzes the metabolism of terpene alcohols. Later – with the transition of hominid to terrestrial life and bipedalism, socio-cultural adaptation process has changed the direction of selection to favoring variants of structural genes, which make possible the intake of subjected to fermentationfruit [110]. Probably, initiating and stimulating factors were the reduction in the area of tropical forests and,as result,transition to terrestrial life and a new diet. The effects of alcohol is the multiple – energetic, psycho-physiological and toxicological ones. Each of the components is caused by not only ethanol but also products of its metabolism (acetaldehyde, primarily). Accordingly, in the biological module of SESH a complex set of genes for optimizing the complex processes and features has been formed.

Stress relief, facilitating communication, increased aggressiveness of inter-group conflict is not associated with participation in energy metabolism effects of alcohol on the psyche, but gradually became the dominant trend of adaptatiogenesis. On the other hand, the enzyme (alcohol dehydrogenase primarily) of metabolism, utilization, and disposal of the toxic effects of alcohol and the frequency of the corresponding genes in the population defined by socio-culturalmodule, and more specifically a set of commonly used psychotropic substances. Because of the use or disuse of alcohol and alcoholism drifted from the scope of biological module to sphere of socio-cultural moduleof SESH. This

process intensified by involvement of technological module to the production and distribution of alcohol. The result of the invention and implementation in a culture of winemaking, brewing, etc. technological schemes was, however, a change in the configuration of SESH. Because of its accessibility alcohol transformed into autocatalitic process and get closer to the borders of the «window of socio-cultural adaptability», to emergence of compensatory complex of socio-cultural adaptations, socio-cultural differentiation of societies on the «culture of drinking» basis, etc.

Another interesting example of this kind is a relatively high frequency in human populations carriersof male homosexuality trait. In modern Western society there is clearly an intention to consider homosexuality as a component of population genetic and cultural norms. In the cultural history and contemporary cultural diversity there are a number of examples of open recognition of homosexual behavior as normal and is not contrary to the moral standards (ancient Greece), and the spread of homosexuality in interpersonal relations (Victorian and post-Victorian England) de facto. This phenomenon does not occur in such a scale in other species of mammals and other animals, and all attempts to explain it, in the framework of the classical theory of natural selection were unsuccessful. Therefore, some researchers got to homosexuality the name «Darwinian paradox». Already ètont fact within the described concept SESH serves as a necessary (but not sufficient) argument to suggest that we are dealing with one of the examples of determinated by culture of gene-cultural co-evolution.

One of the last, seemingly well-grounded, though controversial, hypotheses [111] assumes the following. Initial mechanism of stabilization ata society of genetic determinants of homosexual behavior is a combination of some genetic and sociocultural factors. These factors resulting co-evolutionary interactions turned into a single co-adptaptinal complex:

• Evolutionaryformed a human bisexual mechanism for determining the sex traits complex, in which the development of the behavioral stereotypes of male or female pattern determined by the action of regulatory triggers during critical periods of ontogenesis;

• Uncompletely limited by sex action localized in autosomes genetic determinants of increased sexual attraction in women;

• rigid social stratification social structure coupled with the ability for women to achieve a rapid increase of their own social status, as well as the status of the next of kin («social elevator») by forming stable sexual-reproductive pairs with the higher social strata.

It seems to us, in the case of a complete confirmation of the hypothesis postulated mechanism of its population norm sexual and reproductive behavior is appropriate in relation to a certain stage of evolution sociogenesis options and socio-cultural typesonly. After establishing the initial population equilibrium gene frequencies it is supplemented, replaced or eliminated as the generation and development of elements of the culture and the transformation of the social and ecological environment. A priori, for example, it seems likely that the growth of

tolerance or intolerance to manifestations of homosexuality, let alone integration or exclusion included in the complex socio-cultural demographics regulators.

Features of the ancient Greek civilization as a system of city-states of with themain part of the population living in a relatively small territory, were a prerequisite for the spread of such kind of relations, and, above all, among the aristocracy. This idea is probably trivial to those, for example, who are familiar with the biographies of ancient Greek philosophers Diogenes Laertius, the classical Greek poetry, etc.

In his classic study of Werner Jaeger [239, c. 242] in the early twentieth century wrote: «The love of a men for a boy or young men was a significant historic element in the early Greek aristocratic society is inextricably linked with its moral and class ideals... Athenian poets and legislators in Athens mention or praise it as a matter of course. They have a particularly noble origin, since Solon, whose love poems to the boys mentioned among the highest good things of life». Modern researchers claim that the fundamental differences between sexual mores in ancient Greece and our society makes it difficult to compare two cultures [240, c. 20]. Thus confirms the conclusion about the spread of the phenomenon of homosexuality in a given human population as a result of socio-cultural transmitted relatively autonomously from biological mechanism of the phenomenon.

The concept of cultural constructivism sexual behavior and sexual roles, become the basis of modern Western culture. Its initial postulate becomes the assertion that sexual behavior determined (or constructed) by the culture in which human lives [241, c. 20].

At the same time, occurrence of the trait is explains by «grasping» its cultural inheritance and is adaptively significant, so to speak, «by definition». (Sexual orientation is accountable so many biological rules that homosexuality cannot be considered a purely social «construct». Everything indicates that there is a biological basis of sexual orientation [241, c. 213]).

Hellenistic culture can be traced apparent discrepancy reproductive and sexual behavior stereotypes, and it stated by historians of culture for a long time. This feature at the time did not receive further development due to natural limitations associated with the biological component of SESH. In the Middle Ages a combination of socio-economic conditions with specific demographics contributed to the binary system bundle sociocultural adaptation – Institute of monasticism and the categorical rejection of sexual behavior, not ensure the implementation of the reproductive function. According to the modern researcher, «any sexual relationship, not take to the conceiving a child, were considered as illegal and «unnatural». Gradually rejected by various forms of sexual intercourse have a general definition of «sodomy» [241, c. 41].

In modern Western (Atlantic) culture is formed by a similar to the ancient Greek ofgene-culture co-evolution trend of tolerance. This trend supported, however, by the new configuration of the techno-humanitarian balance – dichotomy of a common complex of sexual and reproductive functions into two independent components [241, c. 34].

In a sense, the reproductive technology provides the sexual revolution can be seen as the final stage of directed by culture evolution of sexual and reproductive behavioral complex. The main trend of the process turns out to be a permanent autonomy of programmable by culture behavioral stereotypes from one-to-one conformity of the genome (set of genetic determinants) and phenome (set of phenotypic traits) of Homo sapiens.

In particular, sexual and reproductive emotional complex is one of the three core elements supporting the proto-hominid culture («Hunger und Liebe regieren die Welt» ─ «Hunger and Love rule the world», Friedrich Schiller, did not mention the third element – Power). In the social and cultural transformation, it diverged to five alternative cultural models [242, c. 25-26]: platonic, sensual, integrated psycho-physical, antagonistic and also the negative «Loves». Each of them in their own design provides an association of physiological functions and adequate emotional response.

As we assume the basis of such behavioral multiplication is more complex and plastic (in comparison with genes) system of structural and functional association of individual self-replicating cultural elements (memes, culture-genes). These relationships can be built as purely conscious or unconscious emotional ones, and may have verbal and logical nature too. As a result, the cultural component without losing their evolutionary continuity with ininitial basic biological adaptation or maladaptation loses all formal similarity with it.

Trans-modular gene-cultural and cultural-technological interrelationships are carried out as a chain of overlapping co-adaptational loops of directlinks and feedbacks. This explains in our opinion the complex and therefore hardly tapped figure of such dependencies. The functional and adaptive communication between the social and behavioral acts of individual genetic factors are mediated by social and cultural context and are initiated or repressed by epigenetic signals, which serve as the social representations and cultural symbols.

Data cited above assert political preferences (rationalistic module) will probably find a correlation with the presence of certain genes (genetic module), but only with certain communicative structures (sociocultural module). In the communicative structure the holders of adaptation has been included in a certain period of ontogenesis (trans-modular epigenetic transmission mechanism) [122].

Similarly, the genetic expressionof propensity to accumulation of overweight natural way varies depending on the historical age in which «happen to»individual live [243].The expression of «risk genes», as we have said, is more pronounced in belonging to the «animal husbandry» cultural type individuals, etc.

The empirical data of presented here scientific publications in recent years, selected, recognize, relatively arbitrarily. However, these examples are confirming the original postulate of our concept. This postulate, we recall, is reduced to the existence of a special attribute unique species of hominids– three-modal stable evolutionary strategies as a discrete system integrity.

Individual modules of this system did not evolve out of adequate dependencies with the evolution of other modules. This may be dependent

dynamic and informational (changing the composition and the frequency components of the module) and communicative and semantic (change of correlative values of the individual elements of the module while maintaining its composition).

Ultimately, the interaction of genetic and cultural adaptation plays a significant role in the epidemiology and the risk profile of the differential development of pathological processes in ontogenesis [244,p.34]. That is to say, pathological and epidemiological component of evolutionary risk. It is more typical for gene-cultural co-evolution and techno-humanitarian component should go through integration into the socio-cultural module to be actualized as “diseases of civilization».

Historical infectious epidemiology represents one of the most striking and indisputable examples confirming the above elementary processes of the genesis of evolutionary risk in its system integrity. The origin of most infectious epidemics periodically ravaged human populations, and put civilization on the verge of ruin due to the Neolithic revolution.

The first global technological innovation, as we have repeatedly written, played the largest role of progressive system adaptation in techno-culture-anthropogenesis. By its nature, it can classified, as strange as it sounds, as component of modern biotechnology of NBIC-complex. Animal husbandry and plant breeding tied the evolutionary history of Homo sapiens in the Gordian knot with y an evolutionary fate of domesticated plants and animals only, but also with other species – members of the same ecological system. An additional factor for catalyze progressive complexity of the Homo sapiens adaptive system became a significant increase in the number of a social groups. It wasa necessary condition for the effectiveness of this type of technological innovation.

The direct dependence of the volume of productions of agrarian and pastoral economics from area of using earth's surface, Sun's energy and photosynthesis is a previous links in the reason chain. Changing of ecological relationships inside the man-made ecological systems are as one of the direct consequences.

First adaptive changes to the new environmental conditions have affected the genomes of organisms whose life cycles were associated with the animals involved in the process of domestication. Pathological microorganisms and other parasites joined tothe environmental contact with human whose ability to resist infection was very low. As a result, they have implemented relatively rapid evolutionary process of the transition to a new ecological niche («change owner»).

Traces of this process have preserved in the complex life cycles of parasites. The cycles involves a complicated sequence of life forms and, in parallel, changing organisms-hosts (vectors) [245;246].

In addition to this, eight of the fifteen human infectious diseases is likely to have passed to humans from animals (diphtheria, influenza, measles, mumps, whooping cough, smallpox, tuberculosis); three probably were originally agents of infectious pathologies of primates (hepatitis B) and rodents (plague, typhus), four (rubella, syphilis, tetanus, typhoid fever) have yet unknown origin. Thus, the

«constructed» by Homo sapiens 11-15 ths years ago a new ecological niche, (agro-bio-eco-system) does not completely fit into the already existing complex adaptive human.

There are a significantly increases the integrated adaptability (a significant weakening of the problem of resources supplies, primarily) in Neolitic revolution. But some of the innovational features had a side maladaptive effect. Importance of side effect at integrated evolutionary dynamics and in conjunction with the accompanying socio-cultural and biological adaptations permanently increased. These secondary maladaptive manifestation and evolution have become a source of risk in the future.

Low innate immunity Homo sapiens has led to imbalance co-evolutionary ligaments host-parasite. In other words, the stochastic fluctuations in the cycle of the Volterra-Lotka involving humans and pathological organisms acquired considerable scale in comparison with the commonly observed in nature. That is why heavy and prolonged epidemic for several millennia, have become a powerful factor in the human evolution in the broadest sense of the word – its genetics, cultural and social order. They are also in serious extent identified topos of evolutionary landscape in which formed the vectors of the historical development of the gene pool, cultural traditions and scientific and technological developments in historical time and cultural space. The result of these systemic innovation outside biological componentsof SESH was the destruction of the Volterra-Lotka cycle for most new infectious pathologies whose evolutionary strategies providing high virulence and short latency period of infection. This result would be unattainable in terms slow or insufficiently pronounced immune response in the human population. The implementation of this evolutionary scenario is achieved as a by-product of socio-cultural adaptation.

Alternative adaptive strategy pathogens of other infectious diseases (primarily tuberculosis, AIDS, and others.) Proved to be more and benefits from. These pathogens have moved to a strategy of chronic infections characterized by prolonged and less acute course of pathogenesis. As a rule, in this case they are also associated with certain elements of biological or socio-cultural component of SESH as their adverse events. AIDS, sexually transmitted diseases, tuberculosis [247] become socially conditioned «diseases of civilization» intractable without total disintegration of a complex adaptive system integrity.

Because of this technological innovation remain the most effective means to control the evolutionary risk but not complete elimination of its components. Non-excludable logical assumption has integration in the further evolution of such pathogens in the overall structure of the adaptive complex created by SESH. The hypothesis of an infectious origin, not only cancer, but also ulcers, mental pathologies, etc., at recent years, receive some empirical support, although far from a decisive confirmation or refutation [247]. In any case, however, the genesis of any disease of civilization, as well as increase their frequency, there is a completely inexplicable byproduct of SESH operation in general and macro-components (boil-, culture-, technological) and internal elements of the latter.

Certainly, the most striking example of the mass infections effect on the evolution of SESH is plague. Its importance as a factor of evolutionary risk in the history of Western civilization and a mechanism to overcome described previously [47, p.500]. Here we repeat this description in thesis form. Perhaps not by accident that the turning point for the history of Western civilization at 14th century so rich in events and processes in various areas of life of civilization, a complex of modern researchers believe that the backbone in the chain of the Middle Ages – Renaissance – Enlightenment. All of them, however, have one common feature of the – extremely powerful of emotional response.

And probably the champion in this sense, is a plague that penetrated into Europe from the Mongol-Tatar invasion across Cafu (now Feodosia) in 1346 [248;249] and then took away a quarter of Europe's population. (Her impressive description left Boccaccio in his «Decameron»). Plague has generated strong social and psychological stress, and manifestation of this stress was the expectation of the Second Coming, the Last Judgment and the related series of disasters and catastrophes. That is when the emotional intensity of social reaction has gained the most extreme, is clearly beyond the socio-adaptive response, and therefore destructive manifestations. In the 13th century a sect of flagellants appears, and in parallel with strengthening the epidemic becomes massive social movement. The number of individual groups migrating to Europe, reached 100 people, and despite the opposition of the spiritual (including the Pope) and the secular authorities, the sect was quite large and viable for at least several decades. Speeches penitents and begging for salvation often acquired the character of a mass psychosis that emerged in the form of local centers of convulsive dancing and then cover the whole crowd (so-called Chorea). Powerlessness in the face of death, not only the secular authorities, but also of the Church, together with the subsequent emotional depression, served, according to historians, one of the causes of perceived at the time of sunset Middle Ages and the transition to the Renaissance, and then to the New Time. To new social order mental attitude hegemony Mind over blind Faithwas characteristic[250;251].

Therefore, the plague, along with other socio-ecological factors of the late Middle Ages, caused a number of adaptive changes in all components of SESH – biological (change in frequency of blood groups A and B having immune importance), socio-cultural and technological modules. This evolutionary transformation of socio-cultural and technological-rationalist components of adaptatiogenesis led to a single evolutionary risk reduce of infectious disease pandemics.

However, more important, they became significantly epochal system-forming innovation raise the value of the integral adaptability of humankind. The evolutionary potential of this adaptation (commonly referred to as technological civilization) has not been exhausted and still

The configuration of the first (gene-cultural) co-evolve ligament serves as a criterion for fixation/elimination of specific configurations of techno-humanitarian

balance and its components. The growth of gene-cultural component of the evolutionary risk of technological civilization is a synergetic mental aspect of the same civilization. The contents of this installation in its weaker form is reduced to the priority level of «freedom» of choice by the individual specific social role of exist repertoire as a criterion of social and human progress [47, C.337]. That is, obviously, can be interpreted as going back to the Fourier feminist thesis about overcoming biological determination of gender roles of men and women in public life as a measure of women's emancipation [252, p. 11].

This trend is evident in the interpretation and conceptualized intensively accumulated by the physical and cultural anthropology data (themselves rather ambiguous) about the evolutionary relationships of biological (Sex) and social (Gender) components of human self-identities.

In most publications clearly traced the following argument: if the distribution of roles between the various sex determinated earlier by genetic inheritance, then this causally link was overcome. Typically the name of one of the recently articles is «Stepping Out of the Caveman's Shadow: Nations' Gender Gap Predicts Degree of Sex Differentiation in Mate Preferences» [253]. On the basis of its own investigations the authors argue that the statistical distribution of gender roles correlates primarily with the statistical distribution of the economic status of male and female, and not with the generated during early stages of anthropogenesis distribution of social roles between the sexes within a social group of hominids.

As part of the three-modal model SESH these data suggest only that currently adaptive window of biological and socio-cultural modules for this indicator overlap sufficiently to prevent an irreversible gap between Sex and Gender. Because, the resulting statistical distribution of social roles determined by more dynamic system (sociocultural module). This situation can change dramatically as we approach the window border socio-cultural adaptability. Its limits set by the boundaries of the same biological window. In the latter case, the trend of the evolutionary changes of techno-rationalist module will obviously be reoriented to the two remaining modules correction. The most effective technology currently looks correction structure is a biological modules. Such outcome is more likely also because it is adequate to the above-described embodiment predisposition of Western technological civilization.

Association of evolutionary-biological and cultural-civilizational aspects of human existence becomes even more obvious when you consider the inherent English original use of the word «man», has two meanings: «man» and «men»

The stronger wording this thesis is formulated as the original intention of the rationalist and socio-cultural component of SESH to overcome their dependence on the biological component and bodily organization. Mental ideal modern becomes the thesis: human corporeality and, in general, an individual's biological

organization are a socio-cultural rather than a biological construct. From social and biological anthropology (Michel Foucault, M.Duglas) this postulate very quickly migrated to empirical sociology (K.Shilling), and then embodied in the social order for development of providing technological schemes.

From this perspective it becomes clear an unusually wide range of emotional motivation to modification of the own corporeality. This predisposition widespread in all socio-cultural types, seemingly, outside the direct connection with the adaptability [254]. Indeed, this is an adaptation of the system of not direct action, which provides the ability to overcome the inhibitory effect of biological (slower) components in SESH adaptatiogenesis. «The victory of spirit over the body» is the guarantee of a high adaptive individual plasticity, group adaptability, but also a higher level of evolutionary risk too.

For sustainable development are provided to balance this predisposition by other evolutionary trend with opposite expression.

Done the above output can be interpreted within the described concept also thus: the nonlinear interaction of two links of SESH co-evolutionary ligaments determines the spectrum found in this ethno-genetical and ecological and cultural context of normal and pathological phenotypes and therefore, a pool socially demanded technological developments to their normalization.

This notion of «norm» is also a function of not only somatic genetic basis of human existence, but also differentiated socio-cultural life, in which somatic human corporeality «fits». An indirect confirmation of the leading role of an imbalance of gene-cultural co-evolution as the main source of evolutionary risk, at least until modern phase of SESH evolution is follows fact. Most of the genes, referred to as a source of intra-genomic conflict and «paradoxical» trend selection during the last phase of anthropogenesis one way or another associated specifically with neurophysiologic pathologies.

Contemporary sociology of human biological corporeality concluded that in the framework of Cartesian rationalism is impossible. As Chris Schiller, one of the founders of this research sphere, declared, now we have the means to unprecedented control organs of human body, but we also live in an era that forced us to radically doubt in our knowledge about what constitutes our physicality and exactly how we should control it. There is a decline of the religious shackles, which are built on a stable ontological and existential certainty having its source outside the person, and the transformation of our somatic organization in the central element of the mass consumer culture as a symbolic value was happened.

As result, a modern human led to increasingly give bodily organization value as only foundation of self-expression. Because elimination or weakening at Western culture of religion as a factor of evolutional, trans-individual and trans-personal semantic stabilization only your own body is material basis of own

individual (not a group, much less universal) self-realization [255, p. 3]. «My body is my affair», the slogan goes far beyond the scope of the feminist movement, and is the nominee for the title of the main brand High Hume technologies age [47].

Very relief typical for the West (Atlantic) version of technological civilization predisposition of «self-identification liberation» from biological basis diktat is expressed in a newspaper quote: «... Jenner says that she is a woman, then so it is. This is the only the logical conclusion that can make a tolerant and civilized society. However, racial dysphoria exists solely in the brain. There are good and reasonable argument: men feel like a woman, «women» who feel men and ever-increasing army of doubters – all this for me is quite acceptable, and there are no problemsIf. It is clear that sexual identity – is something more than having a penis or vagina. Who can deny the existence of the hidden feelings of people? We can`t bring to life Jenner, except medical devices that would smooth her gender transition»[1].

Note several circumstances. The separation of sexual and gender identity on the one hand and ethnicity and race, on the other hand, seems unjustified and avoidable in the subsequent course of the techno-culture-anthropogenesis. In the end, the conversion of any type of personal identity in the subject of individual choice, determined exclusively by plasticity of biological module in the variable context of the culture and manipulative possibilities of technological module with respect to the attributes of identity.

In this sense, racial and ethnic identification are for the individual much less of a problem than with the sex-gender counterpart. There are a mass of empirical evidence in the history of any ethnic group (in Russian - these are Ethiopian roots of Pushkin, Lermontov Scottish ancestry, ethnic roots Mendeleev, Vernadsky, Mechnikov, Tolstoy family clan and other representatives of culture of the Russian ethnos).

And indeed the above quotation is taken from the reports of a white woman (Rachel Dolezal), which for many years posed as the representative of African Americans and served in Washington as president of the regional branch of the oldest and most prestigious human rights organization – the National Association for the Advancement of Colored People[2].

Similar examples of full integration into social commonality other race are plentiful and served as the basis for the storyline of classic literary storiesof Mark Twain, Sinclair Lewis and and others. In contrast to the gender of sexual orientation, such transformation can be achieved within the framework of socio-cultural module of SESH, technological innovation affect only race determinants which only reinforce this process of ethnic (self) identification of persons. The adaptive value of biological ethnic (racial) determinants is caused by the dominant

[1] http://www.independent.co.uk/voices/comment/man-becomes-woman-and-white-becomes-black-in-this-age-of-transition-10321779.htm

[2] http://inosmi.ru/world/20150619/228677116.html#ixzz3dVmCUGrp

evolutionary semantic of social group. The semantics system allows to group identity by comparing the communicative relationship between individual biological characteristics – race determinants (epicanthus of Mongoloids and dark skin of Negroids, blue eyes and blonde hair of Europeans etc.) and sociocultural qualifiers (belonging to «own» or «foreign» race).

The evolutionary significance of genetic and cultural connotations of signs (evolutionary semantics) details discussed below. Obviously, in the Western mentality value of actually biological traits in «diagnosticum» of a race over the course of several centuries' decreased social and value of cultural qualifiers grew. Top position in the ranking of such attributes «outsiders», eventually took the presence of the representatives of the respective race in the genealogy. As a result, along with the older predispositions of objective criteria of race (this judgment is generally the same as the paradigm of physical anthropology), arose as the antithesis predisposition of the «unnatural», socio-cultural character of racial identification (a key point in the sociological paradigm, the concept of race).

This consideration and allows us to interpret the difference between an arbitrary gender and racial objectivity (self-) identification. Paradoxically, it is the fact that the rank of the biological determinants of gender have not yet overcome, makes emphasis on cultural and psychological components of gender (self-) identification. In accordance with predispositions of the socio-cultural origin racial identity genetic determinants play no role in the formation of cultural elements of the module; but according to predispositions of objective existence of racial differences, racial identity is objective cultural and social phenomenon. Racial identity is usually regarded (in the modern Western mentality) as having social and ethical values. Therefore, the socio-cultural motivation to change «racial profiling» seems meaningless in terms of personal social status. Resolution of the conflict between biological and socio-cultural components of racial differentiation in Western culture s seen in the Western mentality as solvable solely by means of socio-cultural module of SESH.

This is not true of gender identities related to satisfaction of basic needs. The conflict between the biological and socio-cultural components as well as between individual elements of biological adaptive complex are essential to the social situation and the individual psycho-physiological comfort. There is a social demand for techno-rationalistic (mainly biomedical and reproductive) innovation, that provide bridging co-evolutionary conflict. Personal self-determination becomes extremely significant for lifestyle, social status, membership in a social group and hat provide bridging co-evolutionary conflict. Personal self-determination becomes extremely significant for lifestyle, position in society, membership in a social group, sub-cultural type («one of us!»), etc.

We go back to the original thesis: at the absence of socio-cultural norms and constraints the conversion of a carriers of Western (Atlantic, technological) type of civilization ina products of the self-construction and self-manipulation limited by composition and capacity of the techno-rationalist module of SESH extremely.

These delimiters themselves allow sharp stochastic or deliberate deviations, as we shall see.

As is easy to understand the objective significance of the fifth criterion of evolutionary risk (value priorities) records are not subject to review without destroying the identity of the previous result bio-sociological stages of socio-cultural evolution. In other words, the set of optimal scenarios subsequent evolution retains existential meaning of notorious, commonplace but necessary in terms of Homo sapiens being system of universal human values. Its existence puts limits just described conflicts between supra-individual group adaptations and channels the group selection at a genetic and socio-cultural level.

4. EPISTEMOLOGICAL AND EVOLUTIONARY ADAPTIVE ASPECTS OF POST-ACADEMIC SCIENCE

Adaptive response of SESH aims to restore the optimum techno-cultural (the techno-humanitarian in another terminology) balance. This balance has developed in technological civilization and based on rigid autonomy of actually scientific research. «Science» seen by us as a key element of techno-rationalist module of SESH. Today it perceived as excessively dangerous component of SESH. As part of the concept SESH the very evolution of scientific rationality from classical to non-classical, and later – to post-academician (human-dimensional, post-non-classical) forms is the result of a homeostatic mechanism to ensure co-evolutionary integrity of SESH. In other words, the genesis and evolution of bioethics, and the organization of co-evolutionary science is a sociocultural evolutionary adaptation to the new landscape of socio-culture-anthropogenesis. By the systemic socio-cultural adaptations technological innovation rates can return to available to sociocultural control magnitude.

Previous sociocultural transmutation of Western mentality, made the principle of the autonomy of social scientific knowledge supporting rods of technological civilization. Bioethics is one of the core structures of the new mentality, because of this civilization is in a phase of society of globally-evolutionary (existential) risk. This conclusion may seem paradoxical from the standpoint of classical epistemology, where the main evaluation criteria in relation to the scientific concept performs its empirical verifiability and freedom from mandatory assessment and judgment. But under the new version of evolutionary epistemology, where they took the adaptability (survival rates of self-organizing system), it is quite correct. (Above we had the process name «adaptive inversion 3» and highlighted its recursive nature).

At binary conjunction of co-evolving cultural elements Bioethics-Transhumanism the first element (Bioethics) It has a protective- stabilizing function in the evolution fast was constituted as a typical example of the new – post-academician organization of scientific research and its product – a scientific theory [256;257].

Features of the new organization of scientific theory can convey a very capacious category – transdisciplinarity [258;259]. The Bioethics (as in other scientific concepts related to the so-called interpretive scientific knowledge) explanatory model has not one but two (science and socio-humanitarian systems of only partially compatible with one another initial postulates and principles. The relationship between them carried out through application-projective exits of theoretical concepts. Accordingly, the «disciplinary matrix» of bioethics has two central core and overlapping zone of projective-applied developments, the latter is theoretically possible to empirically verified (falsified). The general scheme of such a paradigm is as follows (fig. 4.1). As you can see, represented scheme

combines the individual elements of the paradigm concept of T.Kuhn [260] research program of I.Lakatos [261]and the network organization of theoretical science of L.Laudan [262]. The empirical basis for this (dual-core) model of paradigm structure of post-academic science can serve not only a variety of case-study on the sociology of sometheoretic concepts. Equal value is a direct analysis of the logical structure of the same theoretical concepts.

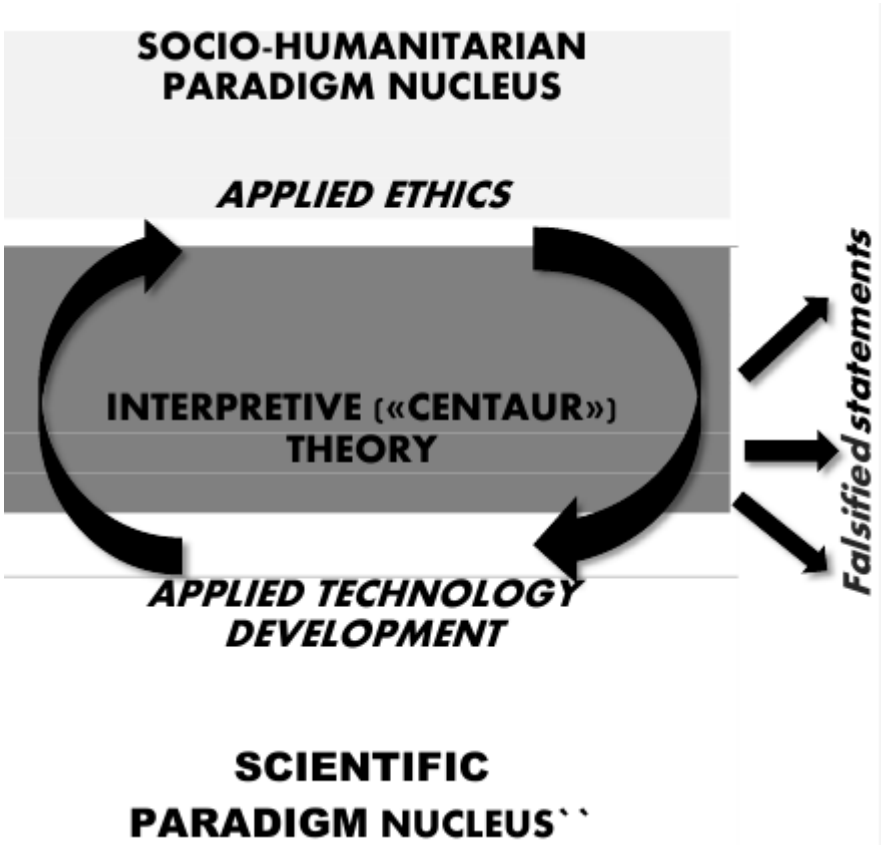


Fig. 4.1 Block diagram of the disciplinary matrix of bioethics and other interpretive («Centaur») theories of post-academic science

For example, Donald Meyer in his fundamental monograph devoted to the logical analysis of the concept of «biodiversity» (key in today's socio-ecological and biopolitical constructions) states that the objective component of the argument inevitably contains logical and empirical contradictions. We apologize for a long, but very interesting and indicative to clarify the current state of evolution of techno-humanitarian balance quotation[263, p. 3]:«When it comes to biodiversity and the range of arguments that defend and build on its alleged value, it is hard to avoid the impression of culturally conditioned, uncritical acceptance and unhealthy disciplinary inbreeding. Circularity, confusions, missing premises, normative biases, and doubtful empirical claims go unnoted and uncorrected. Worse, these failures of reasoning are often repeated – error for error, detail for detail – by one party after another. It is as if there is a tacit agreement among colleagues not to rock the boat of bad reasoning – perhaps out of fear that there is no other way to

defend nature and its value. Confirmation bias – the human tendency to actively seek and interpret information in a way that confirms closely held beliefs and the corresponding tendency to ignore or underweight disconfirming information».

We fully associate ourselves with the unequivocal conclusion: normative assessment of the absolute priority of biodiversity conservation precedes rather than follows from the scientific and theoretical arguments. In other words, the need to preserve biodiversity stems not from the laws of nature, and from the moral choices made by human, determined the dominant system of value priorities, and not the objective interests. Assessment criterion for biodiversity is evolutionary correctness and not evolutionary efficiency. Initially and unavoidable concepts of post-academician science are ideologically, ethically and politically engaged.

(In fairness, it should be noted that the same conclusion come and others have a few more decades before. So, for example, the Russian ecologist wrote: «The investigation undertaken by the author showed that the rampant growth of the number of publications that use (I want to say – exploiting) the term «biodiversity» is not related to any breakthrough in the field of ecology ... Undoubtedly only that it is not a science, and politics» [264, p.20]).

The manifestations of sociologization and ideologization (in a broad sense) of science in modern society of risk comes from these considerations too:

- Ideologization (management of research priorities), the direct and often decisive participation of political and business structures in the initiation of research projects;
- The commercialization of research, acquisition of scientific concepts attributes of market goods and
- The politicization (reporting) of science, a significant control by extra-scientific social structures and institutions of all aspects of the course and the results of all the research stage (topics, concepts, methodology). It is directly and openly (de jure), but not indirectly and implicitly (de facto) too;
- Separation of a single process of scientific knowledge on the two autonomous in their social functions of flow – a riskogenic (dangerous) science (transformation of the world respectively to the ideal image of the desired future) and warns the science (detection and calculation of risks posed by scientific and technological developments, in other words, by riskogenic science).

The meaning of the last factor is even greater that it acts as an agent that catalyzes and directs the course of the previous three ones, which themselves look very alien to the classical conception of science of 18-19 centuries.

5. EVOLUTIONARY SEMANTICS OF TECHNO-HUMANITARIAN BALANCE AND DEVELOPMENTAL RISKS (CONTENT ANALYSIS OF WEB RESOURCES)

Conceptual model of the post-academic science as a binary bundles dangerous and warning knowledge developed earlier [265].

The factor triggering the transformation of socio-cultural component of the adaptive strategy in the direction of the origin and formation of ligaments between «risky (riskogenic) science» and «warning science» evolutionary achievement was the risk of scientific and technological development of the existential level, in particular, the emergence of High Hume processing facility (other names – technology-driven evolution, NBIC, -OMICS, etc.). Its distinguishing feature is the development of effective processes for control or manipulation, and the ability to create unauthorized random genetic change, socio-cultural and cognitive codes Homo sapiens. With regard to bioethics – transhumanism ligament role-played by individual factors of existential risk from the use of the same technological complex.

The relationship between the two components of scientific knowledge form an asymmetric (uncompensated) circuit with positive and negative feedback (fig. 5.1) [47, c.179]. Increment of «dangerous knowledge» is necessary for the development of «warning knowledge» but the latter itself cannot exist because the actual material for scientific progress in this area delivers its partner. «Dangerous knowledge» stands as auto catalyst own progress, and a catalyst, «warning of knowledge». Last inhibiting the ongoing development of «dangerous knowledge» deprives itself of its own base for the increment. Overcapacity of «dangerous knowledge» facing the crisis, and then the self-destruction of industrial civilization, excessive development of «warning of knowledge» – will lead to a stagnation of industrial civilization, deprives it of adaptive plasticity.

Essential to establish parity between the two trends of post-akademician science and the formation of a temporary evolutionary trend of technological civilization in the future has a so-called Knobe effect (Side-Effect Effect). According to Knobe the emotional perception and rational assessment of potential negative adverse consequences of any innovation has in mind higher status compared with positive consequences for the same innovation [266;267]. As a result, the initial social assessment of any technological innovation tends to overstate the level of risk from its implementation, especially if innovation is related to the substantiality or the self-identity of the human being. Obviously, this phenomenon is the mechanism for future shock [268] and future-phobia [269], but on the other hand, it is included manipulation n the factors providing relative stability of SESH.

In such a system speak of a standard adopted in classical science procedure of verification/falsification of the scientific concept of authenticity is not possible. Her place is taken by more or less pronounced social verification.

In theory, the social and psychological mechanisms of Elliot Aronson consciousness manipulation postulated the existence of two alternative socio-psychological mechanisms of perception, processing new information and making a decision – verbal-logical and associative-emotional [88, p. 384]. The first mechanism involves a relatively lengthy analysis and the creation of an explanatory model, the second mechanism is the search for emotional association with pre-existing thought stereotypes. As recent empirical studies [270, p. 385]suggest, risk perceptions of nanotechnologies and other innovations (which in the present work are classified High Hume) really depend from(1) the logical relationships between innovation and developing the social consequences of their implementation, but also (2) the emergence of various kinds of psychological associations between different concepts.

Based on these facts, we have assumed that the socio-cultural landscape of evolution of rational-technological component SESH including the direction and strength of its reverse effect on the biological and socio-cultural components, and is determined, above all, by emotional reactions of mentality. Only secondarily, this effect is determined by the by the direct result of rational study of the social consequences of technological innovation. In other words, modern (IVth) phase of SESH evolution characterized by a balance of internal (rational-deterministic), external (social and psychological) technogenesis factors, and science development. The task of forecasting the evolutionary trends of socio-anthropogenesisis to ascertain concrete value of this balance with respect to the most risk-taking technology.

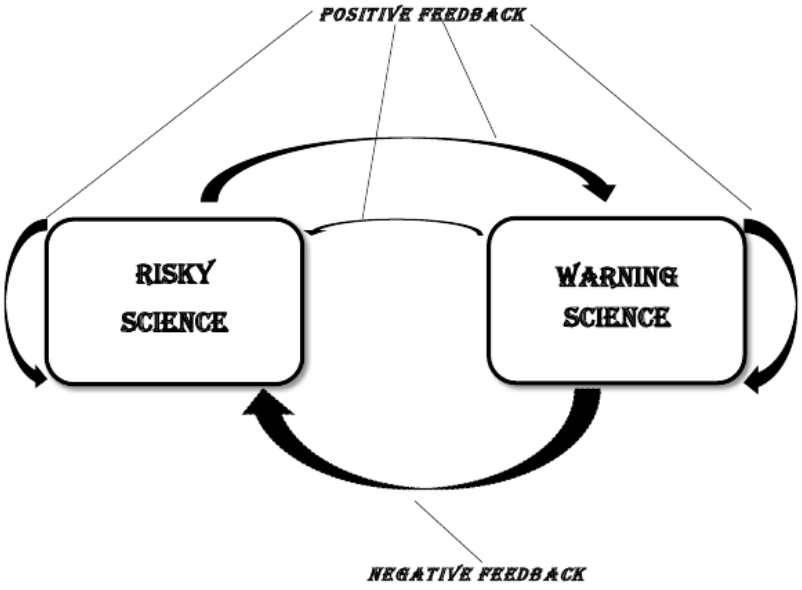


Fig. 5.1 Functional divergence risky (dangerous) and warning sciencies

The second thesis lies in the possibility of determining the balance of the rational-technological and socio-cultural factors based on comparative content analysis of scientific research and mass-media communications. In other words, we assume the following initial postulates and principles:

1. There is an expression correlates between mental emotionally colored images and verbal lexical items related to the impact of technology-driven evolution;
2. The impact of this paradigm of conceptual fields (research program) to another research program and the impact of socio-cultural discourse on the evolution of scientific theory in this model is determined by the frequency of joint use (semantic associations) in the communications of key elements of the conceptual and terminological apparatus of the two different concepts;
3. The higher semantic association, the more pronounced in the mind of the individual and the social group the association between the values of the two concepts (lexical units).

First of all, we were interested in semantic association terms (keywords) of somehow related to the evolutionary paradigm lexical constructs, among themselves and with the various aspects of its application usage. The development of these fields of study and disciplines takes place in a social context and a certain evolutionary landscape. The exact path of this development is determined by a balance of perceptions of the potential benefits, risks and the possibility of monitoring and control in society. The key elements of such a balance is, we assume the parameters of the frequency distribution of the terms «biological risk», «bio-security» and «biological safeguard» in associations with specific scientific developments and theoretical concepts.

In accordance with the original working hypothesis the structure and value of semantic associations of basic constructs of individual concepts of post-academician science is constructed as a network of nodes that connect specific pairs of lexical items – concepts relevant to theoretical constructs. This system reflects the structure of the scientific paradigm. Thus, the concepts of «risk» and «safety» are transdisciplinary, and contain elements of both natural scientific (nominative) and socio-humanitarian (imperative and axiological) knowledge. As a result, the matrix of semantic association can be considered as a kind of meta-construction of ower-paradigmal level of association.

Let's call this structure integrity maintained logical relationships and semantic associations elements of biological and humanitarian discipline-technological complex (BHDTK or BHDT-complex).Its distinguishing feature is a general natural-scientific paradigmatic core goes back to the theory of biological evolution (1) and similar technological applications (2). The subject of the latter serves the control and management of biological and mainly socio-humanitarian and socio-economic component of anthropogenesis. The complex consists of bioethics, biopolitics, bioeconomics and other transdisciplinary research areas. Their emergence has occurred in recent decades (from 1970). The number of publications in scientific journals and mass–media, can calculate their presence in the comparative research.

5.1 Basic settings, features, and limitations of theoretical model

Accordingly, the primary technique used for searching, collecting and interpreting data is content analysis, including using Internet sources [271;272].The number of semantic units are defined by the conjunctions formula N = «I» AND «J». Measure of the interconnectedness of the various areas of dangerous and warning sciencies can serve factor semantic association. It calculated by the formula $F_{ij}=N_{ij}/N_j$, where N_j - population number of publications containing semantic unit «i»; N_{ij}- populations containing semantic units «i» and «j» simultaneously. Thus, the value of F is not commutative ($F_{ij} \neq F_{ji}$) [47, p.215].

The level ofsocio-political pressure is determined by the dynamics and static differences between the corresponding representations (for example, «the risk of» versus «profit») in scientific publications and in the media on specific conceptual or research areas. Similarly, criss-cross correlative influence of risky and warning science defined as the presence of lexical units (concepts) of «risk», «safety», «security» in the pools (populations) of publications in the field. A comparison of individual values F_{ij} in populations of reports in the local segment of the Internet, operated by the scientific community, or groups of experts in the conceptual fields and in the global network as a whole was carried out too. By this way, it will determine the possible coincidence or divergence of theoretical constructs, circulating within the scientific community, and expectations of mass consciousness.

The coefficient of association is formed by two components – the logical deducibility (the availability of the deductive or inductive links between the concepts) and the actual semantic association, based on a holistic intuitive and emotional assessment. The first component is dominant in the theoretical constructs of science, the second one – in the stereotypes of culture and mentality. Accordingly, the first (logical) component is detected during the standard procedure of verification/falsification of scientific concept, the second (emotional) component is implemented in the course of social verification amounting to integration/exclusion of mass consciousness.

A magnitude of $\Delta F_{ij}= F_{ij1}-F_{ij2}$ is recorded, where F_{ij1} and F_{ij2} – population ratios semantic association of scientific publications and a global search (in our study – Google), respectively. So, positive values ΔF_{ij} correspond to higher association of terms in the communications world network, and according to the original working hypothesis reflect the general characteristics of the mentality of modern societycompared with scientific publications. Negative values ΔF_{ij} reflect the increased interest to the pairs of terms in the scientific community, compared with expectations of mass consciousness (public opinion), andit is reflected in the composition of the relevant messages circulating on the Internet. Mismatch associationcriterion

$$\Delta F_{ma}= (F_{ij1}-F_{ij2})/F_{ij1} \quad (3.21)$$

more sharply reveals the greatest possible external influence, which can provide a social and cultural context for the development of this concept.

Negative values for this indicator ΔF_{ma} in pool publications show incentives for growth of association coefficient by second alternative pool and a deceleration of association coefficient growth in the second alternative pool by first member of the comparison ligament. Thus, the value ΔF_{ma} = -4.919 for a lexical unit «talking»in a common pool of publications for cluster «human nature» corresponds to the similar parameters ΔF_{ma} = +0.831 for pool of scientific publications on this lexical unit. Thus, we can talk about encouraging by scientific research of association «talking» and «human nature» in the mass consciousness and braking similar associations in topics of research pressure from the general cultural predisposition. The smaller the absolute value of ΔF_{ma}, the less external pressure experiencing the development of appropriate population (pool) online publications and accordingly mental structure, a reflection of that it is.

Meta-description of these data leads us to the conclusion that the decline in the absolute value ΔF_{ma} diagnoses the decrease of conceptual overlap for imperatively-axiological and descriptive-epistemic (scientific) discourses. The latter is also a basic attribute of the classical scientific rationality (the «principle of ethical neutrality of scientific knowledge») and classical (industrial) phase of industrial civilization, that based on the Kantian-Hume methodological dichotomy «world must» (ethics), and the «world of things» (knowledge) [273].

A resolution of the method is limited by «contextualization» of search of keywords resulting from the features of the software related sites. A priory the effect of «contextualization» becoming a significant with the values of the association index approaches 1. In this case, the quantitative interpretation compared with lower values F_{ij} is difficult, although the increase in $F_{ij} > 1$ shows the integration of the respective semantic units in the wider cultural or general scientific conceptualization diskurs.Faktor F_{gen}

$$F_{gen} = \frac{|N_i - N_j|}{N_i + N_j} - F_{ij} \qquad (3.22)$$

F_{gen} magnitude equal to the difference between the highest possible relative amount of text fragments (messages), in which the terms «I» and «J» not occur together, and the relative amount of fragment, where they are in association. This value reduces the coefficient of association to $F_{ij} \leq 1$.

If $F_{ij} > 1$ it reflects the rating of involvement in general terms the semantic structure of the test pool of publications, in other words – the rating of lexical structures (context), which can meet the studied pairs of terms. Due to the uncertainty values F_{gen} is possible only qualitative interpretation.

Within the theoretical explanatory constructs modern transdisciplinary (post-academician) science sources exceeding the threshold ratio of semantic association $F_{ij}<1$ may be associated with the structure of transdisciplinary paradigm. The latter includes, as we assume, the two central core – natural sciences (deskreptive) and humanitarian (mandatory or normative) ones.

Within each paradigmatic nucleus and between them there are a system of deductive-inductive (vertical) relations between descriptors, including recorded semantic units. This contributes to «jump» the search algorithm from one branch of the logical arguments related to other branch with a similar semantic structure. These «jump» occur between axiological and descriptive constructs as well. As a result, recorded F_{ij}magnitude is overpriced.

On the other hand, the relationship between descriptive and imperative components of the transdisciplinary theory is actually an associative based on partial overlapping of semantic fields of humanitarian and scientific conceptual nuclei. The result is a multiplication values F_{ij}.

So, communication between the semantic units within each conceptual nuclei are predominantly verbal-logical and between nuclei are associative ones.

Another restriction is associated with semantic ambivalence results of content analysis: F_{ij}-index does not indicate a specific meaningful communication between members of the associative pairs. For example, the association of the terms «optics» on one side and «bioethics» and «bio-risk» on the other hand indicates only on the use of optical tools in biotechnological research, and does not indicate the existence of a logical (deductive and inductive) links between theoretical concepts. Because, the results of content analysis must be constantly compared with the analysis of the semantic content of the texts. Especially it concerns the paradoxical results, or difficult to explain within the framework of a scientific theory or «common sense».

The mean square error index is calculated by the formula of association for alternative sample

$$S_F = F_{ij} (1- F_{ij})/\sqrt{N} \qquad (3.23)$$

5.2 Structure ofBHDT-complex

Using search engine Internet portal ScienceDaily.com a ranked by frequency of occurrence list elements BHDT-complex BHDT. As already mentioned, the distinguishing feature of BHDTC is the integration of natural scientific (particularly biological), socio-economic and humanities elements. For these reasons, you can make the obvious conclusion in our opinion on the classification

of BGDT to systems and construct the so-called post-academician science, more specifically to its «warning» variety [47].

The next step involved the detailed visualization of association schemes of individual elements of a complex with specific research themes and associated lexical units (keywords). To this matching keywords and the information messages BHDTC on portal ScienceDaily.com were identified. Common semantic constructs associated with specific elements BHDTC in publications and on websites www.Nature.com www.Sciencemag.org in 2000 – 2012were then selected.

The structures of semantic associations on both sites are broadly similar. There are, however, significant differences in the social consequences of the use of BHDTC technology. The index of semantic association in this case is much higher at online publications populations at www.Nature.com. Semantic Association lexical units BHDT-complex in this case, consists of three distinct cluster.

He first cluster includes terms related to the system conceptual framework of technological civilization and civil society, which is in a phase of risk society. Thissystemisfundamentalintermsofprioritiesforthreatandriskcontrolofmoderncivilization. Cluster make up terms on general problems of diagnostics and treatment of the most common, severe, and limiting the duration of life, first and foremost, oncological pathologies. F_{ij} in this case is in the range 0.2-0.5, but for some couples terms reaches extreme values ($15 \leq F_{ij}<66$), beyond the «physical sense» of this indicator.

Such high value index F_{ij} testify to the integration of concepts cluster in the content of the basic philosophical and/or ideological systems of modern society. In other words, the concept BHDTC develop within the dominant mentality of logical constructs, they are not marginal for this type of society.

An indirect confirmation of this hypothesis is «exorbitant» value of semantic association index of concept «biodiversity» and «psychiatry» (F_{ij} = 3747). This fact is likely to be interpreted in connection with the revision of the criteria for mental health and disease.

This conceptual and methodological shifts in mentality and worldview easily consistent or follows logically from doctrine of individualism and individual rights to self-determination as a basic predisposition of Western (Atlantic) variety of a technological civilization. In this context, an increasing number of pathologies of mild to moderate severity pass into the category of «individual existential projects».

In the same context can be interpreted and revised attitude of society towards sexual minorities, suffering from the effects of chromosomal diseases (Down's syndrome, first of all), etc. Representatives of the anti-psychiatry movement from 1960-1970s. consider schizophrenia and related mental not as anomalies, but as an alternative basis for the substantial existential projects. Concepts of «mental norm» and «mental pathology» considered as a purely socio-culturally conditioned and equivalent to personal behavioral modes (existential projects). The last, in turn, determines the specific form of an adequate interaction of the subject with the surrounding material and socio-cultural reality.

Between the BHDTC basic elements of a network of semantic and logical connections occurs. This network determines internal organization of the complex. The central core of this organization quaternary conjunction of concepts: (bio-) «risk» –(bio-) «safety»– (bio-) «safeguard» – «bioethics». All these elements have similar F_{ij} values at belonging to the first cluster associations pairs. +++ The structure of the cluster includes matching association with lexical units «Cancer», «Disease and Treatment» («Viruses»), «Stem Cells», «Ecology» («New species», «Tropical forests»).

Unlike other members of this subset of the first association cluster concept (lexical units) «Bioethics» is association with the lexical unit «conflict». This is consistent with the main social function of bioethics in civil society – to serve both the regulatory framework, the social movement and the rationalist algorithm resolving social conflicts associated with the development of technology-driven evolution («NBIC» – or «HIGH HUME» – complex technologies) and their theoretical foundation («OMICS» complex disciplines).

However, the main difference in this case is quantitative: a coefficient association range for «bioethics» is $28 \leq F_{ij}<66$. Given the nature of search engine focused on the search for similarity information fragments, this fact is likely indicative of the use in containing the lexical structure "bioethics" network publications a wide set of basic constructs of modern civilization.

Arguments of the validity of this assumption is based on the postulate of the dual (deductive logic and associative by connotation) conditionality quantities F_{ij}. The first component (deductive-logical connections between the content of lexical units) dominated in the field of natural science theoretical constructs. The second component (the possibility of formation of semantic connotation links with existing concepts) – prevails in the field of humanities.

So, the inclusion of the concept «bioethics» in the standard form of discourse is a sign of its integration into the lexicon of modern humans and in used they build vocabulary and phrases. This feature of bioethics (not lexical construct, but it uses the concept) says the successful verification of the social bioethics, and is manifested by the formation of a very broad and many-element field of semantic associations. If these arguments will be adequate to reality, then the coefficient of semantic associations can serve as a measure of social veracity of humanitarian doctrines. The constructs of socio-humanitarian knowledge after passing through the filter and becoming an element of worldview and/or mentality.

Organization of the first cluster of lexical unit «biological policy» («biopolitics») is radically different from the types described above. It includes only two elements of «urbanization» and «financial policy». The first element is the greatest creates problems of a biopolitical nature; the second item is the most common factor that is associated with the solution of biopolitical problems.

Elements of the first cluster of the above tetrad («cancer», «disease and treatment», «virus», «stem cells», «new species») constitute the second cluster of the lexical unit «biological policy».

According to our hypothesis, this structure reflects the initial stages of formation and institutionalization of the disciplinary matrix of biopolitics (younger concept compared to previous) in the overall system post-academician science, philosophy and mentality as a whole.

Lower frequency of elements of the cluster of «biopolitics» in comparison with the 1-st cluster concept «bioethics» on the same show. Discourse analysis of the relationship between these concepts we carried out much earlier, and it shows that bioethics in the contemporary phase of evolution of the information society – or rather, its Western species (civil society) serves as the ideological and methodological and normative-regulatory framework, which determines the biopolitical correctness the correctness of those or other measures. In other words, bio-ethical expertise problems denotes bio-political feasibility of possible ways to solve them.

The second cluster of semantic association brings together concepts – regulatives and descriptors of the basic directions of scientific and technological developments with the greatest significance. To those in the case of the tetrad concepts «risk»– «(biological) safety»– «(biological) safeguard» – «bioethics» include the terms «infectious diseases», «public health», «psychiatry» and «scientific conduct» and «transport». Coefficient of association of the biological risk concept with these terms is relatively stable and varies between 0.06-0.08. The composition of the second cluster is identical, and the F_{ij} magnitudes lie in the same range of values and concepts of biosafety and biosecurity.

As the initial assumption on the distribution of functions among the members of the transdisciplinary core BHDT-complex is, the above-mentioned three concepts related to the provision of natural aspects arising risk-taking the problems of scientific and technological development. The concept of «bioethics «is central to understanding the socio-cultural and economic risks. A prevalence in the second part of the cluster of terms that reflect exactly the value-normative aspect of science and High Hume technology would expect.

Indeed, in the second part of the cluster in conjunction with the «bioethics» presented

- terms, reflecting unfavorable development or degradation of the human environment and having a very high social status in the system of values of modern civilization («endangered animal», «avian flu»);
- the terms associated with the development of acute (or perceived in the public consciousness as acute ones) social conflicts («racial inequality», «social problems»).

It should be noted a higher ranking social aspects, in comparison with the natural science aspects of technological progress ($0.27 \leq F_{ij}<0.71$ and $0.06 \leq F_{ij}<0.08$, respectively). In our opinion, in the mentality of modern human alarmist emotional responses have a clear tendency to prevail over rationalist expectations of additional benefits and improve the quality of life due to the application of scientific knowledge.

Features of the structure of the second cluster of the concept of biopolitics, we have considered above. Second cluster «Biodiversity» concept was the most diverse. Judging from the data analysis, the highest priority here are directions relating to the development environment, an individually-oriented medical technology and space exploration. The degree of involvement of biological biodiversity in all of these areas of research is very large ($0.85 \leq F_{ij}<0.94$).

Finally, the third cluster in relation to science components of the transdisciplinary matrix («risk»– «safety»– «safeguard») reflects precisely crisscross association of these concepts with potential and current socio-political consequences of the implementation and use of BHDT-complex. The structure of the third cluster includes terms such as «consumer behavior», «education policy», «privacy issues», «endangered species» ($0.005 \leq F_{ij}<0.01$).

The same cluster in the case of the concept of «bioethics» includes extremely heterogeneous in content group terms – from «biochemical research» and «environmental research» and «Diseases of malnutrition» to «transport» and «landpolicy or land managed» with a very low value of the coefficient of association ($0\ 01 \leq F_{ij}<0.05$). Rather, it demonstrates the incipient expansion of the associative field of bioethics at the new fields of knowledge and culture. As already mentioned, the concept of Bioethics was able to integration in the general mentality of technological civilization, especially its western type (civil society).

Probably structure a third cluster of associations of «biopolitics» can interpreted similar. It consists of terms associated with acquiring or have already acquired the social importance of political issues («infectious disease», «health», «depression», «conduct research»). These terms are «drawn» to the biopolitical conceptual field and are perceived by the scientific community and society in general, it is as the names of biopolitical issues that can`t be completely reduced to the traditional political science sections.

The third cluster of «biodiversity» concept practically includes only 2 members («biochemical research», «developmental biology»), with significant values of the coefficient of association – $F_{ij} = 0.06$. Obviously, this result reduces to the statement of the two most common methods of assessment of this indicator and the greatest importance of the individual parameters of biodiversity assessment.

As already mentioned, when matching the total 3-cluster scheme association the composition and specific values on different sites vary considerably. This fact can be explained by a combination of two factors – individual differences in site policy and regional differences in the social context. Further consideration must be carried out taking into account a this facts. This substantially reduces the reliability of the findings. However, certain conclusions can be made.

In particular, the concept of «biological risk» on the site www.Sciencemag.org detected predominate socio-political perspective in the first cluster. The structure of the first cluster includes terms here in decreasing order of magnitude F_{ij} «Political Science», «stem cells», «child development», «conduct

research», «rights of the individual.» This feature characterizes the structure of the association to all the above concepts BHDT-complex.

In the cluster of this and other concepts from the BHDT-complex in this case include terms relating to the field of population control, ensuring the rights of the individual and ensure individual freedoms, and political processes.

F_{ij} here reaches extreme values, beyond the «physical sense» of this indicator. Such high values of the F_{ij} show integration of these concepts in the content of the basic philosophical and ideological systems of modern society.

The second cluster ($10 \leq F_{ij} \leq 20$) combines the concepts– regulatives and descriptors of social conflicts and conflicts between different social communities: racial differences, consumer behavior, political problems of education, etc.

Finally, the third cluster ($0 \leq F_{ij} < 1$) refers to the specific issues of the use of risk-taking technological innovations. Here in meaningful terms concepts «stem cells», «child development», «health» fall. These lexical units represent themes with high conflict status as associated with acute ethical and legal dilemmas and alternative ideological and political interpretations.

The maximum values of the association observed for the first cluster «bioethics» (over 200) and «biopolitics» (over 300 for the term «political science»). We can say that in this case, a marked politicization of the conceptual field BHDT-complex. More precisely, we should talk about larger conceptual overlapping of science and socio-humanitarian fields of transdisciplinary conceptual matrix of the BHDT-complex.

In other words, the concept BHDTC develop within the dominant mentality of logical constructs, and they are not marginal for this type of society.

This conclusion, given a more pronounced focus of the journal «Science» on the social aspects of science and technology and the social function of the of science as social institute in industrial civilization and civil society is extremely important. This is a significant, albeit indirect evidence of politicization and indoctrination of modern post-academician stage of development of science, its transition from a modus-1 (disciplinary and paradigmatic organization) to the modus-2 (problem-transdisciplinary organization) on terminology H.Novotny.

It is interesting to note that of the three sections of the policy, with a basic value within the transdisciplinary matrix BHDT-complex («public health», «funding policy», «environmental policy»), the first two well ahead of fall in the second cluster ($F_{ij} < 0, 25$), while the political aspects of the environment – the third cluster ($F_{ij} < 0.1$) of «bioethics» concept. The latter focuses primarily on the safeguard of individual rights and freedoms, while protecting the environment initially appealed to the needs and interests of society as a whole. In addition, a variety of environmental political issues historically been much earlier. In the interaction of these two factors, you can find the cause of this phenomenon. Bioethical aspects of ecology seen as derivatives rather than underlying problems of bioethics. In other words, they have not as methodological as pragmatic meaning.

Next Research Series solves two main tasks:

- firstly, identify differences between the structure of semantic associations between scientific discourse and mass consciousness and mentality;
- secondly, clarification of the relative roles of the regional context, and other factors affecting the differences in the structure of the semantic associations of research topics related to the concept of BHDT-complex risk.

In general, the composition of the common Web-sector clusters were similar to those in the scientific discourse. The greatest similarity reaches first cluster «biological risk» concept. However, impression arises that the development of socio-humanitarian kernel of BHDTC transdisciplinary matrix (concepts of «bioethics» and «biopolitics») stimulated primarily by extra-scientific factors of scientific theory development. In other words, the proliferation of this theme to scientific discourse determined by external pressure of the dominant ideological and philosophical doctrines and systems value priorities. The fact that the active participation of members of the scientific community with high academic status, at all stages of the genesis of bioethics and bio-political concepts, does not contradict this thesis. The reason for the apparent discrepancy lies in the conflict of interests and the multiplicity of social roles (professional, political, and so on.) of individuals at the same time and at modern society.

In support of the above considerations can lead structure of the first cluster of associations of «biopolitics» concept at general sector. Unlike those in the pool of scientific network publications in common sector of Network associated with the concept of biopolitics terms obviously affects very specific, and causes an increase in social resonance problems of social life. There are «health», «children's health», «education», «biology» and «developmental biology». In contrast to the pool of scientific publications here felt a clear pragmatic shift to everyday social concrete, rather than abstract models prospects for further social evolution.

The same can be said about the structure of the first cluster of «bioethics» concept in common sector. There are dominated the associative connections with «social problems», «developmental biology», «psychology», «health». The value of the coefficient of the association for the bioethical issues is in the range $0.53 \leq F_{ij} \leq 0.82$, and for the biopolitical problems – $1.85 \leq F_{ij} \leq 2.0$. If our baseline model representations are true, bioethics has already emerged in the mass consciousness of the system of associative links with the problems of social life. At the same time similar connections of «biopolitics» currently has already won high-ranking public attention, but the structure of semantic associations («that we from this wait?»)still quite ambivalent and tends to be interpreted very broadly. If may so express, biopolitics has proved its value, but has not yet determined the boundaries of their applicability in the consciousness of society.

The next issue is the impact of mental and general cultural «landscape» on the configuration and growth rates of the individual components of theoretical and applied science.

A comparison of individual F_{ij} at populations informational messages portals Nature, Science and Google information engines will determine the possible coincidence or divergence of theoretical constructs, circulating within the scientific community, and expectations of the mass consciousness.

Somewhat surprisingly, the structure of the semantic associations of the concept of biological risks in a population of publications of the portal Nature and wide area network (search engine Google) differs very little between them. The only statistically significant difference is due to a marked predominance of the semantic field of the term «health» in the global network as compared to the population of scientific publications (ΔF_{ij} = -0.92, ΔF_{ma} = -14.2). In a population of online publications of the journal «Science» the difference between them is even higher (ΔF_{ij} = -0.94, ΔFma <-20), and it suggests the obvious socio-political orientation and, consequently, the financial pressure on the development of the subjects of scientific research.

Except for this, socio-psychological, and cultural-psychological factors have little impact on the development prospects of this theoretical concept. In other words, the associative structure of scientific and extra-scientific discourse within the semantic field of the concept biorisk practically coincide.

At the same time the same factors, obviously, stimulate (ΔF_{ij}<0) the study of biological safety associated with a very wide range of research topics. The highest absolute value is achieved ΔF_{ij}, of the «biological safety» and «health», «public health» (and related terms), «disease and treatment», «psychology», «scientific conduct» (obviously in terms of taking into account social responsibility) «conflicts».

In itself, increased public attention to the pragmatic themes of human health as well as social development of the appropriate determinate subjects of research (obviously reflected in the volumes of priority financing) looks quite predictable, if not trivial. However, the last part of the list relating to conflict resolution and social responsibility of researchers, looks very symptomatic. This fact demonstrates, in our view, including the public consciousness of security problems within the sphere of post-academic science, involving a joint view of the natural sciences and the humanitarian aspects of experimental sciences and theoretical constructs. It is obvious that security issues are integrated in popular culture as an attribute of modern scientific knowledge, rather than purely applied problem of the use of new knowledge and new technologies (safety).

Mismatch association criterion reveals a somewhat different picture, and allow to more accurately assess the possibility of social and cultural (extra-

scientific) influence on the evolution of the theoretical concepts. For «biological safeguard» ΔF_{ma} for the term «education policy» reaches the maximum absolute value and is equal to -355. This suggests a very high degree of social determination of formation of educational programs in this area in comparison with the internal needs of the development of science. Just below is «Land Management» (ΔF_{ma} = -271.9) and «pollution» (ΔF_{ma} = -262.7).

In the next place on these criteria are «psychology» and «confidentiality»(-166<ΔF_{ma}<-171). This is followed by a term referring to the regulation of the market and to ensure optimal conditions – «consumer behavior» (ΔF_{ma} = 130).

And only then to be ranked list, the term «health» (ΔF_{ma} = 100).

However, a special group of semantic associations constitute the terms reflecting the extremely large absolute values of social pressure on research subjects (ΔF_{ma}<-900). This group includes «political science», «labor safeguard (safety)», «environmental researchs», «nutritional diseases». Obviously, these lexical items are the distinctive brands trends and areas with the highest social order (inquiry). As you can see, the conceptual field of the inquiry may be defined as the intersection of the political problems and quality of life.

The range of social context effects on the subject of scientific publications in the journal «Science» in this regard is different, having, so to speak, pragmatic orientation. But here, the issues of political control of research activities are at the center of attention and can or should be taken into account by the scientific community.

If we pass to «bioethics» and «biopolitics» as kernel elements of socio-humanitarian transdisciplinary matrix, for the first of them («bioethics»), the range of ΔF_{ij} lies mainly in the positive, and for the second («biopolitics») – in the negative values. This is probably due to more advanced stage process of institutionalization of bioethics since the latter because of its conformity to the dominant mentality constructs and intentions assumed the role of the system-forming factor of public opinion.

Figuratively speaking, in conjunction society – science, last member of binary bundles dictate the «rules of the game» in the formation of topics and areas of research, development, regulatory framework, etc.

It should be noted, moreover, a relatively narrow range of variation of coefficient associations differences in scientific and common sectors of the global Internet of bioethics concept. For any associated terms, ΔF_{ma} of this concept is approximately 0.8-0.9. A set of terms is very broad and heterogeneous. It seems that bioethics has become a powerful ideology worldview of modern civilization, one way or another affects the majority of the field of mental, spiritual culture and public opinion.

The concept of biopolitics is experiencing the most significant impact by «educational policy», «social issues», «labor safeguard» from the socio-humanitarian segment of the public consciousness and by «biology» from the natural science segment, and in general, it is predictable.

5.3 Prospects and risks of controlled evolution of human: the intentional structure of post-academic science

At a pools of scientific publications and websites www.Nature.com www.Sciencemag.org concepts «(bio)improvement of human» («Human enhancement» and «bioenhancement») are extremely rare. This construct, however, it is extremely clearly denotes a positive intention of technology-driven evolution application to human beings. (Social sciences and humanities in the same intention coded lexical construct «High Hume»). In this sense, it (construct) with emotionally negativistic «biological risk» and neutrality or implicit positive «biosecurity», «biosecurity» allows you to define more clearly the mental and socio-cultural evolution of technology landscape High Hume.
In this regard, we searched the incidence of related terms on database www.Scopus.com.

As follows from the data, the frequency of the lexical unit «(bio) enhancement» significantly inferior to the absolute value of the rest of them, but is characterized by the highest growth rates. The greatest surge of interest in this subject is recorded in 2002-2008. The dynamics of the occurrence of a lexical unit «biological risk» has a flatter and more extended in time. The growing number of publications has been celebrated since the 1994-1995.

In our view this reflects not only the surge of interest in the topic of driven human evolution, but also on projected (perhaps intuitively) the transition from its philosophical and theoretical considerations into practice. We emphasize, however,

- firstly, while the coefficients of lexical association concept «human (bio) enhancement» and biotechnological terms can`t be determined due to their smallness;
- secondly, that the concept «human (bio) enhancement» is found almost exclusively in the socio-humanitarian, primarily medical ethical and bio-ethical periodicals.

Thus, of perspective of technologizing evolution within the scientific community discussed within the socio-humanitarian knowledge, without penetrating even into the theoretical and empirical discourse of sciences and technological advances. This concept «human (bio) enhancement» is radically different from the «genetic engineering», to the extent the latter does not go beyond evolutionarily formed biological norm.

Therefore, the totality of the available data suggests that the evolution of the SESH and its holders (Homo sapiens beings) is located near the evolutionary singularity, i.e., irrevers ible phase transition in the IV (directed evolution), but has

not yet overcome the brink. With regard to the prospects of management of system-forming role played by the humanitarian consequences of the use of the relevant expertise of technological schemes, rather than their fundamental technological feasibility. In other words, the absolute hegemony in the mentality of technological imperative of modern civilization significantly limited in the of risk society (the IVth phase of SESH evolution).

This does not mean the loss by the technological imperative of its position as one of the most important intentions of socio-cultural adaptive complex of SESH in its Western kind of technological civilization. We are talking about comparative upgrading humanitarian components in the scale of values and priorities. Characteristically, described a surge of publications, including the concept of «bio-enhancement» explained the holding of two panel discussions. These topics concern

- Firstly, the possibility of using the High Hume technologies to bring the moral and emotional aspects of human psyche in line with the realities of modern technocultural environment (i.e., on the admissibility of the regulatory process techno-humanitarian balance itself) [274]and
- secondly, the «optimization» of emotional and rationalistic balance of mental processes, above all, reduce the proportion of uncontrolled by emotional and logical intellect mental states. (Such conditions - such as amorousness are related primarily with sexual and reproductive sphere of human behavior). This intention is concentrated thus in the correction of psychophysiological sexual dimorphism, in particular, a possible female embryos «bioenhancement» (because of the greater adequacy of the female psyche to the same civilizational realities) and the gradual elimination of sexual dimorphism of Homo sapiens at all [275;276;277;278;279;280].

This observation is well illustrated and empirically proves the thesis of dissociation of individual elements of a biological adaptive module as a result of the influence of techno-rationalist module and under the control of the socio-cultural module. Within the framework of the concept of 3-modular SESH spread opinion about the possibility of controlled technology to overcome the sexual dimorphism is an example of co-evolutionary formation of techno-cultural ligament. The substrate basis of this phenomenon constitute the initial mental predisposition of Western civilization on the highest priority of individual freedom and, as a consequence of ideological pluralism of rights standard of different social communities; the formal teleological basis constitute the needs of progressive development of the technological module.

It has been said amplifying permanently from the middle of the 20th century trend on providing semantic technology to overcome the biological conditionality of gender social roles. As a consequence there is a gradual replacement of biosocial adaptations of reproductive and (increasingly) ─ demographic features by techno-rationalist innovation. Limit point of this trend of Homo sapiens evolution is complete loss of functional dependencies between the two functions. Ability to

save «sexual» (not reproductive and tied to reproduction function) component among anti-stress and maintaining of individual psycho-physiological norm mechanisms. Technologization of this sphere will then progressively increase. In our opinion, this assumption is fully justified, at least in relation to the West (Atlantic) variant of technological civilization, and while preserving the development trends of global civilization in relation to herself also. In a socio-cultural system of value priorities and ethical imperatives (Islamic, for example), this evolutionary scenario, obviously tantamount to catastrophe and evolutionary actualization of existential risk, i.e. extinction of humankind.

Because of combining the technological imperative and individualistic humanism in the mentality of Western civilization point of application of modern technologies of directed evolution are already initially the SESH as a whole, rather than individual modules. That humanism becomes technologized first and then actually technologized humanism is a necessary and sufficient basis for practical transhumanism.

«We claim that human beings now have at their disposal means of wiping out life on Earth and that traditional methods of moral education are probably insufficient to achieve the moral enhancement required to ensure that this will not happen. Hence, moral bioenhancement should be sought and applied» [271, p.124] – formulate this thesis Ingmar Persson and Julian Savulescu. In this example, it is obvious, there are two parameters, and these parameter of human evolution are irreducible to each other – at least phenomenologically (as two system-forming evolutionary factors).

Accordingly, the magnitude of the risk of evolution will be determined by the ratio of the evolutionary correctness and evolutionary efficiency under the leadership of the first of them. Recall that in accordance with our ideas trend correctness of evolutionary divergence diagnosed by the structure of associative links between theoretical science and popular culture. To this question we now turn.

5.4 The thematic structure of theoretical science and the predisposition of mass culture on technology-driven evolution

At spectrum of research preferences (set by coefficients of direct associations of the title term) of biotech online publications at www.Nature.com most pronounced association observed in relation to «genomics», followed by «GMOs» and «genetic engineering». A similar range of site www.Sciencemag.org, is leading «gene engineering» and «GMOs».

The spectrum of genetic engineering research associations demonstrates leadership topics «GMOs» (in the natural high coefficient of association with the term «biotechnology») at site www.Sciencemag.org.

Scopus database has lower coefficients of semantic association. Rating associated terms of a sequence of «genome», «biotechnology», «genetic engineering», «GMO».

In general, patterns of association coefficients are clearly site-specific, which obviously reflect differences in the structure pool of publications.

Stable growth in the number of publications involving the «biosafety», deployed, thus somewhat later (from the beginning of the 2000s.) And developing very intensively. This difference seems to reflect a different emotional meaning of the terms «risk» and «safety», and demonstrates a certain parity of risk-taking and warning science, translated into the plane of practical measures to ensure the effective use of biotechnological innovation. Note also that the starting positions of concepts «Biorisk» and «bio-security» also vary greatly: in the latter case, the increase in the number of publications started from scratch, whereas the «risk»(probably due to ambiguity of the term biological risk) occurs in appreciable number of publications already in the early 1960s.

The coefficient of association (F_{ij}) the concept of «biological risk» to the concept of «biotechnology», «genetic engineering» and «GMO» reflects the representation of relevant areas of research in the general population warning science and, consequently, the value priorities of the scientific community with regard to the subject matter. (In this context the term «concept» and «semantic unit» are regarded as identical.) According to our data, the $F_{ij}$is for 2000-2013. 0.48 («biotechnology»), 0.48 («genome»), 0.10 («genetic (gene) engineering») and 0.176 («GMOs»). Values of «biosecurity» F_{ij} overall are very close.

This parameter value F_{ij} for term of NBIC-complex and lexical units «benefit» and «products (goods)» is quite comparable with the value for the terms «Biorisk» and «biosecurity». This is particularly evident for the pool of publications database Scopus. In this case, the value is in the range 0.9-0.95 for Nature.com site. For Scopus measure F_{ij} for the term «benefit» is somewhat lower and varies between 0.25 («GMOs») – 0.16 («biotechnology») .

This applies to all of the terms associated with positive perception of economic predispositions of all aspects of the development of NBIC-complex. Focusing on the removal of the practical and economic benefits and applied, and utilitarian and pragmatic orientation of research subjects can`t be, in our opinion, the doubts. This fact demonstrates the positive economic intention of such subjects, stimulation of the evolution of the business area (and, consequently, the scope of policy and law) in the triple helix of evolution of technological civilization. We can assume that the described pattern has a basic attribute of technological civilization. (For comparison, the same indicator of the involvement of the relevant terms in the interpretation of risk-taking, for the site Nature.com 0.32-0.10 and 0.13-0.03 for Scopus).

Of course, there is reason to link the activity of the total publications containing the results of the research in this area, with a set of subjective and objective factors characterizing the research activity. These include, first of all, the system predisposition, i.e. epistemological value and priorities of the thematic

structure of the social inquiry and the commercial demand for the results of relevant studies, the structure of the disciplinary matrix, and so on.

All of this requires further analysis. Nevertheless, the fact that the theme of «risky science» in relation to the biotechnology sector of NBIC-technological complex covers just under 50% of the pool (population) of scientific publications, is eloquent enough. Obviously, the attention of researchers expressed reorient the study of side effects of scientific and technological development, forecasting and risk analysis and fight against them. In other words, the further path of scientific progress dramatically largely determines risky than it was previously in the period of classical type of scientific rationality and corresponding social status of science.

It should be noted, in the public mind and in the media attention given to the problem is much higher, making the fields more vulnerable to biopolitical and ideological pressure.

According to the conclusions of a meta-analysis [281, p.142] of scientific publications in the western sources 1990-2010rating perceptions of risk of genetic engineering research is slightly higher than the rating of perception of the benefits and advantages derived from their use (46 points against 30). At the same time trend found in the regression coefficients for this indicator shows a marked increase in the attention of society to the risk-taking components of genetic engineering (0.45) at a relatively constant level, focusing on the benefits of the same technology (-0.08). For twenty years, we have formed a clear geographic differentiation of the adaptive landscape, which takes place the formation of the biotechnology segment of the SESH technological component. Risk perception of biotechnology is more pronounced in the EU and elsewhere in Europe than North America.

This fact is confirmed not only by almost all studies [282, p.17] including our own. It has become trivial to stating, politicians and business scope to be reckoned it. This is stipulated in the legal field of the respective regions and geopolitical configuration. How indifferently stated several European experts led by Oliver Sanvido in 2012,although the European Commission intends to extend the schema of the risk assessment of GMOs, the decisions taken in accordance with the EU Directive 2001/18/EC is currently focused on the risk assessment. Estimates of the potential benefits not explicitly taken into account in the implementation of GMOs in Europe. Although in other legal acts of the decisions on the use of GMOs could take into account both the potential benefits of growing GM crops, as toffee associated to [technology] Alternatives [174, p.84]. Another researcher also notes that the tightening of the regulatory and restrictive measures are no noticeable effect on the overall negative predisposition Western European mentality with respect to genetically engineered foods [283].

Dominic Brassard [283, p.17] In this case, made a very important observation: the position of the supporters and opponents of this confrontation not only contradict each other. They initially antinomic in the Kantian sense of the word, since the outcome of mutually exclusive initial settings – «GM technology are the good» versus «GM technology lead to danger». The arguments of the other

side are not considered because they are outside of their own conceptual field. In other words, there is a formation of two alternative mental and socio-cultural types and each has a center of crystallization estimate evolutionary consequences of technology-driven evolution. As part of the mentality and ethos of the scientific community there is a predictable result of delay on the internal dichotomy and the community into two priority system associated with the «risk-taking and «warning» science.

The latter conclusion is confirmed by the substantial analysis (case study) of social history dynamics of biotechnology, in particular genetically modified organisms of the last decade. An example is the reaction of public opinion and, therefore, the political elite at a contradictory in methodical outline studies of I.V.Ermakova (Russia, 2009) and Seralini (France, 2012) of the biological risk of long-term effects of genetically modified food products. As authors believed they have received credible evidence of high-risk GMOs-products [284;285].

These publications have generated enough contradictory and bordering the unequivocal rejection reaction from the scientific community, and order more business whose interests were associated to GMOs. The answer of social movements and quite a large number of political figures was certainly negative about the prospects of further practical use of GMOs and other genetically engineered innovation. In principle, this distribution of opinions and assessments could be predicted based on the already quoted effect knobs.

So, scathing reaction of public opinion had arisen in connection with bio-political importance is not so much the scientific results themselves, as prospects for their use as a tool of political technologies to reformat the electoral structure and mentality of society. As a result, these publications were consistently brought highly rigid scientific expertise. In particular, the results of the group Seralini tested experts of six European countries and have been collected and compiled in a special report European Food Safety Authority, totaling 157 pages [286, p.1]. The experts concluded that the scheme of experiments and statistical processing technique of the results contain a sufficiently large number of errors. As a result, the conclusions are not based on reliable empirical basis and are, if we may say so, to a much greater degree of «politically motivated». Under political motivation here means the prevailing influence of the original ethical and social (extra-scientific) research on value priorities intra-scientific criteria adopted by the scientific community. . Earlier equally close police subjected the Ermakova data.

It is interesting to note that further discourse, in particular, verification and analysis of the findings of scientific research translated in the judicial field. At least this applies to the media and alarmist public organizations and. Thus, the materials of the site «GMO-review «are on the content and conclusions explicitly negativistic in relation to their subject (GMOs). At the report on the outcome of the proceedings in the Philippine court on the termination of field trials of GMO varieties of eggplant states follows. «Seven experts in the last trial really tried, but were unable to refute the study of Seralini (2012) in respect of serious effects in rats fed a long time GM maize NK603 and a small amount of the herbicide

Roundup». The court's decision, according to the same report, said that «the testing or introduction of Bt-eggplant in the Philippines by the nature and intentions of a serious and direct threat to a balanced ecology because no single document nor what criteria it is not an environmentally friendly event». In the absence of the original, we continue to rely on the same electronic publication. Output in the title, gives the impression that it is the court proved the accuracy of the data Seralini: «The attempt to refute studies Seralini fails in court». Meanwhile, even in the above quotation it comes to social and environmental risks and not about the reliability of the scientific concept. The same decision focuses on the social and political aspects of the implementation of the results of genetic engineering research.» There is no scientific consensus on the safety and effects of Bt-eggplant; there is no law passed by Congress that regulates the Bt-eggplant as the GMOs; the precautionary principle is applicable in the light of uncertainty and failure (ineffectiveness) of the current system of regulation; Bt-eggplant with its social, economic and environmental impacts on the surrounding environment not may charging only scientists who adhere to the interests of the parties concerned». The conclusion of the intensification of the process of combining scientific and social discourse became particularly evident after the «withdrawal» by the magazine of the fact of publication of the article of Seralini group. The case of disavowal by scientific journal content of published article is not rare in modern science and, as a rule, only increase the politicization of evaluating the reliability of previously published data.

The combination of strictly scientific, moral, political and legal conceptual fields becomes unavoidable (by virtue of the ambiguities of individual social roles and conflict of interest) common place of postacademician scientific discourse and practice of the research process.

Next publication on the assessment of the effects of consumption of GM products, which has caused an equally sharp socio-political resonance, judging from the scientific community was more justified in terms of the canons of classical epistemology and its conclusions more weighed, although still contributed negativistic perception of the prospects for genetic engineering [286].

Subsequently, there were reports about the initiation by the National Russian genetic association so-called «Rat reality Shaw», in which different groups of laboratory rats will get or not containing GMO diet [287]. They shall be checked by using different methods, and video protocols are broadcast on television. Thus the (quasi-) scientific experiment is translated into show business and manipulation technologies, and the conclusion of data accuracy and validity of the findings will be made not by the scientific community, and social and political movements based on considerations of the ethical choices and political correctness.

The other dominant motive of discussion linked to sociological and socio-psychological predispositions of adhering to alternative interpretations of experimental data participants. The main factor here is the conflict of interest associated with the polysemy of the social roles of contemporary researchers, at the same time is interested in improving their status in the scientific community, but

also in securing financing, the implementation of business plans for technological innovation, etc. While meaningful arguments of the parties with regard to the methodology and interpretation of empirical data, the schema validity of experiment and theoretical conclusions remain relatively constant. Actually, the scientific arguments in the discourse participants currently immersed weaknesses of both supporters and opponents of genetic engineering and biotechnology innovations. The most striking example of this «sociological» bias of modern biotechnology is F.W.Engdahl article [288].

General methodological problem of post-academician science is a key term «long-term consequences. Scientific publications to justify the original risk GMOs have a characteristic detail of the planning and research methodology. Group Seralini used genetic line rats, originally created for cancer research and, in particular, modeling oncological diseases. This line is used in the standardized three-month study of possible carcinogenic effects of GM foods. However, during the implementation of the research program has been revised. The probable cause could serve as the inability to clearly negative interpretation of the results.

Expanding beyond the observation period, the original terms of the limited makes methodological diagram Seralini experiments not justified in terms of reliability and validity of the results. Research group Seralini and arguments of his critics both contain propositions and facts that are open to subsequent revision or refutation of both the logical and empirical aspects. The position of Seralini and Ermakova opponents is more reasoned. However, the decisive factor becomes the lack of absolute reliability to any scientific-theoretical construct.

If the risk level reaches the existential level, and in the structure of risk evolutionary component dominates, the classical methodology of scientific research and the generation of technological innovation itself becomes a source of risk. The classical scheme of the cycle of generation of scientific concept and its subsequent verification provides the adaptation of new knowledge to new data made by falsifiers as new scientific paradigm.

In this scheme, each discovered error even inaccuracy of the scientific concept turns into a generator of new scientific knowledge. That, in essence, evolutionary and epistemological scheme of Karl Popper. However, the feature of the existential risks have asymptotic approximation of the probability (P) of its realization (actualization) to the unit over time: $dP(R)/dt \rightarrow 1$. Translated into the language of the socio-political pragmatists, this means that the researcher loses the right to make a mistake. Long-term consequences of imprecise objective scientific knowledge and, accordingly, created on its basis technologies, cannot always be predicted, eliminated or neutralized.

One striking example of the potential of such a scenario is the story of the now banned the use of the pesticide DDT(dichlorodiphenyltrichloroethane).The discoverer of its insecticide activity Swiss chemist Paul Müller got in 1948 Nobel Prize «for the discovery of the high efficiency of DDT as a contact poison». As is well known, widely used as a pesticide DDT was the beginning of the 1970th almost universally forbidden to use because long-term harmful effects. However,

the immediate aim of the use of DDT – the fight against insect-vectors of infectious diseases, primarily malaria has been achieved by this time in the United States and other countries. According to some estimates, the technology the use of DDT has prevented about 500 million deaths from malaria. Currently, DDT is recommended by the World Health Organization, among others, the use of insecticides, although not on such a scale [289,p. 272; 290;291]. Such ambiguity of results [246; 245;292] of the use of technological innovations can be considered a general law of development of industrial civilization and all mechanisms of adaptationgenesis by SESH. With the approach of the evolutionary risk to the existential threshold risk itself becomes its dominant component of adaptability. The effectiveness of management for achieving evolutionary existential threshold risk is system-forming parameter at adaptive landscape Homo sapiens.

As a general conclusion, we observe initiated by culture distinct adaptive reconstruction of components of SESH. An adaptive reconstruction of techno-rationalist module is in the deployment of the so-called «warning science» («warning scientific knowledge»); and in contrast to the classical («dangerously», «risky») science «warning science» is oriented on the self-reflective analysis of the consequences of scientific and technological development.

There are additional arguments to socio-evolutionary interpretation. It reinforces by clear disparity between theoretical and paradigmatic value of the studies and an extremely high spike in attention not only outside, but also within the science community. In classical science such excitement for purely descriptive empirical studies not involving their own disciplinary matrix structure would seem strange. For modern forms of postacademician science\ aimed at solving social problems, not the solution logic puzzles (Thomas Kuhn) this reaction is quite natural and understandable.

However, the functioning of the co-evolutionary scheme of binary connections between elements of SESH (fig. 1.2) provides that the adaptive response of slower components to innovation of faster components initially lags in phase. In other words, spontaneous reaction of the cultural component (in this case) on technological innovation «focused» on those elements of the risk, which coincide with the already-established phase technogenesis. In particular, public attention focuses in the example described on the possible negative effects of genetic engineering techniques that are common to chemical, breeding, pharmaceutical innovation at mid-twentieth century (allergies, oncology, various remote physiological pathology, etc.).

However, the modern stage of SESH evolution is characterized by the ability to deconstruction or erosion of genomic and cultural component. As results, the most serious (and hard calculable) risks of existential significance level remain at this stage remains out of view of socio-cultural adaptation. Only after making «braking effect» technogenesis warning areas of scientific knowledge activated, and the latter, in turn, allow to identify, evaluate(predict) and develop neutralization measures adequate objective distribution of risk factors. In other words, we really are dealing with an adaptive reaction to culture and society, which

reformats the evolutionary landscape of the evolution of science, and inhibit the rate of scientific and technological development of certain areas and speeding up the progress of others.

Let's also assume that, in relation to the scientific community, this finding would have been not quite correct. The value system within the scientific community is much more focused on the features of the organization of disciplinary matrix («objectively verifiable) than on mentality of society as a whole. Typically, in most publications of «risk» and «safety» appear together. The first of these focuses on the perception of the danger of scientific and technological developments, and the second – for the development of innovations to overcome it. It is clear, at least at level of interpretation of empirical data and theoretical concepts in the professional mentality of the scientific community potentials of risky and warning science in scientific research are relative balanced.

Reciprocal association coefficient (F_{ji}), reflecting the representation of the theme of risk and, consequently, the level of proliferation of warning science in the relevant research areas, giving significantly different results. In this case, the leaders are genome (0.306-0.312), biotechnology (0.20-0.22) and genetic engineering (0.10-0.11). Surprisingly few publications where association are formed by the lexical units «risk», «security» on one side and «GMO» on the other.

A comparison of data from different servers, with each other allows for several different interpretations, since it depends on some not related factors (the composition of the population of publications, software search engine server, guidelines for the selection of material, and so on.).

Yet we note one indisputable fact. The coefficient of association of the term «biological risk» with various lexical units of the conceptual field of biotechnology and genetic engineering from technology-driven evolution sector to the Google search engine is greater those for Scopus.com and Nature.com. This is especially true for the term «biosecurity». The value F_{ij} in this case is much higher than that for the other terms.

For the terms «benefit» and «profit» such pattern not detected. The values of lexical association for all three servers are quite close, if not identical to each other. Any of these terms in a pool of mass publications associated, primarily, with the concept of «security». Of special note is a lexical unit goods «(products)». It is specifically pragmatic (obviously positive) shade of perception (as opposed to ethically-oriented perception of the terms «benefit» and «profit»). In addition, just in this case in the public mind the intention of association of the term with a «bio-safety» and «biorisk» is much less pronounced, and the opportunity to transform the achievements of genomics and biotechnology in commodities, on the contrary, is stronger.

Require the most attention in relation to biosecurity measures in the Russian-speaking (and other Cyrillic languages) sector of the Internet is research topics in which there are terms (in order of decreasing coefficient of association), biotechnology», «gene (tic) engineering» and «genome». Note parallel to the

association biorisk and biosafety is extremely high. Its particular value in this case goes beyond the resolution of the technique used ($F_{ij} \geq 3.0$). In the sector of professional publications, this association several orders of magnitude lower.

In our opinion, this is a very interesting observation, because the more frequent use of the term «risk» and «safety», respectively can be a direct indicator of the orientation of the individual researcher to risky and warning science. The direct F_{ij}, reflecting the perceptions of the negative aspects of this type of scientific and technological developments, in the mass consciousness, are very high. Almost every publication in the field of biotechnology and genome research in the Russian-speaking sector of the Internet refers to security issues ($F_{ij} \approx 1$). For publications dealing with GMOs, the figure is ¼, and for genetic engineering – almost 40%.

This case, the risk assessment of the evolution the society exceeds that of the scientific community, although in the latter is possible to note a clear difference between F_{ij}, registered in the pool of North American and Western European scientific publications.

There is a very strict opposite examples when high levels of the evolutionary risks associated with technological activity, meets with a very low level of anxiety of public opinion.

For example, there is almost complete unanimity among experts about the causation of the phenomenon of global warming, human activity process. So say the results of a poll and a content analysis of scientific publications (11 944 articles of 29 083 authors in 1980scientific journals for the period 1991-2011). 97.2% of publications and authors in one way or another support the anthropogenic origin of this phenomenon. At the same time, the respondents-laypersons showed striking immunity to this type of information. How to write the authors of the cited study, there is a bottomless chasm between the actual consensus of experts and public perception. It is striking, especially given the evidence of the expert consensus that just less than half of the US population believes that scientists agree with the statement that it is people who are responsible for global warming[293, p. 6;294].

This happens not only because of the nature of the human psyche and the mass perception. Global changes in the environment are regarded as independent kind of human reality, perhaps - product design activities of transcendental (personalized or impersonal) subjects. This subconscious intention complement each – about the dangers of direct (not mediated by-objectives) human intrusion into the sphere of influence of these forces. The role of such subjects are not necessarily initially play transcendent beings (gods, spirits, and so on). Perhaps the source of the formation of such psyche stereotypes could be linked to contacts with competitors on general ecological niche.

Equally, if not more important is another factor – auto programmable technogenesis effect, i.e., separation technology component of the co-evolutionary cycle from other two components of SESH and the subordination of bio- and cultural evolution to technologies development. This mechanism is realized through the implementation of the technology by the mind control those systems of

perception and behavior that are adaptive within a proper technological (but not humanitarian) evolution. According to research group cited here [294, p. 6-7], According to research group cited here, through the use of advertising techniques in view of the dominant in the media value priorities and standards in the mass consciousness form a clear image of the anthropological concept of man-made origin, and global climate change. The loss of credibility and the support of the scientific community is the main feature of it in the mass consciousness.

These data, in our view, show, first of all, the fact of a significant divergence of priorities in risk assessment between the intentions of the mass consciousness (culture) and those within the scientific community. This fact reflecting internal trends of development of science in general and of warning knowledge in particular. Secondly, it also reflects the obvious and a proportional to divergence of mass mentality and scientific knowledge techno-humanitarian imbalance. This imbalance in itself represents a significant threat to the subsequent evolution of adaptive technological innovations.

J.Ziman wrote [295, p.84],«What might be called «post-industrial science» differs from the earlier stereotype of industrial science by substituting «market» competition [of conceptual populations and research schools of their carriers – Ed.] for «command» management». Research groups are working, carrying out commands like a small company that produces a competitive product on the market.

Commercial enterprise and personal mobility replaces the professional responsibility and career stability as principles of research and development activities. Further, he said, not without reason, that the survival of the academic (fundamental) science in the new social context very «nice». The transition from classical to post-academician science is coherent transformation of industrial civilization to a phase of information culture, and the market economy in the knowledge economy. It is accompanied by the appearance in semantic code of the scientific community brands (management, contract administration and control, responsibility, training, employment), unknown here, borrowed from the outside – from a culture of civil society that emerged in the West in the last few centuries [47, c .329].

Thus, the perception of the potential and actual possibilities of transformation of reality through technology-driven evolution is generally positive. While ensuring an adequate level of safety, reducing the evolutionary and other forms of social risk of technological innovation has an absolute priority in the value system. In other words, the question of the benefits and improving the quality of life is important, but it takes only second place in the list of values. The first is the problem of eliminating the risk. So, the first important conclusion from the data is as follows: socio-cultural adaptation of the industrial form of technogenic civilization consisted in the absolute dominance of the representation of the technological module in the cultural module of SESH is no longer an absolute attribute of mentality of Information Society.

The second conclusion follows from the parity of the positive («profit», «benefits», etc.) and negative («risk») intentions of perception of technological module. Return to the value system of the so-called traditional society, based on the priority of stability and emphasis on the dangers and the undesirability of any technological innovation, also occurred. Sociocultural SESH module is currently undergoing bifurcation zone and its condition upon completion of this process, hardly predictable, at least for now.

5.5 Mental predisposition of perception attributes of humanization and dehumanization as a factor of the evolutionary risk gene technology

A second series of studies using the described techniques was devoted to the study of the influence of socio-cultural evolution of the landscape on the perception of the risks for human self-identification.

The totality of the studied involved in the formation of associative links terms, in accordance with the above Wilson and Haslam conceptual model of psychological predisposition [216] was divided into 6 groups. The basis for the assignment to one group or another served as functional and adaptive significance of trait is termed, for the formation of clusters of «human nature» and «humanity» and (of course) the identification of the human mentality of modern civilization. Conventionally, these groups can be described as follows:

1. Language and thought.
2. Social characteristics I (means of providing communication within the family and with close members of the social environment).
3. Social characteristics II (a means of maintaining the hierarchical structure and activity relationship).
4. Manipulation of fragments of the physical and social environment.
5. Social signs III (means of symbolic communication and coordination of actions of individuals).
6. Antisocial symptoms (causing harm to themselves and to other members of their social group).

The pattern (structure) of semantic associations in a population (pool) of scientific online publications and in the general population, and their combination, respectively, reflects the features of the scientific paradigm and mass consciousness. If this premise is true, then the specified pattern can be described in two ways:

- from the point of view of the internal structure of verbal and logical relations, socio-cultural and psychological predisposition within the common and scientific pools (estimated publication (largest F_{ij}) and
- in terms of mutual connotations between members of different scientific sub-populations and common mega-population, i.e., the mutual influences of socio-cultural and psychological predisposition and verbal and logical constructs of

the scientific disciplinary matrix (measured by the relative magnitude of difference association coefficient F_{ma} and correlation r between populations).

The population of Internet publications, where there is the association of semantic units «genetic engineering» and «humanity», with a greater frequency of use terms that serve to designate primarily human traits and attitudes. This applies to both the mass mentality, and theoretical constructs of modern disciplinary matrix of anthropology. However, the greatest interest is the rating of the symptoms of belonging to the humankind.

In accordance with the our model it would be expected that the cluster of the term «humanity» reflects only the deterministic by culture changes. In this case, technology (genetic engineering) intervention to improve them will be evaluated as the most risky. Attributes designated semantic units associated with «human nature» will be treated as such, management or maintenance of which in the normal range, it is desirable and justified (if this does not change the composition and the frequency distribution of cluster «humanity»).

In this regard, interesting is the frequency distribution (fig.5.2) of semantic associations. The highest rating in the cluster of «humanity» are terms referring to the groups to ensure social structure (the third group of attributes), means of communication and coordination (5th group) and means of rational thinking (1-st group): «Helping strangers», «Working», «Serving others», «Making things», «Reading», «Writing», «Studying».

Their change to be considered as the principal terms of controlled by socio-cultural module diagnostic complex for features of humanization/dehumanization under the influence of technology-driven evolution. Technological manipulation, affecting their material and the substrate (including genetic) basis, should be considered at the mentality of Western civilization as extremely risky.

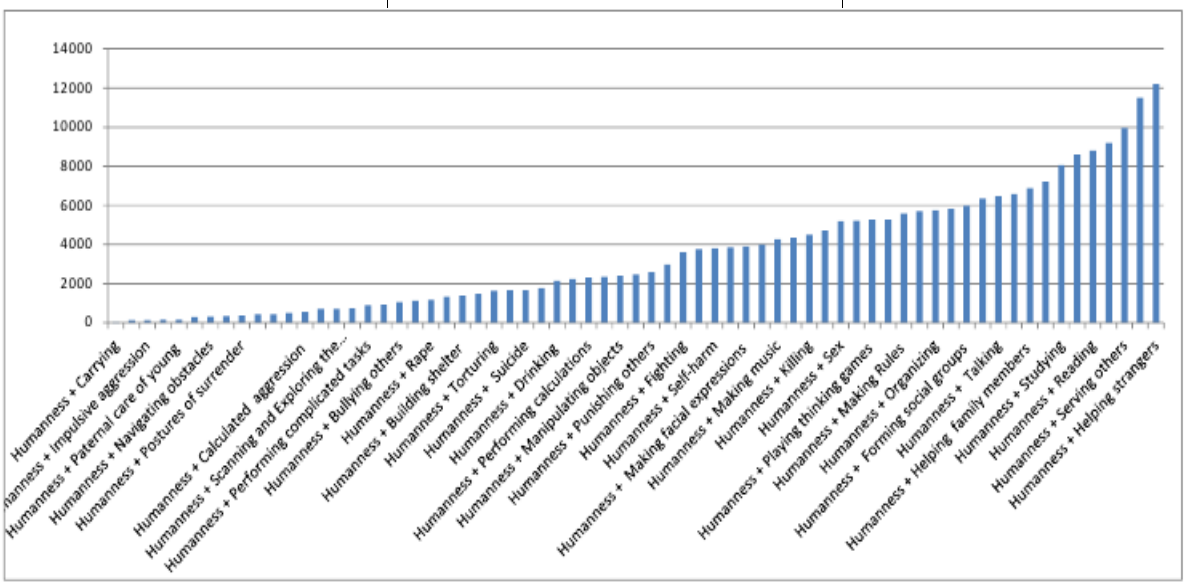
Table 5.1

Equivalence of used in the study English – Russian – Ukrainian lexical units
(see fig. 54-5.5)

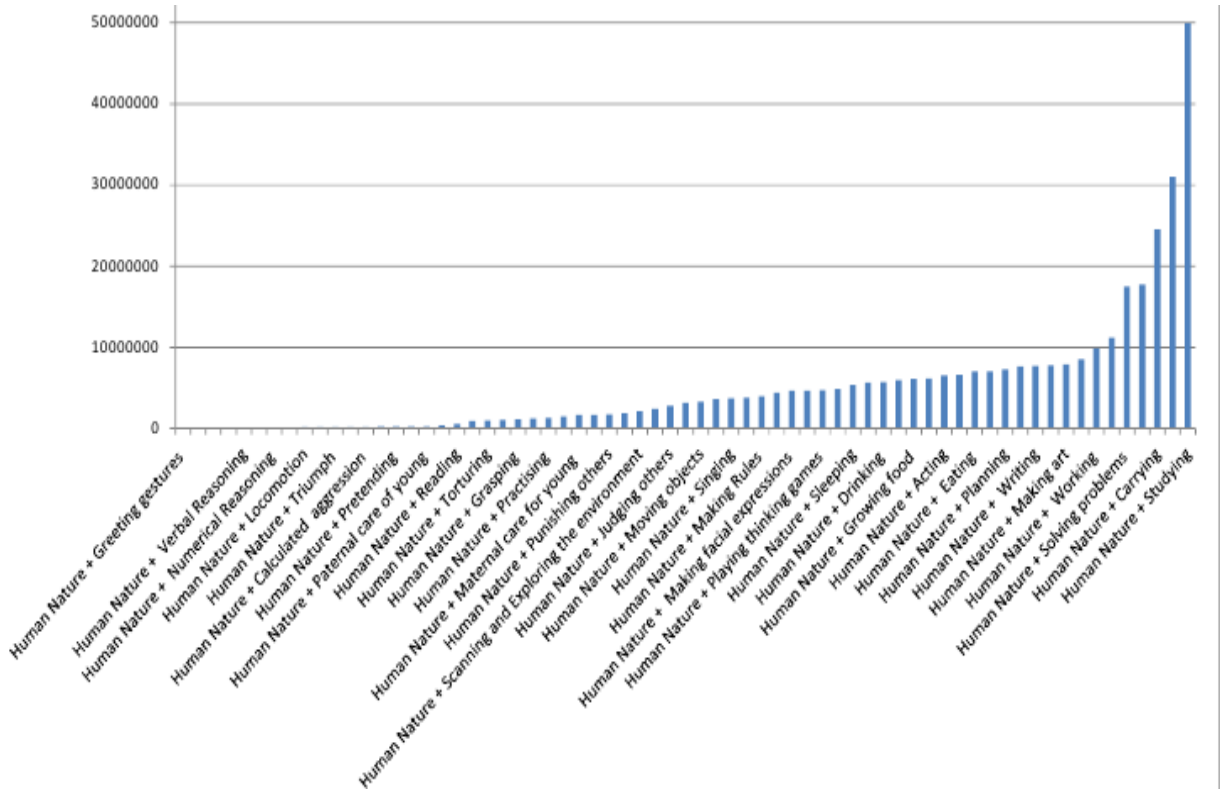
English	**Russian**	**Ukrainian**
1	***2***	***3***
Acting, Pretending	Хитрость	Хитрість
Begging	Бедность	Бідність
Building shelter	Строительство жилья	Будівництво житла
Bullying others, Rape	Насилие	Насильство
Calculated aggression	Расчетливаяагрессивность	Обачлива агресивність
Carrying	Доминирование	Домінування
Drinking	Алкоголизм	Алкоголізм
Eating	Обжорство	Обжерливість

Establishing and maintaining affectionate relationships	Тактичность	Тактовність
Fighting	Борьба	Боротьба
Following Rules	Законодательство	Законодавство
Forming social groups	Лидерство	Лідерство
Game, play	Игра	Гра
Grasping	Усидчивость	Посидючість
Greeting gestures	Доброжелательность	Доброзичливість
Growing food	Питание	Харчування
Helping family members	Отзывчивость	Чуйність
Helping strangers	Альтруизм	Альтруїзм
Hunting	Охота	Полювання
Impulsive aggression	Импульсивная агрессия	Імпульсивна агресія
Judging others	Критицизм	Критицизм
Killing	Убийство	Вбивство
Locomotion	Подвижность	Рухливість
Making art	Артистизм	Артистизм
Making facial expressions	Мимика	Міміка
Making Rules	Законотворчество	Законотворчість
Manipulating objects	Конструктивизм	Конструктивізм
Maternal care for young	Родительское поведение	Батьківська поведінка
Moving objects	Целеустремленность	Цілеспрямованість
Navigating obstacles	Ориентация	Орієнтація
1	***2***	***3***
Negotiating	Коммуникабельность	Комунікабельність
Non-vocal communication	Жестикуляция	Жестикуляція
Numerical Reasoning	Вычислительные способности	Обчислювальні здібності
Organizing	Организованность	Організованість
Paternal care of young	Родительская забота	Батьківська турбота
Performing calculations	Расчетливость	Розважливість
Performing complicated tasks	изобретательность	винахідливість
Performing repetitive tasks	Аккуратность	Упорядкованість
Planning	Планирование	Планування
Playing physical games	Игривость	Грайливість

Postures of surrender	БезУспешность	Безуспіінність
Practising	Практицизм	Практицизм
Punishing others	Садизм	Садизм
Reading	Чтение	Читання
Scanning and Exploring the environment	Наблюдательность	Спостережливість
Hunting	Охота	Полювання
Self-harm	Самоповреждения о	Самоуікодження
Serving others	Самоотверженность	Самовідданість
Sex	Похотливость	Похітливість
Singing, Making music	Музыкальность	Музикальність
Sleeping	Сонливость	Сонливість
Solving problems, Making things	Креативность	Креативність
Speaking, Talking	Общение	Спілкування
Stealing	Воровитость	Воровитість
Studying	Сообразительность	Кмітливість
Suicide	Суицидальность	Суїцидальність
Teahing	Обучаемость	Навчання
Torturing	Жестокость	Жорстокість
Triumph	Успешность	Успіініть
Verbal communication	Красноречие	Красномовство
Verbal Reasoning	Вербальные способности	Вербальні здібності
Working	Работоспособность	Працездатність
Writing	Письмо	Написання

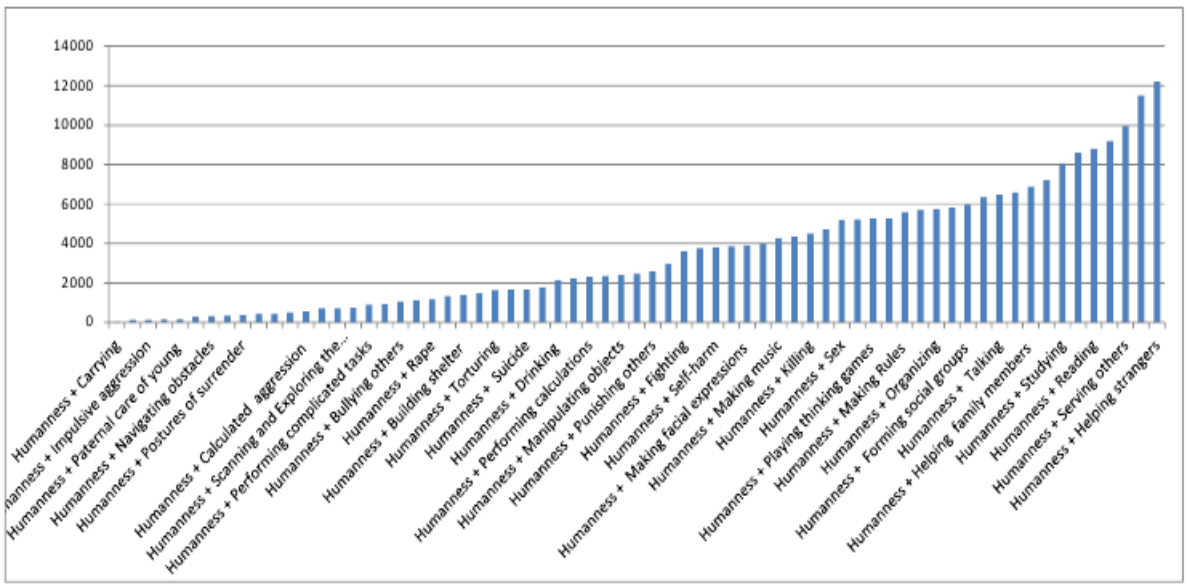


I

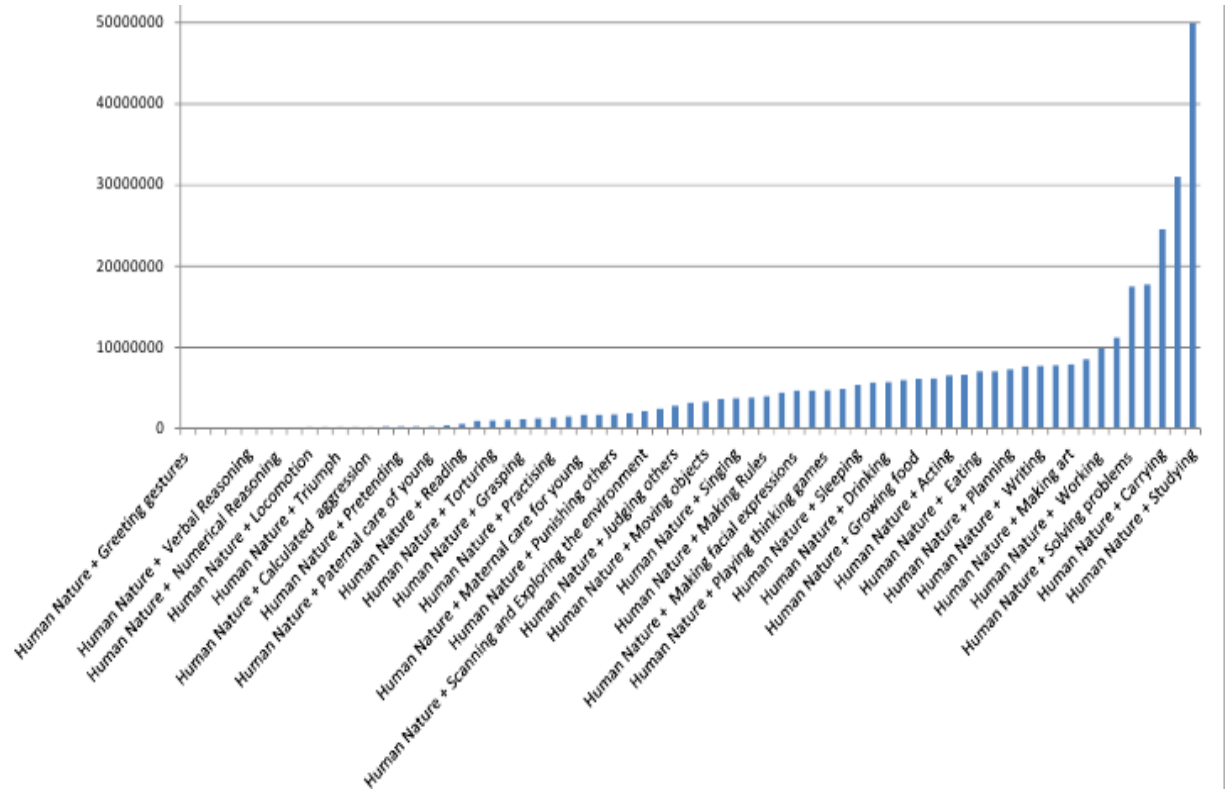


II

Fig. 5.2.Frequency distribution of semantic associations (N_{ij}) for concepts «humanity» (I) and «human nature» (II) in the pool of Internet publications on gene technology at English areas sector (Google.com, 2000-2012).

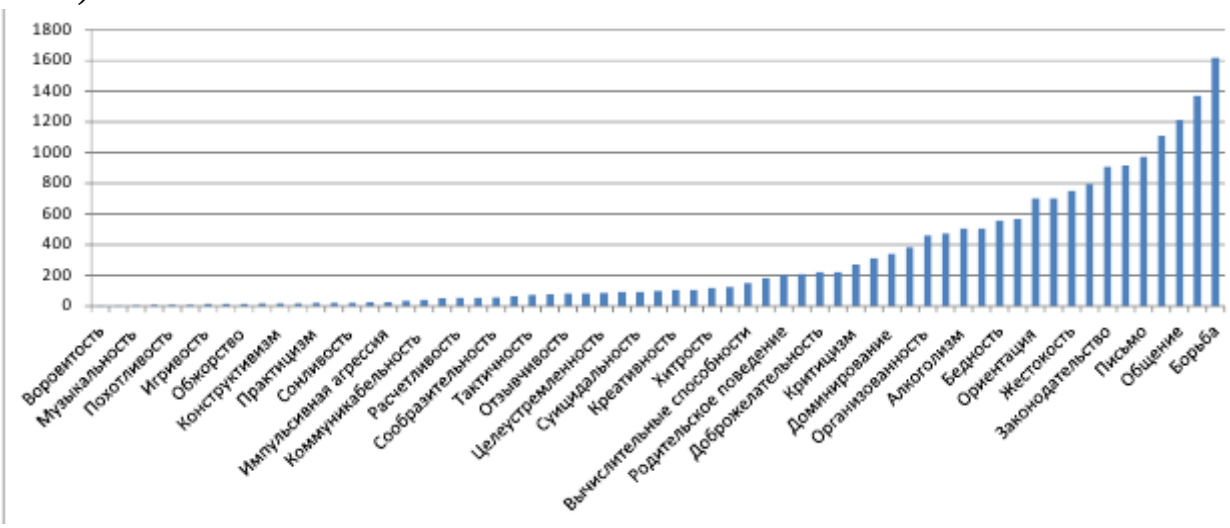


I

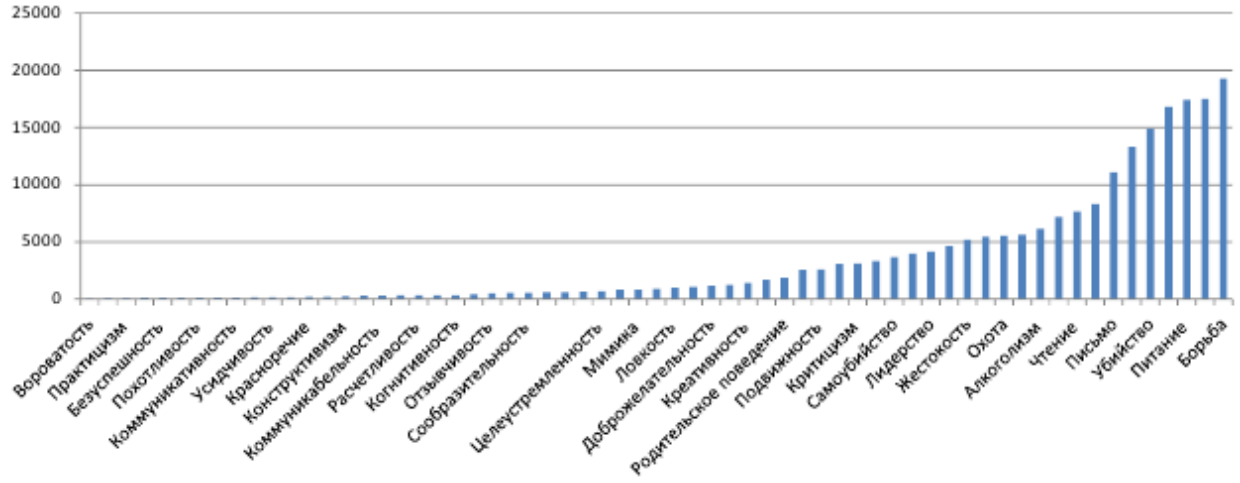


II

Fig. 5.3 Frequency distribution of semantic associations (N_{ij}) for concepts «humanity» (I) and «human nature» (II) in the pool of scientific Internet publications on gene technologyat English areas sector(Scholar.google.com, 2000-2012).



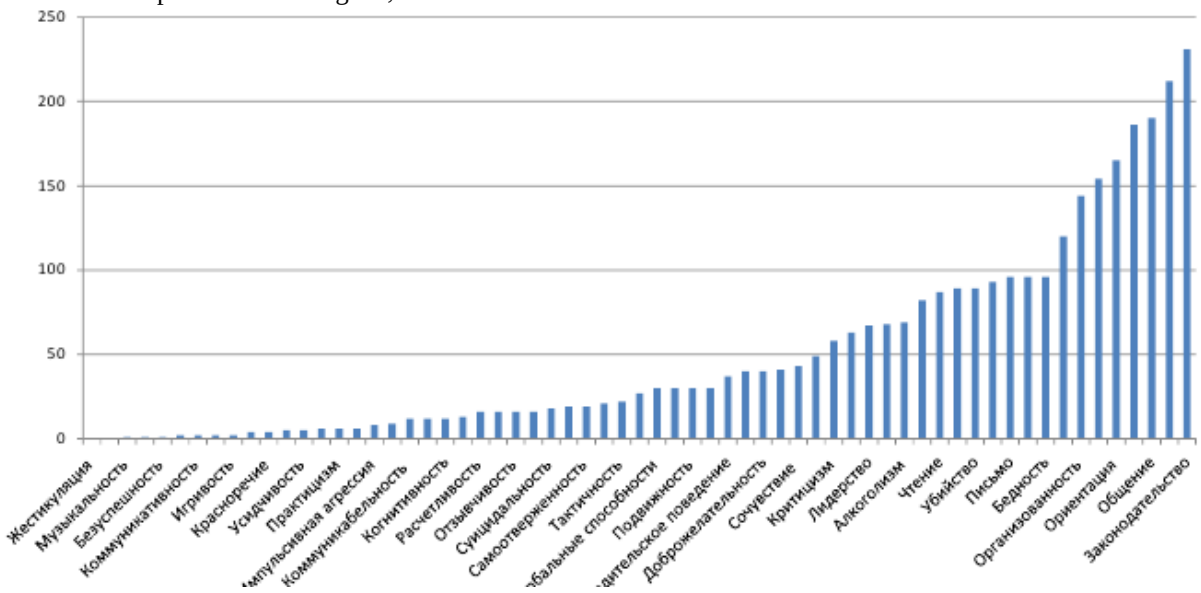
I



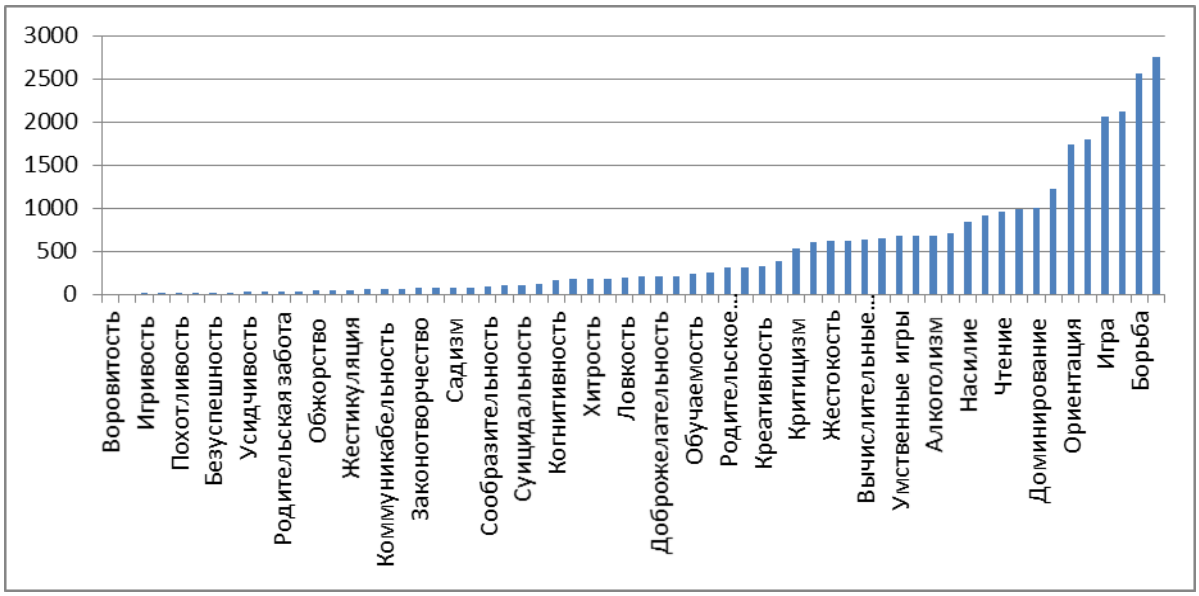
II

Fig.5.4. The frequency distribution of the lexical associations (N_{ij}) concepts of «humanity» (I) and «human nature» (II) at Russian/Ukrainian sector of the pool of *WEB*-publications on biotechnology*.

*The Russian-language lexical items equivalent to English counterparts (fig.5.2-5-3). Lexical correspondences of English, Russian and Ukrainian verbal constructs see table 5.1



I



II

Fig.5.5 – The frequency distribution of the lexical associations (N_{ij}) concepts of «humanity» (I) and «human nature» (II) at Russian/Ukrainian sector of of the pool scientific *WEB*-publications on biotechnology*.

*The Russian-language lexical items equivalent to English counterparts (fig.5.2-5-3). Lexical correspondences of English, Russian and Ukrainian verbal constructs see table 5.1

By the same (1, 3, 5) group of attributes include semantic units associated with the cluster of «humanity». Thus, the absolute priority of maintaining humanity have different parameters of social behavior, and (to a lesser extent) – (social) intelligence.

Next, in descending order of strength of association with the concept of «humanity» are the physiological and morphological characteristics and means of social survival/viability (Group 2) and the manipulation of external(ecology and socio-cultural) environment (Group 4).

Finally, a short list of features related or contributing to anti-social behaviors, for the destructive social organization (Group 6 and partially group 4).

This shift of the spectrum of semantic association represents, in our opinion, of particular interest. The sequence of this fragment of the frequency spectrum as follows: «grasping», «drinking», «negotiating», «suicide», «non-vocal communication», «torturing».

Immediately struck by several circumstances. Lexical unit «Grasping» is multi-valued metaphor. Its contents can be interpreted in three ways:

1. The morphology and motility – the appearance of grasping hand.
2. Sensorics – understanding difficult to interpret the facts or their complexes by separating the essential parameters of the object, which in this context can be neglected.
3. Cognitivistics – the development of abstract thinking.

In modern psychology, defines the term Grasping: the ability to move together two or more mutually facing surfaces in three-dimensional space, to move together while still allowing free movement of the remaining fragments of the holding surface. Thus the acquisition of the ability to stimulate the transformation in the sensorimotor system and made possible the development of abstract thinking. Therefore, the highest rating of this trait among the other attributes of human is quite understandable. The same applies to the ability to achieve a compromise of conflicting interests and the ability to understand and manage their neighbors without the aid of verbal communication. Thus, this term is a member of the group 4 of features, which includes the manipulation of external funds of natural and socio-cultural environment.

But it is equally interesting that the other attributes of humanity in this part of the frequency spectrum are more negative than positive emotional, and belong to a group of 6 of self-identification attributes. Moreover, among the terms of this cluster little of terms related to the provision of basic factors sapientatlon according to modern theories of anthropogenesis.

We believe that the true original working hypothesis linking the composition and characteristics of online information fragments and the structure of mental predisposition. Then, in the mentality of the unique attributes of the identity of Homo sapiens are associated primarily with the signs that are able to go beyond adaptive norm and detected just by its extreme manifestations. The paradox is that these characteristics are determined by culture, and their optimization by means of gene technology on the same concepts should not be admissible and effective.

The shape of the frequency distribution of lexical associations generally monotonic, and shows no abrupt fracture. As we can probably assume a structure and composition of mental complex «humanity» not strictly differentiated and its reconstruction in the future is possible. An additional argument in favor of the high ductility of socio-psychological predisposition on the basis of «humanity» is the fact that a number of concepts associated with this construct, overlaps with the identical constructs associative pool of «human nature».

Lexical association of the concept of «human nature» are easily detected even visually turning point separating 5 signs with the greatest values ranking from the rest of them.

The strongest association found for semantic concepts «Studying», «Sex», «Carrying, «Helping family members», «Solving problems». This set of concepts, and behind them the attributes of human beings is a mixture of members of the 1-st, 2-nd and 4-th groups. These features taken togetherprovide cognitive processes, ability to habitat reconstruction and organization of the most close social relationshipsAs to be expected, namely the improvement of cognitive abilities and reconstruction of sexual behavior are the most anticipated for technological manipulation objects in the modern mentality.

Among the attributes of weakly associated with the «humanity» and genetic engineering are «carrying», «greeting gestures», «impulsive aggression», «numerical reasoning», «paternal care of young». Obviously, these signs are not considered as significant in terms of the uniqueness of the human being. Does this mean that these signs of the modern mentality refers to those features of Homo sapiens, which have an animal origin?

Referring to the cluster of «human nature». Composition constructs with the lowest frequency of occurrence of cluster does not coincide, in general, with the composition of the previous cluster.

In general, the «gray» area of the frequency spectrum (signs with intermediate frequencies) in cluster «humanity» is a wide. Perhaps the possibility of genetically engineering optimization in strong measure will depend on the efficiency of use of the social construction(mind control) technology. For a control of the evolution of these features will be a significant factor in the balance of the competing impacts of groups of influence on public opinion, at least, on the implementation of the relevant stages of the initiation process protocols.

Among the semantic constructs with the greatest frequency in both clusters there a significant number of names negatively perceived traits. This may indicate a significant public attention to the technological possibilities of correction of negative deviations from the already developed during anthropogenesis standards, though it not allows you to find one on the prevailing attitude towards this possibility. The first mentality reveals the possibility of technological intervention to maintain the already established norms, but not its optimization, i.e., going beyond already established limits, even though in order to improve and enhance the attributes of humanity to the mental ideal.

As might be expected, the concepts are more the coefficient of association will be characterized by greater significance of this factor.

In the mentality the content of the concept of «humanity» doing more preferred an optimizing these attributes through sociocultural engineering, rather than genetic and biotechnologies. In other words, the preservation of human uniqueness must be ensured at a constant of the human genome, or the part that is responsible for these symptoms. Therefore, this optimization should be carried out by individual behavioral adaptation and reconstruction of the social and cultural environment, but does not improve the genome. At least, this corresponds to a system of value priorities of the modern West (Atlantic) variant of technological civilization.

An example of such a reconstruction and its ideological base can serve as a paradigm valeology in the former Soviet Union and the anti-psychiatry at the West. By decreasing the value of the semantic association of these traits with «humanity» and/or by increasing the value of their semantic association with «human nature», the possibility of using genetic engineering will meet more favorable social context.

Sharper conclusions can be made by clicking on the absolute performance of the semantic association of the concepts of «humanity» and «human nature» (in conjunction with the term genetic technology), and the individual features humanization/dehumanization (N_{ij}) relative to the value of this parameter (F_{ij}). The total frequency distribution pattern of associative links naturally preserved. However, it is possible to take into account the significant differences in the frequency of use in the pool online publications themselves these concepts and, consequently, the size of associative clusters «humanity» ($N_{ij} = 18.3 \cdot 10^3$) and «human nature» ($N_{ij} = 6.42 \cdot 10^6$) . This significant difference, at least in part, can be explained by a natural accent of this technology sector in the manipulation of the genetic code, not the cognitive and socio-cultural codes.

First, it should note that between the volume of «humanity» and «human nature» clusters and the value of the semantic associations of their constituent terms there is an inverse relationship. At the more numerous cluster value of the coefficient of association as much lower as compared to the alternative - as in the whole group, and on separate lexical units. Perhaps the subject of communications on global ethical and social problems, are dissolved among the masses of technical and pragmatic details.

In other words, according to our interpretation, the mentality of the modern civilization does not consider the issue evolutionary of risk as a significant problem, if not refer to gene technology personal mental and physical uniqueness. (Uniqueness, we recall, is associated with «humanity», not with «human nature»). In general, this indicates a more favorable perception of the process modifications of genetic and biological module compared with the development of technology control and individual choice («free» mind). Mind control individuals and social groups across a large (obviously negative) attention than with the reconstruction of the bodily organization.

A second series of studies was carried out on the pool of scientific publications at site scholar.google.com (fig. 5.3). In accordance with the original working hypothesis, these data reflect the structure about socio-cultural predisposition and biological components of the anthropological status of Homo sapiens, if the components of status are exposed to actual or potential genetic technological reconstruction (human enhancement). In other words, the results should reflect the circulating within the scientific community (and apparently consistent with the disciplinary matrix) representation of the relationship between biological and socio-cultural inheritance in the definition of specific traits.

Naturally between frequency spectra of this indicator in the overall pool of online publications (it reflects «public opinion» in general) and a pool of scientific publications (it reflects the structure of the disciplinary matrix and predisposition of specialists) were fully expected some differences.

The pool of scientific publications, most associated with the concept of «humanity» (reflecting the uniqueness of Homo sapiens, and is provided by socio-cultural module of SESH), proved to the terms (in descending order of frequency values and coefficient of association) «Studying»; «Making things»; «Serving others»; «Helping strangers»; «Speaking»; «Working»; «Practicing».

At the cluster of «human nature», there is a similar sequence of frequently used terms, and, accordingly, there exist a sequence of most strongly associated with the same concept terms. At the pool of scientific publications a large number of lexical units represents sequence with a very near and close to 1 values semantic of association coefficient (F_{ij}). The individual characteristics significantly exceed this value. Thus some lexical units substantially exceeds this value. These points note output of analyzed reports from the area mainly associative links between semantic units in the sphere of primarily verbal and logical links. The latter, in turn, reflect the causal relationship between the designated objects. Thus, the criterion of semantic association becomes incorrect.

The most striking example is the frequency of lexical unit «Playing thinking games» of cluster of «human nature» in a pool of scientific publications online. Frequency of concept «Playing thinking games» are outside the range of values of other concepts (N_{ij} = 4730000; F_{ij} = 268.75). The obvious way this attribute and denoting concept is biologically determined key parameter of the anthropological characteristics of Homo sapiens in the framework of the existing disciplinary matrix.

Among 6 groups of humanization/dehumanization attributes in associating with «humanity», in the total pool of publications coefficient F_{ij} falls in the direction

Group 1– «Language and Thought», $F_{ij} = 0.285 \pm 0.171$;

Group 3 – «Means of maintaining the hierarchical structure and activity relationship», $F_{ij} = 0.256 \pm 0.205$;

Group 5 – «Means of symbolic communication and coordination of actions of individuals», $F_{ij} = 0.198 \pm 0.184$;

Group2 – «Means of communication within the family and with close members of the social environment», $F_{ij} = 0.155 \pm 0.125$;

Group 6 – «Damage to themselves and to other members of their social group, $F_{ij} = 0.143 \pm 0.159$;

Group 4 – «Manipulation of fragments of the physical and social environment, $F_{ij} = 0.112 \pm 0.097$.

Note, in the same way this parameter changed in the case of associations with the concept of «human nature» in the total pool of publications. However, the value of this indicator in the total pool of publications significantly (by several orders of magnitude) lower than that of scientific publications. This should be seen as the logical-link substantive terms established in the abstract theoretical constructs (disciplinary matrix) to be more stable and higher than the association terms in mentality.

On the other hand, as the same data show the distribution of mental association currently represents a fuzzy projection of scientific and theoretical logical connections within a single logical structure. In other words, the flow of information in the direction of a scientific theory to mass consciousness dominates over feedback, i.e. over influence of ideological, philosophical, ethical, humanistic, etc. predisposition regarding the themes and content of scientific ideas about the applications of genetic engineering technologies to the human evolution.

The overall conclusion is reduced to a system-forming values of objectified concept of disciplinary matrix (scientific paradigm) in the field of genetics and genetic engineering for the main trends of transformation of evolutionary landscape of techno-culture-anthropogenesis. System of value priorities as factors of the dynamics of humanization/dehumanization to forecast the trajectory of the global evolution of Homo sapiens is a derivative of them.

Thus, the disciplinary matrix of gene-technological complex, according to our research is focused on the specific features of biological module of SESH. As these signs serve anthropological attributes obviously related to the genome, and the mechanisms of their formation are common in Homo sapiens and other biological organisms. Therefore, quantitative modification of this cluster bears little evidence of an evolutionary risk correlates with the loss of self-identity of culture and media intelligence.

In contrast, the mass consciousness according to the same data emphasizes precisely those signs that form socio-cultural module SESH and therefore a their modification (straight – through direct technological manipulation and spontaneous – as a result of changes mediated by modifying their biological foundation) is associated with the highest evolutionary risk. This discrepancy between the socio-cultural and techno-rationalistic spheres of adaptive socio-culture-anthropogenesis fraught with serious conflicts in the future. However, now the intensity of internal conflicts in mentality of modern civilization have not yet reached the threshold of the hard social conflict between its socio-humanitarian, scientific and technological sectors. Evidence of this, as already mentioned, are insignificant coefficient

semantic (lexical) association of public and scientific research sectors online publications.

At the same time, sufficiently high coefficient of semantic association of the cluster of «humanity» suggests considerable research activity of so-called humanitarian technologies (High Hume in the narrow sense of the term, i.e. political, advertising, etc.), that can significantly effect on the associative structure of mentality in the future.

So, the result of the implementation of combined social and biotechnological innovations have to extend and improve the quality of life and physical organization of Homo sapiens, and will be determined by the resultant of HN/HU. The current configuration of the Western mentality is characterized by prevalence of HU-component of the Western mentality (from the 1950s) with the continuous growing (as a reaction to the development of medical biotechnology and genomics) specific weight of HN-component.

More distant and less reliable conclusion applies to perceived divergence of global evolution trend and increase the probability of the scenario of splitting humankind to many divergent biological (or biotechnological) species. However, this perspective stems from too unstable quantitative trends with respect to changes in the mental structure of our chosen method of analysis.

Next, we investigated the structure of semantic associations equivalent forms of East Slavic sector of online publications related to the use of gene technology.(English - Cyrillic equivalence of used in the study lexical units are presented in table 5.1.). In accordance with the initial hypothesis common pool of Internet publications should reflect the characteristics of the mass consciousness and mentality, with their inherent system of evaluation priorities for the various aspects of the topic associated to a particular lexical unit (concept).

For this purpose, the matrix was composed of semantic associations studied concepts and terms in the Cyrillic (Russian/Ukrainian, par excellence) sector of Google search engines.

First of all, we note that the trend to strengthen the association of categorical terminological apparatus of biotechnology with the process of humanization/dehumanization traced here too. The number of references to the concepts of «humanity» and «human nature» here is quite significant and increasing over the past 10-15 years (fig. 5.4). This trend applies to all considered in this study terms of the conceptual field of biotechnology and genetic engineering. At the same time, both in the scientific online publications, as well as in the total pool, the association of genetic engineering technologies with the concept «humanity» (N_{ij} = 95.000) is much lower in absolute and relative terms compared with the concept of «human nature» (N_{ij} = 248.700). (Relating to the common pool of internet publications quantities are given).

In the English-language sector as we can remember, such frequency distribution is characteristic only for scientific publications.

Concept «humanity» most strongly associated with the semantic units of «biological safety» (F_{ij} = 0.255), «genome» (F_{ij} = 0.145), «biological risk» (F_{ij} =

0.127) in the total pool of Internet publications. The pool of scientific research publications rating the most powerful semantic associations is somewhat different: «Biological Safety» (F_{ij} = 0.315), «biological risk» (F_{ij} = 0.233), «genome» (F_{ij} = 0.164).

The coefficient of association (F_{ij}) «human nature» with the terms of «biosecurity» and «bio-risk» in the total pool of publications. It shows a sharp jump so that it is meaning go beyond the «physical sense» – 1.91 and 1.141, respectively. The third and fourth place in the ranking is occupied by a «genome» (F_{ij} = 0.71) and «GMOs» (F_{ij} = 0.85).

In pool of scientific publications from the group consisting the highest values of association coefficient (the first three elements of rating descending sequence values F_{ij}) lexical unit «GMOs» falls in comparison with total publications pool. As second difference, the range of values is not beyond the scope of «physically meaningful» in the technique of content analysis. It is, as already mentioned, the predominance of verbal and logical, rather than associative links between the members of binary links of lexical units.

In general, as we can conclude both for ethical scientific constructs, in the public mind (mentality) of East Slavic sector network has developed a clear trend. Its content is the interpretation of the possible positive and negative effects of genetic technology through technology impact on the process of humanization/dehumanization of human (Homo sapiens). However, if within the scientific community, this trend is based on the logical structure of the disciplinary matrix, in mentality – largely on emotional and figurative connotations.

However, unlike the English sector of the Network in the East Slavic (based on the Cyrillic alphabet) sector Internet two-cluster association structure of the totality of symptoms that must be considered in the assessment of the effects of the implementation of genetic technologies did not work, or it could not be detected by the techniques used of content analysis.

Indeed, in the total pool of Internet publications on gene technology rating semantic units, most associated with the concept of humanity, is as follows: Борьба, Fighting (N_{ij} = 1620); Игра, Game (N_{ij} = 1370); Общение, Speaking, Talking (N_{ij}=1210); Питание, Eating (N_{ij} = 1110); Письмо, Writing (N_{ij} = 974); Убийство, Killing(N_{ij} = 915); Законодательство, Making Rules(N_{ij} = 910); Успешность, Triumph (N_{ij} = 795).

A similar sequence for the «human nature» is Борьба, Fighting (N_{ij} = 19300); Игра, Game (N_{ij} = 17500); Питание, Eating (N_{ij} = 17400); Законодательство, Making Rules (N_{ij} = 16800); Убийство, Killing (N_{ij} = 14900); Общение, Speaking, Talking (N_{ij} = 13300); Письмо, Wrighting (N_{ij} = 11100); Успешность, Triumph (N_{ij} = 8300)

The composition of the two sequences is the same at 87%, and in 3 symptoms (Fighting, Game, and Triumph) is the same their position in the frequency spectrum too. Such a coincidence indicates ambivalence attributing most symptoms as belonging to one of the two clusters, and, therefore, and the lack of a clear differentiation between «humanity» and «human nature» in East Slavic

Sector of Internet. This, in turn, could be evidence of geopolitical differentiation of Western and Eastern Slavic (post-Soviet) mentality on the impact of modern genetic technologies in the process of humanization/dehumanization of humanity. (Although more precise, we should speak about targeting Latin and Cyrillic cultures).

Against the imperfections of the method as an alternative explanation for the data indirectly indicate marked differences between the structure of associative links common pool of publications and a pool of scientific publications on issues related to «human nature» or «humanity» in Russian/Ukrainian Sector of Network. Our methodology allowed to reveal that the value of F_{ij} cluster «humanity» in a common pool of publications concede, and in a pool of scientific publications – exceeds that of the cluster «human nature». For the English-language sector of the observed ratio.

The average values of the association (F_{ij}) by groups of signs constitute ranked sequence for which a common pool of publications can be represented as follows.

Cluster «humanity»:

1. Group 4 – The manipulation of fragments of the physical and social environment $F_{ij} = 0.00245 \pm 0.0029$.

2. Group 1 – Language and thought $F_{ij} = 0.00240 \pm 0.0025$.

3. Group 6 – Antisocial symptoms (causing harm to themselves and to other members of their social group) $F_{ij} = 0.0017 \pm 0.0017$.

4. Group 3 – Social signs II (a means of maintaining the hierarchical structure and activity relationship) $F_{ij} = 0.00106 \pm 0.0014$.

5. Group2 – Social characteristics I (means of providing communication within the family and with close members of the social environment) $F_{ij} = 0.0007 \pm 0.00084$.

6. Group 5 – Social characteristics III (means of symbolic communication and coordination of actions of individuals) $F_{ij} = 0.00048 \pm 0.00041$.

A cluster «human nature»:

1. Group 4 – The manipulation of fragments of the physical and social environment $F_{ij} = 0.155 \pm 0.186$.

2. Group 1 – Language and thought $F_{ij} = 0.146 \pm 0.168$.

3. Group 3 – Social characteristics II (a means of maintaining the hierarchical structure and activity relationship) $F_{ij} = 0.062 \pm 0.126$.

4. Group 6 – Antisocial symptoms (causing harm to themselves and to other members of their social group) $F_{ij} = 0.0523 \pm 0.0622$.

5. Group2 – Social characteristics I (means of providing communication within the family and with close members of the social environment) $F_{ij} = 0.049 \pm 0.053$.

6. Group 5 – Social characteristics III (means of symbolic communication and coordination of actions of individuals) $F_{ij} = 0.0196 \pm 0.0178$.

The pool of scientific publications ranked similar sequence as follows.

Cluster «humanity»:

1. Group 1 – Language and thought $F_{ij} = 0.229 \pm 0.204$.

2. Group 4 – The manipulation of fragments of the physical and social environment $F_{ij} = 0.220 \pm 0.234$.

3. Group 3 – Social characteristics II (a means of maintaining the hierarchical structure and activity relationship) $F_{ij} = 0.159 \pm 0.224$.

4. Group 6 – Antisocial symptoms (causing harm to themselves and to other members of their social group) $F_{ij} = 0.158 \pm 0.146$.

5. Group2 – Social characteristics I (means of providing communication within the family and with close members of the social environment) $F_{ij} = 0.076 \pm 0.075$.

6. Group 5 – Social characteristics III (means of symbolic communication and coordination of actions of individuals) $F_{ij} = 0.067 \pm 0.045$.

A cluster of «human nature»:

1. Group 1 – Language and thought $F_{ij} = 0.171 \pm 0.163$.

2. Group 4 – The manipulation of fragments of the physical and social environment $F_{ij} = 0.165 \pm 0.191$.

3. Group 3 – Social characteristics II (a means of maintaining the hierarchical structure and activity relationship) $F_{ij} = 0.110 \pm 0.18$.

4. Group 6 – Antisocial symptoms (causing harm to themselves and to other members of their social group) $F_{ij} = 0.080 \pm 0.085$.

5. Group 2 – Social characteristics I (means of providing communication within the family and with close members of the social environment) $F_{ij} = 0.059 \pm 0.059$.

6. Group 5 – Social characteristics III (means of symbolic communication and coordination of actions of individuals) $F_{ij} = 0.039 \pm 0.026$.

This data can be compared with earlier English-language sector of the Internet.

The total pool of English sector of the Internet publication of the average value of each group of signs F_{ij} has following ranked order.

Cluster «humanity»:

1. Group 1 – Language and thought $F_{ij} = 0.285 \pm 0.171$.

2. Group 5 – Social signs III (means of symbolic communication and coordination of actions of individuals) $F_{ij} = 0.246 \pm 0.00137$.

3. Group2 – Social characteristics I (means of providing communication within the family and with close members of the social environment) $F_{ij} = 0.211 \pm 0.0012$.

4. Group 6 – Antisocial symptoms (causing harm to themselves and to other members of their social group) $F_{ij} = 0.143 \pm 0.159$.

5. Group 4 – The manipulation of fragments of the physical and social environment $F_{ij} = 0.128 \pm 0.0002$.

6. Group 3 – Social signs II (a means of maintaining the hierarchical structures and activity relationships) $F_{ij} = 0.0232 \pm 0.00017$.

A cluster of «human nature»:

1. Group 1 – Language and thought $F_{ij} = 0.0008 \pm 0.00049$.

2. Group2 – Social characteristics I (means of providing communication within the family and with close members of the social environment) $F_{ij} = 0.0006 \pm 0.00000024$.

3. Group 5 – Social characteristics III (means of symbolic communication and coordination of actions of individuals) $F_{ij} = 0.00056 \pm 0.00000022$.

4. Group 6 – Antisocial symptoms (causing harm to themselves and to other members of their social group) $F_{ij} = 0.00041 \pm 0.00045$.

5. Group 4 – The manipulation of fragments of the physical and social environment $F_{ij} = 0.00037 \pm 0.00000014$.

6. Group 3 – Social characteristics II (a means of maintaining the hierarchical structure and activity relationship) $F_{ij} = 0.000066 \pm 0.000000026$.

The pool of scientific publications online. These sequences are as follows. Cluster «humanity»:

1. Group 1 – Language and thought $F_{ij} = 0.713 \pm 0.365$.
2. Group 3 – Social signs II (a means of maintaining the hierarchical structure and activity relationship) $F_{ij} = 0.712 \pm 0.261$.
3. Group 4 – The manipulation of fragments of the physical and social environment $F_{ij} = 0.541 \pm 0.0029$.
4. Group 5 – Social characteristics III (means of symbolic communication and coordination of actions of individuals) $F_{ij} = 0.485 \pm 0.329$.
5. Group2 – Social characteristics I (means of providing communication within the family and with close members of the social environment) $F_{ij} = 0.448 \pm 0.305$.
6. Group 6 – Antisocial symptoms (causing harm to themselves and to other members of their social group) $F_{ij} = 0.314 \pm 0.304$.

A cluster of «human nature»:

1. Group 4 – The manipulation of fragments of the physical and social environment $F_{ij} = 1.142 \pm 0.0012$.
2. Group 6 – Antisocial symptoms (causing harm to themselves and to other members of their social group) $F_{ij} = 1.0625 \pm 0.0005006$.
3. Group 3 – Social signs II (a means of maintaining the hierarchical structure and activity relationship) $F_{ij} = 1.051 \pm 0.067$.
4. Group 5 – Social signs III (means of symbolic communication and coordination of actions of individuals) $F_{ij} = 1.036 \pm 0.0003$.
5. Group 1 – Language and thought $F_{ij} = 1.029 \pm 0.042$.
6. Group2 – Social characteristics I (means of providing communication within the family and with close members of the social environment) $F_{ij} = 1.016 \pm 0.338$.

To illustrate the consequences of associations ranked HUMANITY in the cluster can be represented in the form of diagram:

GENERAL (TOTAL) POOL

1 5 2 6 4 3 **(Latin)**

---

1 3 4 5 2 6 (**Cyrillic**)

POOL OF SCIENTIFIC PUBLICATIONS

1 5 2 6 4 3 **(Latin)**

in a cluster of human nature the same scheme is follows

4 1 3 6 2 5 (**Cyrillic**)

GENERAL (TOTAL) POOL

1 2 5 6 4 3 **(Latin)**

---

1 4 3 6 2 5 (**Cyrillic**)

POOL OF SCIENTIFIC PUBLICATIONS

4 6 3 5 1 2**(Latin)**

The obvious difference is in the structure of semantic associations text fragments in the English- and Russian-Ukrainian segment of the Internet. The same can be said of the relationship between sectorial structures of common pool of publications and a pool of scientific publications.

At the Cyrillic sector of the Network the most significant association between belonging to humanity and the attributes of human as a biosocial being marked according to ability to abstract thinking, language and purposeful reconstruction of material and spiritual reality.

It is necessary to use a fuzzy expression, perhaps even a metaphor, «belonging to humanity» in view of the above stated the lack of a clear differentiation of mental predisposition to two cluster – provided by the biological inheritance «human nature», and the socio-cultural determined «humanity».

However, even more important is another circumstance. 2rd and 3rdpositions in the ranked list of signs of humanity and human nature take indications of the ability to maintain a hierarchical social organization, and asocial behavior.

Characteristically, the largest association coefficient (0,6795 ± 0,0123 for the first cluster and 0,5791 ± 0,00366 second) has a lexical unit «Борьба Fighting»(group 4)among scientific publications. This lexical design has an obvious (constructive/destructive) emotion coloring. High values F_{ij} are also lexical units «насилие, Bullying others, Rape» (0.385 ± 0.0134 for the 1st cluster) and «Жестокость, Torturing» (0.3077 ± 0.0120 and 0.1414 ± 0.00182 for the 1st and 2nd clusters, respectively), «алкоголизм, пьянство, Drinking» (0.221 ± 0.0097 and 0.1549 ± 0.00196), «Убийство, Killing» (0.28525 ± 0.0115 and 0.1418 ± 0.00183). The group owns the following three lexical structure with high values F_{ij}– «Законодательство, Following Rules» (0.7404 ± 0.0108 and 0.6221 ± 0.00353), «Организованность, Organizing» (0.4615 ± 0.0140 and 0.276 ± 0.003),

«Работоспособность, Working» (0.157 ± 0.0074 and 0.1371 ± 0.00177), «Альтруизм, Helping strangers» (0.128 ± 0.0063 and 0.0466 ± 0.00066), «Сочувствие, Compassion, Empathy» (0.138 ± 0.0067 and 0, 0585 ± 0.00082), «Критицизм, Criticism, Judging others» (0.186 ± 0.0085 and 0.1214 ± 0.0016).

The lowest rank in the sequence have symptoms related to the provision of basic communication links within the social group and ensuring coordinated the activities of individuals, primarily with the use of various forms of symbolic communication.

We can come to the following conclusion as it reflects the above results content analysis of Web publications. The structure of the East Slavic mentality has a higher association of opportunities technological transformation,

- firstly, to the ability strengthen the vertical of social communication within society (the proto-power) and,
- secondly, to the ability an individual does not adhere to and confront the norms of social behavior, even in the case if it involves the destruction of society and the self-destruction of the individual (nonconformity, rebelliousness, revolutionariness).

The above proposition is a statement of a trend in the evolving post-Soviet mentality. Is this trend invariant socio-cultural type, or is the result of stochastic fluctuations of the last few decades or centuries of historical development?It can be found only as a result of further study of the system.

Unlike, at the EnglishWeb-sector a higher association observed for the attributes of linguistics and thinking, symbolic communication and maintenance of structures in small social groups (family, closest social environment). In the scientific community, together with the high rank of the association have the gene technology with antisocial behavior.

As can also be assumedtoo, inter-sectorial differences reflect differences in the correlative value priorities for relations individualist and communitarian intentions. In this case, the content analysis revealed a specific orientation of the Western mentality to the high priority (positive or negative) of technological modifications of microsocial environment and the mentality of the East Slavic to modification of macroparameters social system.

Finally, essential is more pronounced similarity of associative structures patternsofgeneral pool and pool of scientific publications in the English-language sector of the Network as compared with Eastern Slavic (cyrillic) sector. High coefficients of association in a pool of scientific publications are talking about an adequate conceptualization of the elements of clusters of high humanity and human nature in general transdisciplinary paradigm of biomedical and genetic technologies of HIGH HUME.

Power of the mutual influence of the mental context and theoretical constructs of modern biotechnology paradigm, we evaluated by the ratio of two factors – the correlation coefficient of associative complexes and the mismatch associationcriterion(ΔF_{ma}). Both the English- and in the Eastern SlavicWeb-sector

correlation coefficient of associative structures of scientific and mass media publications is much higher than in the cluster of «humanity», reaching a value of r = +0.791 (range of values of the correlation coefficient lies between 0.636 to 0.929). There are high positive values of the correlation coefficient in the express negative values of ΔF_{ma} for the general pool publications and positive values of the same indicator in the pool of scientific Web-publications. It say is likely a high impact scientific and theoretical constructs on the formation of mass consciousness.

In general, average ΔF_{ma} are not extremely high in absolute value. Alternative paattern would indicate strong instability of techno-humanitarian balance and, accordingly, confirm the significant magnitude of the socio-cultural and technological components of the evolutionary risk. In fact, the value of ΔF_{ma} at different groups of signs is concentrated in -2.0 to -2.8 to a common pool of publications and + 0.6 to +0.7 at scientific publications. We have found in last cluster, only three points where the magnitude of discrepancy associative patterns of mass media and various academic information fragments (ΔF_{ma}) indicates a high riskvalue, at least in the future. These points are the differences in the assessment of the significance of «non-voice communications» (ΔF_{ma} = 0.986 for the general pool, and -68.31 for the pool of scientific publications) «self-harm»(0.95 and -19.0) and «Carrying» (-1679 and 0.92). The combination of indicators F_{ij}andΔF_{ma} suggesting a stimulation of interest to scientific research by the social and cultural context, in the first case and deceleration in the rest. The relatively low coefficients of association do not allow to conclude that the critical values of techno-humanitarian component of evolutionary risk.

From the total number of publications in the general pool of English sector group 3 (a means of maintaining the hierarchical social communication and activity)and group 4 (manipulation of fragments of the physical and social environment)falls(r = 0.645 andr = 0.636 respectively).

In a «human nature» cluster correlation of associative patterns of the general pool of Web publications and pool of scientific publications significantly lower and in some cases has the opposite orientation (r = 0.002 with a range of -0.387 to +0.393).

Negative correlation of associative patterns observed in group 3 (r = -0.387) and group 6 (r = -0.165). The latter group as already mentioned, constitute different manifestations of antisocial behavior - harming ourselves and others. So, in a «human nature»clusterof English Web sector of publications quite contradictory picture of the techno-humanitarian balancedevelops. This conclusion is supported by prominent negative average magnitude of the difference of semantic associations between pools of publications (ΔF_{ma}). The range of values is between -3.2 ± 0.07 (group 1 – the attributes of language and thought) to -178.9 ± 167.1 (Group 6 – antisocial features).

In this intra-group variance in each group is quite high. Within the group values of ΔF_{ma} change from negative to positive values.In accordance to the

working model it corresponds to the predominance of scientific discourse to mass consciousness at techno-humanitarian balanceformation.

The highest positive correlations observed at group 4 (r = + 0.387) of this cluster. This can be explained on the basis of detection of contradictions between the scientific paradigm and system of social and psychological predispositionabout the environmental prospects of technological transformation. In other words, co-evolutionary bunch of opposing elements (interests and values) is formed. Superposed conceptual fields of values (axiological) and epistemological discourses is the reason for this. In the classical phase of industrial civilization, these forms of discourse do not overlap.

In our view results of scanning of Eastern Slavic (based on the Cyrillic alphabet) Sector Network are an e=ven greater interest. At extremely high values of ΔF_{ma}at associative patterns of «humanity» cluster the correlation is also very high toor = 0.927 and the range of values of the group r not lower 0,877. This correlation and ΔF_{ma} are in a cluster of «human nature»much lowerGeneral correlation between pools of mass media and scientific publications almost absent, and mean group values of this index are in the negative side of the scale and fluctuate 0 to -0.539. In other words, this area has currently the most potential and actual available for technological manipulation, and mentality of the population and the scientific community is evolving in almost opposite directions. Most likely, the associative structure of scientific communications to a much greater extent determined by the actual verbal and logical connections within the scientific paradigm than the scale of value priorities of post-Soviet society.(A paradigmatic matrix, of course, is the same in English and Cyrillic sectors of network.)

At Cyrillic sector dominance elements of scientific (descriptive) and not the social and ethical (imperative) discourse in the formation of techno-humanitarian balance is observed on the following items (lexical units)

1. «Самоубийство, suicide» (ΔF_{ma} = 1591.6 and -1.57; Group 6).

2. «Борьба, Fighting» (-95.52; group 4), «ориентация, Navigating obstacles» (-86.47; group 4) «законотворчество, законодательство, Following Rules» (-84.219 -3.158 and; group 3).

3. «Успешность, Triumph» (-75.83; group 4), « критицизм, Judging others» (-36.938; group 3), «хитрость, Acting Pretending» (-18.381; Group 5),социальное лидерство, Forming social groups (-16.44 and -11.07; group 2).

4. «Наблюдательность и подвижность, Scanning and Exploring the environment» (-10.35 and -15.85; group 2), «интеллектуальные игры, intellectual plays» (-8.769; group 1).

5. «Жестокость, Torturing» (-7.034; Group 6).

6. «Сообразительность, ingenuity» (-5.833; group 1), «родительское поведение, Maternal care for young» (-4.14; group 2).

7. «Работоспособность, Working» (-3.663; group 3), «игра, Playing physical games» (-2.117; group 4), «практицизм, Practising» (-1.571; group 3).

The first place of suicidal behavior in this rating is probably explained by the following way. At a low magnitude of semantic association in the public mind ($5{,}4 \cdot 10^{-5}$) at Eastern Slavic mentality considers suicide a consequence of personal choices and social conditions, while in science the genetic background of this phenomenon have been identified and the possibility of its modifications by genetic engineering technology has been widely discussed.

Next – anthropological attributes determining or related to social status. Psycho-physiological and genetic components of these signs (or rather, their correlation with genetic and epigenetic factors) began to emerge in the past decade. This creates quite a noticeable trend for reductionist scientific publications. Socio-psychological predisposition of European civilization rather strongly opposed to this process, as a result of cognitive dissonance generated.

Following one of the characteristics of antisocial behavior comes the next group represented by symptoms in varying degrees characterize the diverse signs of mental and physical of the human condition.

These attributes are distributed across all six groups, and the average group parameters in the total pool of «human nature» of East Slavic sector is as follows.

Group 1 – $\Delta F_{ma} = -3.2 \pm 0.07$ r = -0.07

Group 2 – $\Delta F_{ma} = -4.7 \pm 0.14$ r = -0.539

Group 3 – $\Delta F_{ma} = -10.7 \pm 0.65$ r = -0.240

Group 4 – $\Delta F_{ma} = 0.155 \pm 0.186$ r = -0.340

Group 5 – $\Delta F_{ma} = -5.1 \pm 0.16$ r = -0.358

The pool of scientific publications has its own outsiders. Possibility of technological reconstruction of these features attracted much less attention professionals compared to the total pool of publication (i.e., the structure of the preferences of the mass consciousness).These include: «артистизм, артистические способности, Making art» (ΔF_{ma} = -85.85), «Импульсивная агрессия, Impulsive aggression» (-35.844), «похотливость, сексуальность, Sex» (-20.30), «склонность к обжорству – избыточному потреблению пищи, Eating» (-17.36), «конструктивизм, Manipulating objects» (-11.224), «Расчетливость Performing calculations», (-5.12), «тактичность and коммуникабельность, Negotiating» (-4.72 and -4.15), «Красноречие, Verbal communication» (-4.136) and «аккуратность, Performing repetitive tasks» (-3.424). At these points expectations and the ability of the real technological manipulation evaluated within predisposition and intentions of the mass consciousness is much higher as compared to the scientific community

Obviously, socio-cultural psychological predisposition of East Slavic mentality expect from gene technology go beyond ways of correction of purely biologically caused pathological behavior. At the same time the importance of the biological factor in relation to the abilities of artistic creativity, sexual behavior and

irrational social behavior regarded in East Slavic mentality slightly higher than is allowed scientific theories.

In this regard, particularly interesting high rate ΔF_{ma} of Impulsive aggression (-35.844). Calculated (rational) aggression or hostility, on the contrary estimated as neutral, association coefficients are very close. Obviously, instrumentalism may be a key differentiator to unequal perception of the importance of changes in the process of humanization/dehumanization of aggressiveness, and the same applies to the prospects of technological control of aggressiveness. Rational forms of aggression are instrumentalist by definition as based on the calculation of the means to achieve the goals. Presumably, that confidence in the high specific gravity of rational emotional ("animal") motivation in the origin and development of social conflicts is the dominant psychological and socio-cultural predisposition here.

Based on the comparison of characterize our model parameters of potential (ΔF_{ma}) and current (r) violations of techno-humanitarian balance, the conflict is detected in a large number of points of associative structures patterns. However, the imbalance of the scientific and theoretical constructs and predisposition of East Slavic mentality nowhere reached a critical (existential) level, and even nowhere is essential for verification of the results of social science concepts. The exception, perhaps, of Group 2 and Group 6 (in the latter case, it concerns the individual socially important features).

Such a big difference patterns of semantic association of English and Eastern Slavic sectors of Network is reflected in the magnitude of the correlation between clusters and pools publications. Eastern Slavic and English-language sector demonstrate significant correlation only in the «humanity» cluster of scientific publications pool ($r = 0.67$). In all other cases, it varies between 0.02 – 0.03 in magnitude. It seems that the structure of associative and logical connections in comparable sectors in clusters of «humanity» and «human nature» based on a completely different system of values and priorities and predisposition on the possibilities of technological reconstruction.

Most likely, all this and, especially, low correlation of most suitable for technological manipulation features in a cluster human nature of East Slavic Web-sector permit conclusions

1. on a more stable balance between the components of techno-humanitarian balance and, consequently,
2. on a smaller relative importance of extra-scientific factors of gene technology developments in the West, compared to the post-Soviet geopolitical space.

This conclusions may seem paradoxical, given the intensity and scope of the various associated with criticism of gene technology alarmist movements in the West. Controversy, however, removed to stating extensive and influential social,

judicial and administrative control of these processes through bioethics committees, government agencies and others, at a relatively high level of development of the associative structure of predispositions of the mass consciousness and mentality.

At the same time in the former Soviet geopolitical space the balance between the public and the administrative control is clearly shifted toward administrative control measures, and as follows from extremely low values of F_{ij}, public opinion is potentially capable to sharp fluctuations. Such instability has the potential to lead to significant pressure on the implementation of technological innovations in the field of controlled evolution in a condition of political and social crisis.

However, we must take into account the peculiar post-Soviet geopolitical space a priority of maintaining macro-social stability that detects and according to our analysis. In this case, the administrative control is able to provide the high level of stability of the evolutionary trend of techno-humanitarian and techno-biological ligaments of SESH. As the necessary conditions of stability are:

• Low values of the association in the general system of mentality («public opinion»);

• Consistently high values of this parameter in the scientific community;

• Match the original predispositions of the scientific community and the political elite.

Based on our data, the first two conditions are generally met, while the third is in an indeterminate state. With regard to the thesis sustained high values F_{ij} within the scientific community we note that F_{ij} in Cyrillic sector inferior to these parameters in the English sector. In the English sector, the first members of the ranked sequence of average values of the association coefficient for the «human nature» cluster above unit. Given the nature of the search engine, this means that the attributes of the cluster integrated into the logical-semantic structure of the text.

That is, the attributes -leaders of «human nature «cluster, have already been identified as the most promising objects for gene manipulation technology of human enhancement. This conclusion relates primarily to adjustment of pathological (antisocial) attributes: a group of 6 in a cluster of «human nature» is ranked second in the ranked order of English scientific publications.

In the sector of scientific publications based on the Cyrillic alphabet, these values are lower by several orders of magnitude and patterns rated sequences differ significantly from the English pool. Group 6 is shifted significantly towards the end of the scale. Perhaps biomedical technology on the post-Soviet geopolitical space currently evaluating the idea of a genetic correction of social pathologies with more caution.

So, the impact east-Slavic historical experience of the twentieth century, in our view, is obvious. Over the past 100 years the thesis of social conditioning of human nature was in the mentality of the Russian Empire and the Soviet Union part of the official or semi-official ideological doctrine. The history of «racial hygiene» in Nazi Germany and the «genetic discussions» in former Soviet Union is deeply influenced by the structure of the predisposition of intellectual and

scientific elites in post-Soviet countries(in some contradiction with the influence of the latest scientific and technological innovation).

6. CONCLUSION

In this study, the organization of SESH consistently viewed from three perspectives.

1. The nature of the carrier (substrate) of adaptive information - biological, socio-cultural and techno-rationalist adaptive modules. This aspect is equivalent to various ways of adaptive information replication - genetic, socio-cultural and symbolic inheritance.

2. The nature of the relationship between the generation and adaptability - Darwin-Weismann modus and Lamarck modus.

3. The nature of the various adaptations co-evolution, which results in their integration into a single evolutionary stable strategy - co-evolutionary Informatics and co-evolutionary semantics. This aspect is equivalent to the evolutionary mechanism of overcoming the conflicts between the various adaptations.

Therefore, stable adaptive strategy of Homo sapiens is a superposition of three different adaptive data arrays: biological, socio-cultural and technological modules, based on three independent processes of generation and replication of an adaptive information – genetic, socio-cultural and symbolic inheritance. This, third component SESH focused equally to the adaptive transformation of the environment and carrier a stable adaptive strategy. Thus, its aspect of the implementation SESH can be called informational ones.

Another aspect of the realization of functions SESH (co-evolutionary semantics) is a time-varying code of correspondence between members of pairwise co-evolutionary ligaments. (Some researchers have used to refer to this phenomenon, the term semiotic cooptation [296;297]. This term equivalent (co)evolutionary semantics used in our research. Accordingly, we consider as equivalent terms co-evolutionary informatics and semiotic selection, because in the latter case, biological and socio-cultural line of modules achieved by mutual selective pressure. The role of the operator is specifying rules of corresponds the biological and socio-cultural, socio-cultural and techno-rational, and biological information arrays. This function is performed by a system objectified interests (praxeological oriented knowledge), or by the system of subjective values (psychological predisposition).

Replication of praxeological oriented knowledge is carried out in the framework of techno-rational module through mechanisms of symbolic inheritance, and replication of value priorities is carried out within the socio-cultural unit accordingly, sociocultural inheritance (cultural traditions). If the main «appointment» of interest is a material survival of carriers of SESH (evolutionary efficiency), the «purpose» of values (evolutionary correctness) determined by their ability to ensure the preservation of self-identity.

In accordance with the information/semantic dichotomy of mechanisms inter-module coevolution the influence of culture on the structure and composition

of the populations of Homo sapiens, and on the pool of High Hume technological schemes is divided into two separate types:

1. changes in the frequency of certain genes, and the prevalence of specific technologies and their applications (information coevolution) and
2. the general increase in the level of genetic polymorphism and technology diversity (semantic co-evolution)..

Note that the semantic mechanism of communication between the modules in a biological time scale is very fast and immediately affects the complex traits. Because this change of structure communicative and co-evolutionary relationships (gene-cultural co-evolution and techno-humanitarian balance) can be regarded as discrete. As a result, for example, genetic polymorphism for a particular complex of DNA sequences is conserved and, after elimination of the relevant socio-cultural type to genome. With the change of the socio-cultural predisposition complex total variability of the genome should accumulate. Indeed, if the examples fixation or elimination of certain structural genes in the population under influence of socio-cultural factors are relatively few, correlation between the levels and patterns of genetic polymorphism and sociocultural types undoubtedly exist[298].More rapidly evolving autonomous element of the co-evolutionary pair becomes sense-factor for the partner. Semantic co-evolution is the discrete acquisition of adaptive significance of individual alleles by changing socio-cultural types and manifested as an increase in the genetic variability of populations of Homo sapiens and domesticated species parallel to socio-culturogenesis

Pattern of the impact of culture on the organization of the genome is distributed from actual human genome to the genomes of «cultivated» (domesticated) species, whose existence and now depend on the evolution of man. The genome of these species formed sub-genome providing communication with biological evolution as an evolving system of social and cultural predisposition [299, p.30]. Thus, a comparison of the results of adaptability investigation by methods of biological and cultural anthropology can serve as another empirical falsifier of the SESH concept. The evolutionary correctness is main parameter that links the two dataset.

Like the system of values and meanings priorities and predisposition evolutionary correctness in the biological time scale is capable to discrete fluctuations in instrumental regard. Thus, evolutionary risk may increase discontinuously to the existential level, not only as a result of technological disaster, but also because of the conjugated with technological progress changes in system of values priorities and semantic connotations.

However, on the other hand, such object is able to spontaneously increase system complexity, and at different stages of socio-techno-anthropogenesis leadership take on its individual components. About 350-400 years ago because of the transmutation of the sociocultural component of SESH technological civilization arose. Permanent expansion of the controlled by Homo sapiens «socio-ecological niche» and the escalation of risk techno-anthropogenic effects are a features of this type of civilization. The maximum value of the evolutionary risk

reached in the case of antiparallel changes dynamics of evolutionary efficiency and evolutionary correctness. In this case the intrinsic value of the risk extremely rapidly crosses the boundaries of the «physical» sense (R_{int}> 1). Reaching this point is irreversible semantic destruction (destruction of value priorities, and concept of humanity and human nature especially).

Two specification seems quite logical. Adaptability of SESH is generally defined by reproduction of the relevant information files, and by semantics of intermodular co-evolutionary relationship. In view of this, for example, the proliferation of new system of socio-cultural innovation can`t be implemented by a simple type of contact contamination (diffusion), but requires the inflow of biological carriers of corresponding co-evolutionary semantics.

This conclusion was confirmed by empirical observations of the relationship between the spread of dairy farming and the invasion of ethnic groups - gene carriers of constant lactase activity. Previously it was thought that this type of process was a simple process of socio-cultural borrowing and imitation [300].

Periods of abrupt increase in the value of the evolutionary risk obviously coherent periods of «scientific and technological revolution» and the indigenous reconstructions of dominant value systems in society. As a result the structure of co-evolutionary connections between the elementary adaptations of different modules and actual adaptive meaning of each element is destabilized and prone to unpredictable stochastic fluctuations.

The system of prevailing in society value priorities has a structure including several levels: personal (unconditional) interests, group (conventionalist) standards, abstract and theoretical (universal) values[301;302][3].Here, above all, in the area of group norms and predispositions on specific attributes humanization/dehumanization possible relatively rapid reconstruction, that radically changing the semantics of the cultural module and biological or techno-rationalistic ones. As a result, the adaptive landscape where the evolution of, for example, a biological module (adaptive significance of its individual elements) as quickly reformatted. An example would be a radical revision of value priorities with respect to traditional and non-traditional sexual orientation in the Western mentality from 1970 to 2015. Human values practically are not involved in this not yet completed the process of transformation of socio-cultural and psychological predisposition, but the result will have a systemic importance for the trend of the future of human evolution.

As can be surmised from the three levels of value priorities and corresponding socio-cultural predispositions (interests personal, group standards, and human values) group standards most susceptible to evolutionary transformation. Individual interests (as most closely associated with the living requirements biological deterministic module) and universal values propriety (the

[3]Two publications cited; first item is classical publication on social ethics of Lawrence Kohlberg, the second onesis study on experimental neuroscience, that after half-century by neuromorphology methods empirically substantiated biological substrate base of L.Kolberg philosophical constructs.

most abstract, distant from the objective reality and close to rationalistic module concepts) are more stable elements of this set.

However, the effect of perturbations group ratios (attributes humanization / dehumanization in particular) diffuses through evolutionarily semantic gear to a biological module and destroying, in turn, semantic matching rules of the module with the two remaining modules. By virtue of this secondary impact of elements of the biological module subject to a system of objective «interests», and then at other levels of socio-cultural module of SESH. There is a fixation of a certain set of group norms and thereupon - revision of universal values as the latter are a reflection of the projective group norms and individual interests.

Therefore, some of the biological adaptation to a new social context becomes a selectively neutral or maladaptive element, i.e. genetic load, and, conversely, some selectively harmful or neutral components of the genome acquire adaptive value. With regard to technological innovation, in their totality, they are clearly aimed at fragmentation of biological adaptive complex separation of its constituent interlocking adaptations (such as sexual and reproductive functions) on independent cultivated patterns.

A scientific and technological revolutions (a paradigm shift) has investigated some time ago (by Thomas Kuhn at classic monograph, 1962), but the evolutionary significance of socio-cultural transformation begins to become clear only now. Meanwhile, socio-cultural inheritance is also capable of a radical overhaul of its structure and composition.

An additional complicating circumstance acts relative independence of each module, and, for example, «macromutation» of cultural and psychological predisposition is aimed primarily at preserving structural distribution of subcultures within a given civilization type, and then, on the selection of appropriate elements of the biological module of SESH.

However, in relative balance of gene-cultural («gene-culture co-evolution») and techno-cultural («techno-humanitarian balance») co-evolutionary semantics and lack of direct formatting impact of techno-rationalist module of SESH to remaining (biological and socio-cultural) ones, the configuration of the entire system not allow uncontrolled jump to the existential level of risk.

Previously we have formulated conditions of such semantic stability in terms of socio-humanitarian knowledge: the core mentality of the West serves the human desire to ultimate ideal («Per aspera ad astra – Through thorns to the stars»). It is complemented by the second intention of the sacred and at the same time, putting limits to this ideal («Ad imaginem suam ad imaginem Dei -The image and likeness of God») and the emphasis on God's chosen people, the absolute priority of the uniqueness of the human person («Unus ex nobis – One of Us», says the God of Adam). Thus the actualization of the desire to bring together the world of things and the world due receive the nature of the movement to the Absolute, ultimate goal («Omega Point», as he called it Teilhard de Chardin) [47, c. 11, 506].

The objectified exempt from metaphorical form the same argument comes down to ascertaining. The trend for the release of the social role and social status

person from the preformation by properties of biological of the substrate (the genome) is a criterion of social (and evolutionary) progress and belongs to the set of basic predisposition mentality of technological civilization in its Western form. This trend, in turn, is balanced by an irrational fear of a possible intervention in the human psyche from the outside, violating the free will of the individual and causes him to act contrary to his «human nature». This trend can be traced at least since biblical times and legends about werewolves and vampires, through gothic novels of 18th century to modern thrillers and science fiction at most recent years.

The system of socio-cultural balances to ensure the identity of Homo sapiens has been very stable, but only until the birth of technology-driven evolution. At this point, the ontological antinomy of evolution versus intelligent design have been completely overcome by West civilization. As a result, limited technology tools transformation the reality proved to surmountable, at least in potentio. Semantic code humanization/dehumanization remains the only integrated into the current SESH stabilizer to global evolutionary process. However, the controller itself is susceptible to considerable stochastic fluctuations, and opened for technological interventions and, therefore, requires continuous monitoring.

With the advent of High Hume technology, risk has reached the existential significance level. At the existential level of technical risk is, by definition, an evolutionary risk as possible leads to the genesis of disappearance of humanity as a species (but not necessarily – intelligent life in general and the noosphere).

When the actual evolution becomes the object of the rationalistic management and/or manipulation, account specific features of the social response to scientific and technological development are essential in determining and prognosis of innovational risk. These factors stem from the substantial foundations of human consciousness and culture, and are the result of the previous biosocial evolution.

Changing the techno-cultural balance as adaptive response of the sociocultural component of SESH to describe above processes led to the transformation of classical science to post-academician science. As part of the same global-evolutionary transformation has to consider and the emergence of bioethics as a form of modern (transdisciplinary) scientific concept that combines the features of the humanities, classical scientific theory and social utopia.

Not so long ago E.Coonin (his monograph we have quoted several times) very observant diagnosed curious feature of explanatory models of modern evolutionary biology: they are narratives with more or less teleological component. Consciously or not, in explicit and implicit logic constructs "to occur ..." inevitably present in these models. A language of these narratives is best suited to describe the evolutionary processes and phenomena, and to create verifiable hypotheses, although it is contrary to the classical(not modern, transdisciplinary) methodology of science[181, p. 473].

This is even truer for that phase of the evolution of man and mind, which is called «phase IV of SESH evolution» and is characterized by a universal process of rationalization and technologizing evolutionary process in this investigation. As an

example of such explanatory model proposed here is an evolutionary model of risk It is combined in accordance with the principle of subsidiarity of objective-scientific (evolutionary efficiency) and subjective humanities (evolutionary correctness) criteria for the value of evolutionary risk. The proposed concept is largely methodological. In other words, it is a meta-theory. It will, we hope, is able serve as a heuristic incentive to formation of available empirical and social verification concrete scientific hypotheses [9].

This total consideration is, in turn, determines the civilizational and evolutionary function of bioethics. As a priori it is clear t each of the three modules of SESH should to have its own system of self-preservation. In the biological module it is the most well studied and is referred to as immunity. In techno-rationalistic module such system is the concept of verification and falsification of reliability of scientific knowledge. At socio-cultural module the system of pre-dispositions regulate human identity in the global-evolutionary transformation and performs the function of self-preservation.

The asymmetry of semantic communication defines (from the denoted object to denoting symbol) the disparity of composition of socio-cultural module. This dichotomy is due to the process of socio-cultural self-identification and implies the relation to each other causal (cause - effect) and semantic (object and its sign) binary oppositions. In this case, determinate by itself culture elements can be designated as protected by ethical and legal standards itself culture object of self-identification of Homo sapiens (humanity). On the contrary, other the elements are at its core stimulated by culture development of biological and genetic. It can regarded as just a symbol of human attributes (human nature), open to manipulation and control by technology. Naturally, the most stable and evolutionary plastic organization of human evolutionary strategy, will be the case when the self-identification system of sociocultural module is basically the same as objective knowledge on the essence of anthropogenesis. This knowledge generated by techno-rationalistic module.

At the highest level of analysis of the problem of evolutionary risk and its components come into conceptual field of the anthropic principle. One of the parameters of the mathematical model of population growth («Doomsday equation») becomes a universal constant human genesis at Universe, and also derived from the characteristics of the socio-cultural and biological evolution. It did not fail to specify one of the discoverers of the anthropic principle Brandon Carter [303].

In 1960, the Heinz von Foerster formulated the law of hyperbolic demographic growth of Homo sapiens, also known as non-academic title «Equation of the Doomsday»[304]

$$\frac{dN}{N}dt = \frac{N}{T^*}, \qquad (7.1)$$

where N - volume of Homo sapiens population on Earth, t- time, T * - constant (probably, species-specific), the physical meaning of which will be discussed below.

n accordance with the equation of Foerster about population growth in the last 10 thousand years governed by the equation hyperbole. In other words, volume of global human population growing with the increasing acceleration and about 2025 will become infinite, i.e., lose its physical meaning. This will mean the end of the evolutionary history of Homo sapiens, although it does not necessarily mean the death of intelligent life in general. Rather, it involves the passage of a certain evolutionary singularity point, the achievement of the magnitude of the evolutionary risk of a value close to 1.

In Foerster equation present parameter T*, which the author has been calculated empirically and, in their estimation, was approximately $2 \cdot 10^{11}$. Brandon Carter in the above-cited paper considers this option as a member of a pool of world constants, determine the appearance of the humans and the formation of their capacity for reflection of natural laws and civilization development. In his understanding of this quantity is a function of the amount of contained in the human genome information (10^{10} bits) and the length of a generation (20 years). By reducing this parameter is below the threshold, the transition from the biological to the socio-cultural, and then technological phases of anthropogenesis (Phase II-III in our periodization of the evolution SESH) becomes impossible.

Both phenomenological interpretation and explanatory model of Foerster «equation of Doomsday «are in full agreement with the views of the organization and formation evolutionary risk SESH defended in this study.

On the one hand, population growth increases the frequency of techno-rationalist and socio-cultural innovations/adaptations and speed of their spread in the population as the co-evolution of these processes in accordance with the Lamarck mode flows through contagious mechanism. This extends the limits of ecological niches available for mastering Homo sapiens and creates conditions for further acceleration of population growth[14;305;306].

On the other hand, the integrity of the structure of three-modal SESH implies a certain inter-module communication correspondence between the elements of the biological and socio-cultural modules (co-evolutionary semantics). After exceeding some threshold number of adaptive socio-cultural elements in comparison with the pool associated with them biologically determinate signs of adaptive evolution efficiency drops sharply. (This conclusion is still valid even under condition ambiguity of semantic connections between the modules).

It is manifested in the accumulation of genetic and cultural imbalances, and inconsistencies to social and cultural environment and psychophysiological features of organism (evolutionary load). In the first approximation, the threshold of the fracture zone of the curve of demographic growth is achieving volume of replicated by social and cultural inheritance adaptive information a value comparable to the amount of genome information. This situation has two fundamental and alternative evolutionary scenarios.

The first («hard») decision means technologization of biological human evolution, i.e., «Improvement» («enhancement») of Homo sapiens using genetic engineering, etc. technology. As already mentioned, this solution is fraught with

the completion of the evolutionary history of humankind (loss of self-identity of generations of carriers mind).

«Soft» solution involves creating a radically transformed versions of evolutionary semantics for regulating gene-cultural co-evolution and techno-humanitarian balance. The newly emerged coevolutionary semantics is to provide best match of the biological and techno-rationalist modules to so-called universal value priorities, preserving self-identity of carriers mind.

Bioethics is largely methodological concept. In other words, it is a meta-theory. It, we hope, can serve as a stabilizer system for attribute identifiers identity of the person, as well as a system of cultural and mental predisposition formed based on them. This system maintains the current version of evolutionary semantics NBIC-technological complex within the «universal values» to ensure the preservation of humanity in the process of permanent development of technologies addressed on the subject of the evolutionary process.

SUMMARY

For mass, everyday consciousness and institutional philosophical tradition it is intuitively obvious that having the ability to control the evolutionary process, Homo sapiens came close to the borders of their own biological and cultural identity. In other words, the Anthropocene era may soon be replaced by epoch of post-Anthropocene, i.e. post humanistic one.

The Anthropocene is not formalized unit of geochronological scale, geological era characterized by the transformation of human activity in the primary factor that determines the direction and regularities of the course of geological processes.

The idea of the Anthropocene belongs to the environmentalist Eugene Stormer and Nobel laureate Paul Crutzen, it was expressed in 2000. This idea completes the process of rationalization of the initially irrational concept, seeking to overcome the hegemony of technocratic determinism. The onset of the Anthropocene is not an abstract, theoretical, especially not worldview and humanitarian problem. It is the question of empirical verification, i.e. the search of criteria (the symptoms) of the new geochronological period set purely empirically. The management of the evolutionary process includes the man himself as both object and subject of manipulation transformations.

Explanatory models of evolutionary phenomenon called «***Man***» always rocked between Scylla of biological and Charybdis of social reductionism.In recent decades, tremendous progress of new research technologies of onto – and phylogenesis pushes the researcher towards reductionist biology, and awareness of the extent caused by the same technological innovation humanitarian and civilizational crisis – socio reductionist approaches.

This conflict itself is a serious challenge to the humanity, which consists in the necessity of overcoming the cognitive dissonance between the two components – the unitary nature of Homo sapiens and created by him technological civilization in their natural and social images. At the same time, it is the most powerful risk-causing factor of the existential significance level that can lead to loss of self-identity as the supporting structure of human nature.

As we assume, the uniqueness of the phenomenon of man is a system feature arising from nonlinear interaction of biological and cultural modules of Homo sapiens' adaptation. The role of the key evolutionary factor of social and cultural anthropogenesis plays a network of relationships between different adaptive modules of stable adaptive strategy of Homo sapiens (SASH). This network can be adequately interpreted under macro description of hominid evolution and with the use of macro-parameters of this process, which can serve as the radical expansion of adaptive information created and replicated outside the genetic inheritance modus.

This idea is not unique. It is almost identical with the ideas of Australian evolutionist Kim Sterelny.

The purpose of this article is to develop a conceptual model of evolutionary stable strategy of Homo sapiens, an integral attribute of which is evolutionary risk, steadily approaching to the existential level.

Stable Evolutionary Strategy of Homo Sapiens

Self-organizing (evolving) systems are objects that contain patterns that act as carriers of spontaneously replicating and mutating information that is necessary for the existence of these objects (a), and as operator ensuring the process of realization of this information (b).

Within the theory the evolution is the process of change of informational fragments of self-organizing objects.

Adaptation includes any internal informational fragments, the presence of which in the system increases the stability and replenishement of the information contained therein.

In the end of the XIX century, James Mark Baldwin was the first who drew attention to systemforming role of epigenetic inheritance in its cultural form in the evolution of man: not only the biological characteristics, but also a set of social patterns of behavior, values, and norms that are passed on from one generation to another and ultimately have a strong influence on what the direction of anthropogenesis will prevail (Baldwin effect). According to the modern researchers (Burman J.T., 2013), Jean Piaget moved in the same direction and, out of his own social positions. According to Jean Piaget the child's psyche is formed during the successive transformations as a result of the integration in the pre-existing socio-cultural environment. The common idea of the Baldwin and Piaget's concepts is implicit concept of self-sustaining co-evolutionary cycle of transformations – genome → culture → ecological niche → genome, the basis for which is epigenetic conversion of genetic program (Young J. L., 2013).

Obviously, one of the common temporal trends of the evolutionary process in general and the process of adaptogenesis in particular can be considered multiplication of systems of generation, replication and translation (realisation) of adaptive information and, accordingly, multiplication of types of such adaptations (Jablonka E., Lamb M.J..2005). At present in relation to human and hominids there are at least four such systems: genetic, epigenetic (in its turn, subdivided into subsystems of methylation, complexforming with histones, alternative splicing); cultural (behavioral); semantic (natural and artificial languages).

Etienne Danchin and Matteo Mameli postulate an inclusive, or shared inheritance – integrative result of the operation of all mentioned above systems of heredity in process of the global evolution (Mameli M., 2004, p. 35; Danchin E., 2013, p, 351). The empirical basis of this thesis is the inability of reduction of inherited components of phenotypic variation to molecular genetic variations of the genome (Zuk O. et al., 2012; Danchin E., 2013, p, 354).

In the organization of the inclusive meta-system of adaptive information inheritance two alternative evolutionary modus of generation, replication and

implementation of adaptive information – Darwin-Weisman modus and Lamarck modus – are implemented simultaneously.

Darwin-Weisman modus is a stochastic one it is not intended to rigidly determined informational structures and/or controlled by them signs, (a) indefinite– is not adequate and does not correlate with changes in theexternal environment (b), it is notprojectional and not constructive, i.e. not capable to change the adaptive landscape, in which the evolutionary process takes place, directly (purposefully or not purposefully) (c); and it's not recursive – it cannot be changed other than as a result of repeated stochastic event (d); the speed of fixing of new adaptations higher, the smaller the size of the population is (e); in the process of distribution of newly generated adaptations the horizontal transfer (diffusion, contamination as a result of communication) is significantly inferior to its specific weight to the vertical one, i.e. inheritance from ancestors to descendants (f). The modus is based on the genetic code and is provided by the so-called Eigen's hypercycles (Eigen M., Winkler R., 1983) – the binary bunch of nucleic acids and proteins with a strict division of the functions of replication (DNA, RNA) and implementation of adaptive information (proteins). The adaptive value of informational fragments is acquired and recorded during the stochastic selection, not connected by the direct functional dependence with the generation of information. Selection and replication of adaptive information in this case is only in carried on along the vertical direction. Modus in relatively pure form actualized during the biological phases of evolution (the biogenesis).

Lamarck's modus is teleological, it aims at the certain informational structures and/or signs controlled by them, (a), it is adequate and/or correlates with the changes in the external environment (b), it is projective and constructive, i.e. capable to the direct change of the adaptive landscape and (cultural and) ecological niche, where the evolutionary process is taking place, moreover, to their purposeful reconstruction (c), and it is recursive – available for the correction during the implementation (d); speed of fixing of new adaptations higher the bigger the size and density of population (e); in the process of distribution of newly generated adaptations the horizontal transfer (diffusion, contamination as a result of communication) is comparable as regards of its specific weight with the vertical one (f). Modus is based on socio-cultural code and is provided by systems of mimesis (cultural heredity) and speech (symbolic inheritance). Adaptive value of information fragments is acquired and recorded simultaneously with the generation of information and in direct functional dependence on the latter one. Selection and replication of the adaptive information in this case is carrying on both in vertical, horizontal directions (diffusion inside and outside of the simultaneously existing social communities of different rank). Modus in relatively pure form actualized during the social phase of evolution (sociocultural genesis).

From the mentioned above it follows the principle of complementarity of both evolutionary modus: Darwin's modus is more inertial and reliable when vertical transmission of the adaptive information in comparison with Lamarck's one. The substrate basis of Darwin's modus (alternative of genetic variability) is

more inertial after elimination of factors of selection and remains longer and, therefore, provides a more sustainable temporary trend.Lamarck's modus is much more efficient comparatively with the Darwin's modus in the process of horizontal transfer (it would be more precise to say – diffusion) of the adaptive information. Thus, the optimum co-evolutionary configuration will be either a mixture of both modes, or extended period of childhood, which provides the overlapping of the periods of dissemination of cultural adaptations beyond one generation. The third factor, which provides rapidity and reliability of distribution of adaptations, – socio-controlled expansion and lengthening of the later stages of ontogenesis outside biologically justified norm of reaction. Concern for the aged members of a social group turns them into natural biological «flash storage» of adaptive information useful for the survival of the group. (All three of adaptive evolutionary solutions are seen in hominid).

In genetic sense (in the sense of origin), the most probable model of the relationship of both modi a priori is the genesis of Lamarck's modus due to autocorrelation of spectra of generation of adaptive and inheritable/diffusing innovations over time. In its turn, the autocorrelation in this model is a phenomenological result of superposition of several autonomous parallel processes of adaptogenesis taking place at different levels of self-organizing systems. This hypothesis dates back to the evolutionary epistemological schemes of Donald Campbell (Campbell D. T.) and Karl Popper, of which we have borrowed another idea – a deep intrinsic homology processes of biological evolution, cognition and learning. All in all the whole history of the formation of classical molecular-genetic and epigenetic paradigms does not contradict this interpretation. Some researchers link this concept with another one – about the necessity to distinguish each member of the binary bundles if the autonomous functions of inherited information – replication of its carriers (replicator) and implementation (realization) of this information (interactor). Actually this autonomy makes it possible binary mechanism of transmission of adaptively relevant information: by actually replication and by epigenetic contamination contagion (Hodgson G. M.,Knudsen Th., 2010, p. 80).

We assume that (Cheshko V. T., 2012)

d) ***biological adaptations*** is encoded in the genome peculiarities of structural-functional organization of the individual that increase the probability of fixation and replication of fragments of genetic information which determine their appearance;

e) ***cultural adaptation*** is behavioral stereotypes prevalent in concrete social group as the result of imitation and communication between the individuals and increasing the probability of its (group) survival and growth of number of commits and replication of fragments of information that determine their emergence by means of emotional and symbolic communication;

f) **rationalist or technological adaptation (innovation)**is the material means and methods of purposeful and efficient conversion, cognitive-projective activity and pieces of information common for this social group as a result of

symbolic communication between individuals through written and oral speech, using natural and artificial languages and increasing the probability of its (group) survival and growth of number of fixation and replication determining of their (means and methods of transformation) the appearance (c).

External, coming as a result of contact with other individuals, the stimulus of generation act of adaptive information (cases b and c) provides for the induction of a specific sequence of epigenetic modifications caused by selectively specific external stimulus. If the latter is a contact with a carrier of a particular type of epigenetic modified trait, we are talking about inherited cultural adaptation. If this stimulus is the result of perception of some informational messages transmitted through artificial code, we are dealing with rational adaptation.

One of the most difficult and controversial aspects of the concept of adaptogenesis of Homo sapiens as a superposition of three autonomous modules stems from the functional dependence of the integral adaptive effect from interdependence of influences of all components of the adaptogenesis process. Thus, the use of tools as a group means of adaptation (now it is one of the key elements of rationalistic adaptive module) provides for the simultaneous implementation of several premises (Biro D., HaslamM.,Rutz Ch., 2013):

1. reliable and correct integration of instrumental activity in the behavioral repertoire of the person, including the existence of a trigger mechanism turning on/off stereotypes ensuring such activity and its situational transformation;
2. adequate physiological and morphological organization (grasping brush, tread, developed brain);
3. sufficient level and direction of cognitive and mental processes at solving routine adaptive tasks exactly this way;
4. synergetic pressure of the environmental situation and social structure, potentiating evolutionary success achieved through the usage.

From this list the I and III condition provides for the existence of biological and the II and IV – socio-cultural adaptive modules

Each of the three types of adaptations has its own substrate-substantive basis – the mechanism of heredity, i.e. generation, replication, implementation (broadcast) and selection of potentially or actually adaptive information. At the same time, the functional organization of all three mechanisms of heredity from the point of view of the system of relations between their basic functions includes the same elements (Lewis H. M., Laland, K. N., 2012, p. 2171): mutations, modifications and recombinations.

This scheme is based on the classification and general model of hierarchical organization of mechanisms of inheritance, which is described in the monograph by Eve Jabłonka and Marion Lamb (Jablonka E., Lamb M.J., 2005).

The difference between genetic and cultural adaptive modes obvious and is in various ways of replication of adaptive information – biological and socio-cultural inheritance. The difference between cultural and technological (rational) adaptive modules due to the character of relationship with biological (genetic) component of adaptogenesis. The chain of cultural transformations of behavioral

stereotypes can be very long, but its originating point is always biologically deterministic emotional reaction and this substrate base supports the whole chain of social and cultural adaptations. The final links in this chain can be almost completely autonomous from this basis, both in form and in content, but the destruction of the biological substrate like a trigger turns off the whole chain.

Adding of the third (rational) element in the original co-evolutionary link gene – culture transforms it into a triple helix – autonomous self-sustaining cycle of generation of system complexity. This cycle is organized according to the type of evolutionary fractal. Let us consider the basic features of its elements.

The mechanism of biological (actual genetic) heredity is based, as already mentioned, on ***hypercycle*** (***the genetic code***).

The genesis of cultural adaptations associated with the intrinsic to the hominids (and not only to them) ability to mimesis (and imprinting). Obviously there is a definite correspondence – definite or ambiguous – between the structure of neural networks and behavioral stereotypes (***socio-cultural code***), as well as sensual images, it can act as ideal models of reality (***cognitive code***).

The third generation system is the fixation of adaptive information associated with the ***symbolic inheritance***. This type of inheritance implies special rationalistic mechanism of occurrence, replication and implementation of information, implying the construction of an abstract ideal objects – ***interpretants***.

The emergence of another theoretical and methodological paradox – the question of the relationship of adaptability and truth of cognitive constructs – also connected with the development of rationalistic forms of adaptogenesis. The appearance of forms of adaptation one or another way connected with cognitive processes (psyche) is equal to the creation of a new path informational interaction – reality and its ideal image. If this image is adequate to the reality, in theory of cognition it is treated at the same time as the true one and adaptive one in the theory of evolution. However, the reverse statement «any adaptive information is true,» generally speaking, is not always true (McKay R.T., Dennett, D.C., 2009). There must exist a special class of cultural innovations, which are adaptive, but not true («positive illusions» or «adaptive illusion» (adaptive misbeliefs) according to McKay and Dennett (McKay, R.T., Dennett, D.C., 2009, p.493). The balance of adaptive errors is positive despite the falling of suitability in some indicators.

Similarly, the modular principle of the structural organization of ontogenesis does not exclude but implies the emergence of functional conflicts between the individual elements of adaptogenesis – due to the autonomy of their evolutionary origin(Crespi B. J., 2010; Wells J.C.K., 2012; GibsonM. A., LawsonD. W., 2014, p. 245).

With the growth of specific weight of the rationalist (Lamark's) module in the overall process of adaptogenesis of the humanity the value of the «positive illusions» and intra-genomic adaptive conflicts (see below) should decrease, while the value of the system (between-component) conflicts – increase.

Adaptability of all obviously true concepts, that circulating in cultural tradition, is correct only in a dynamic sense. The knowledge even true one,

destroying the already established system of «adaptive illusions», can reduce the adaptability of their media – individual or social group.

According to our hypothesis:

1. between biological, sociocultural and rational forms of adaptogenesis there is evolutionary continuity and some gear;
2. the same mechanism and continuity exist between biological, socio-cultural and symbolic forms of inheritance that ensure them;
3. his gear has co-evolutionary nature, i.e. it implies mutual agreement of the autonomous in their origin series of adaptivelysignificant features – socio-cultural and biological, for example;
4. a necessary condition for the occurrence of such mechanism is availability of the processes of epigenetic modifications of adaptive information, which is an object of external regulation by alternative systems of inheritance.

Functionally three components of Stable Evolutionary Strategy of Homo (SESH) form a hierarchical system of information cycles. Each such cycle provides a consistent generation, replication, selection and fixation or elimination of adaptively significant information. However, concurrently a stochastic process of loss of information due to random errors of replication takes place.

In respect of the main trends of evolutionary transformations each subsystem (module) of adaptive strategy depends on the other two elements of the evolutionary landscape and, in turn, acts towards them as a part of this landscape. Therefore,

- first, the evolutionary landscape of hominid becomes multidimensional in comparison with the evolution of other biological taxa;
- second, the share of external factors in the evolution of man and socioecological systems, which include it, generally decreases;
- third, the nascent imbalance in conjunction adaptive strategy – ecological environment periodically reaches a critical value, and results in environmental crisis.

There appeared a new, synthetic algorithm, where the original (constructive, intentional and mechanistic) cognitive components of the psyche united into a single system. This event can be regarded as the identical one with the phenomenon of «***adaptive inversion***», – sociocultural adaptation, the genesis of which reached the highest point in the phenomenon of anthropogenic civilization. At the first stage of this process the constructive algorithm associated with the intentional in functional and with tool producing activity in the «substrate» respect, incorporates/replaces the mechanistic algorithm as a cognitive mechanism of the forecast of change of reality. Then this role is returned to the original (mechanistic) algorithm, but the adaptive transformation of the behavioral modes develops according to the constructive pattern. In other words, the change of behavior in accordance with (forecasted) changes in the environment is replaced by the changes in the environment according to a new behavioral stereotype. This scheme as a whole brings us back to the triad of conjugate evolving elements ensuring a

progressive increase in system complexity in model «triple helix». So, the general scheme of the conjugateevolution of the biological (G) and sociocultural elements of SESH is an alternation of direct (Ci→Ci+1, Gi→Gi+1), recursive (Ci+1→Gi) and intermodule (Gi→Ci) communications-transitions of co-evolutionary process (Fig. 1).

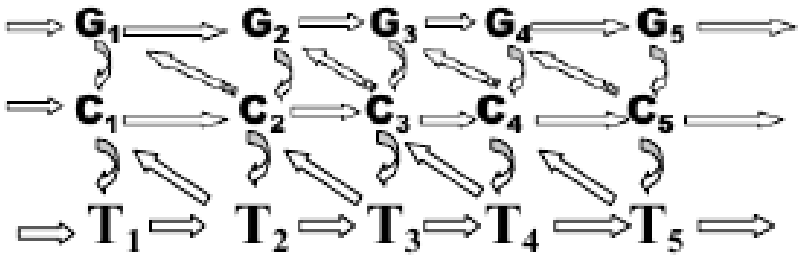


Fig. 1. The block diagram of gene-culture co-evolution and techno-humanitarian balance

If we translate it into the language of the ontology, we can see that as the result of adaptive inversion the «habitat» is split into «the world of objectively-existential» (world of real things) and the «world of projective-perfect» (perfect world)and thus becomes a «reality».A distinctive feature of reality from habitat is binary opposition of the subject (perfect world) and object (world of real things). The traces ofbundle of intentional-constructive algorithms in the«evolutionary history»of anthropogenic civilization is clearly traced in the philosophical tradition of deism in XVII – XVIII centuries.

Theoretically, the same structure (Fig.1) practically without changes applicable to the second co-evolutionary link of SESH – techno-humanitarian balance.

Evolutionary success or failure of socio-cultural and then rationalistic innovation stems from its ability to transform the environmental components into the source of life sustain and extension of the number of carriers of the same innovations. From the point of view of evolutionary thery progressing multiplication ofecological niches available for Homo sapiens takes place. The biological nature of media of adaptive innovation remains the same, at least, in the final stages of anthropogenesis.

The emergenceof anthropogenic civilization is a transformation of the SESH, more precisely, its socio-cultural component, which is characterized by the domination of technological innovation in adaptogenesis and then in socioanthropogenesis in general. Such trend of hominid evolution implies as a side result the escalation of magnitude of evolutionary risk.

In systems theory and computer science of structure the models of SESH similar to the model described above is signified by the term «system of systems» – SoS(Lock R. 2012). As the speed of evolutionary transformations in different modules are not the same there are imbalances and inconsistencies between them. They, in their turn, entail the possibility of a general reduction of adaptability (evolutionary risk***). Thus, evolutionary risk is an attribute of multi-level self-***

organizing SoS arising from imbalance between adaptations of different levels of organization of such systems developing into conflict.

Let us formulate this thesis with regard to the theory of stable adaptive strategies of Homo sapiens: the ***evolutionary risk***, the value of which periodically reaches the existential level is the system characteristic of SESH.

Evolutionary risk: structure and researches

Evolutionary trajectory of biological and socio-cultural forms of adaptation, as is commonly believed (Mouden C. El et al., 2014), is subordinated to the so-called Price equation.

$$\Delta\acute{z} = cov(v; z) + E_v(\Delta z),$$

In which v – adaptive value of the sign z, $\Delta\acute{z}$ – change ofthe value of average populationcharacteristic in one generation; the first member of the equation ($cov(v; z)$) reflects the characteristic change due to its impact on the adaptive value of his media, the second one ($E_v(\Delta z)$) – the changing nature of distribution of the characteristic in the process of interaction between individuals. Obviously the first member describes the process of selection (sampling) of the individuals with different values. The meaning of the value$E_v(\Delta z)$is reduced to the impact of specific options of this sign on the distribution of media of different variants of the characteristic in the population. Thus, genes for altruism increase reproductive success of related individuals by reducing its own adaptability. So the value $cov(v; z)$describes the selectionprocess, $E_v(\Delta z)$ – the process of communication (direct or indirect)between the individuals.

In the case of cultural inheritance (Lamarck's module) the effect of communication considerably increases its share and takes the form of direct contamination (**Contagion**). In the case of genetic inheritance of adaptive significant sign this effect is mediated by family ties of the participants of the communication. Then Price equation in relation to the socio-cultural component of adaptogenesis takes the form (MoudenC.,etal. 2014)

$$\Delta\acute{z} = cov(c; z) + E_c(\Delta z).$$

Where **c** – socio-cultural component of adaptability. . The authors of the quoted article does not consider the rational-technological component of SESH(**t**), but by analogy it can be represented like this

$$\Delta\acute{z} = cov(t; z) + E_t(\Delta z).$$

Note that due to the system of indivisibility of processes of generation and replication of adaptive information in the Lamarck's module the component $E(\Delta z)$ plays much more significant role in adaptativeness compared with the biological component of SESH. At the level of individuals the components$E(\Delta z)$ reflect nonselective trends of bio-, socioculture – and technogenesis respectively.

However, on the level of competition and selection of social groups they become a factor of evolutionary success or failure of the relevant groups, i.e. one way or another have adaptive value. From our point of view this is, the most correct interpretation of recent data (Derex M., Godelle B., Raymond M., 2014,

p.89)concerning the high selective value of the speed ofthe distribution of technological and cultural information in the conditions of inter-group competition

Therefore, some researchers propose to divide it into two subcomponents – constitutional and induced (Heywood J.S. 2005). The first one corresponds to the «inherent» ability of culture to self replication by imitation and learning (phenomenon of cognitive preferences). As a result cultural stereotypes dominating in the society are reproduced with greater efficiency comparatively with theirminor forms. The second one is the ability of some cultural or rationalistic innovations to serve as attractors for behavior in a social group because of the correlation between social status and carriage of certain cultural stereotypes. In essence, the same two subcomponent for the same reasons are present in rationalistic (technological) component of SESH.

It seems *a priori* clear that sustainable evolutionary curve is based on positive correlations between the three components (modules) of SESH (Mouden C. El et al., 2014, p. 236). However, we can make intuitively obvious conclusion that this configuration is a relatively rare event: introduction to the consideration of the third (technological and rationalistic) component.

Amplifier of rationalistic adaptations (primarily the use of a variety of tools) is the increase of stochastic oscillations or stable-high trend of changes in the environmental situation in respect of the source of resources of life sustain.

The hypothesis that explainsthe evolutionarydynamics of the developmentof tool activity, inmodern anthropology is named as the hypothesisof environmental risk(Biro D.,HaslamM.,Rutz Ch., 2013, CollardM.,Buchanan B.,O'BrienM.J., ScholnickJ., 2013).

The condition for high efficiency of rationalistic SESH module is the high quantity and density of population, providing sufficient intensity and reliability of social inheritance and a relatively high intensity of generating process of adaptively significant innovations of culture and technology (Kline M.A.,Boyd R., 2010).

In combination with each other, they create the effect of **delayed risk** associated with the release of risk-causing factors beyond already existing ecological niches. The removal of potential (delayed) form of evolutionary risk associated with «pulling up»of more slowly evolving biological module to a new evolutionary landscape (fig. 1, branch $T_{n-1} \rightarrow T_n \rightarrow C_{n-1} \rightarrow C_n \rightarrow G_{n-1} \rightarrow G_n$). With the passage of stochastic oscillations or sustainable trend of changes of environmental conditions and speed of adaptive evolution of rationalistic and sociocultural modules of certain threshold the stage $G_{n-1} \rightarrow G_n$ falls or is late and it is replaced by adaptive changes of other participants of adaptogenesis:

$$\boldsymbol{T_{n-1} \rightarrow T_n \rightarrow C_{n-1} \rightarrow C_n \rightarrow T_n \rightarrow T_{n+1} \rightarrow C_n \rightarrow C_{n+1} \rightarrow \ldots}$$

However, with the further growth of speed of technogenesis the falling of the stage of adaptive cultural transformation takes place. In this case (due to lower the speed difference of the evolution of techno and cultural genesis relatively with biogenesis) general scheme of SESH evolution is turned to be dualistic:

$$\boldsymbol{T_{n-1} \rightarrow T_n \rightarrow T_n \rightarrow T_{n+1} \rightarrow C_n \rightarrow C_{n+1} \rightarrow \ldots}$$

or

$$T_{n-1} \rightarrow T_n \rightarrow C_{n-k} \rightarrow C_{n-k+1} \rightarrow T_n \rightarrow T_{n+1} \rightarrow C_n \rightarrow C_{n+1} \rightarrow \ldots$$

As a result,the value ofdelayedriskis equivalent to the evolutionary risk. It tendstopermanentincreasewith timeasin the above describedschemetechnogenesisbecomes self-catalyzing process. Advancing development of social, cultural and rationalistic modules of SESH leads to increase of tension of genetically cultural co-evolutionary bundle and techno-humanitarian balance (the growth of inconsistency between technocultural habitat of Homo sapiens and genetic and physiological adaptive norm). The situation of delayed evolutionary risk is solved by the rapid growth of all kinds of variations of the elements of biological adaptive module, which, in turn, is accompanied by increased frequency of genetic and epigenetic abnormalities, called «diseases of civilization». Delayed ecological risk passes in its current evolutionary form.

From now the «***existential evolutionary risk***»will be understood under the term evolutionary risk. Thus, in the first approximation this term will be referred to:

(1) in terms of disciplinary matrix of biological (physical) anthropology – the probability of long-term evolutionary trend, ending in an irreversible decline in the numbers (extinction) of biological media of stable adaptive strategies (in this case – of *Homo sapiens*);

(2) in terms of cultural (philosophical) anthropology the judgement about the loss by the intellect carrier his cultural self-identity are equivalent;

(3) finally, from the point of view of the theory of technology (anthropology of technology), this point is fixed as the coming of posthuman future. (If the process of technogenesis continues we have to speak about occurrence of post-humanism in the evolution of techno – or noosphere – dedelayed on the source system of values and ideology of the author).

All three aspects, in an explicit or hidden form, appeal to the unavoidable and cumulatively accumulated imbalance between individual and group adaptability, which upon reaching a certain threshold makes them incompatible. By achieving this bifurcation point, there is a sudden (catastrophic) disintegration (irreversible decline of adaptability) of this SoS. Further evolution maybe developed according to one of three alternative scenarios:

(1) **Extinction of Homo sapiens** – complete elimination of carriers of this SESH $N(SoS) \rightarrow 0$;

(2) **Posthumanity** – replacing of one SESH by another one, with the elimination of one or more components – $N_1(SoS_1) \rightarrow N_2(SoS_2)$. «Elimination» of SESH component in this context refers to the inability of evolutionary transition between the SESH-predecessor component and the newly formed SESH. In a certain sense, this peculiarity corresponds to a well-known model – «irreducible system complexity», according to which the object cannot come into existence through step-by-step evolution of the previous object;

(3) **Divergence (irradiation) of intelligent life** – decay of the initial set of media of this SESH on several $SoS_1 \rightarrow \Sigma(SoS_i)$. In terms of the theory of niches

constructing and evolutionary ecology this case is equivalent to the fragmentation of the initial ecological niche. If actual or potential intention to unlimited expansion will remain at least in one of the newly emerged media of intelligent life the evolutionary reduction in the third to the second scenario is inevitable.

Existential evolutionary risk of modern technological civilization

Technology makes our genetic constitution and the content of our consciousness the subject of rational control. The result of the development of both types of information technologies is unified: the technologies of manipulation of consciousness (changes of socio-cultural code) and technologies of changes of the genetic code are both technologies of controlled evolution (Cheshko V.T., 2012, p. 337).

Reducing the amount of evolutionary risk caused by uncontrolled (stochastic) microevolution the rationalistic component of SESH, ipso facto raises the amount of risk up to the next level – meta-evolutionary risk at this case caused by the possibility of destruction actually of the SoS of homeostasising ensemble. Let us consider the common mechanism of formation of evolutionary risk related to the possibility of disintegration as a result of destruction of co-evolution and communication relations between the SESH components.

The sources of evolutionary risk are multiple trends of the process of adaptogenesis, in which it is also involved a certain set of elementary adaptations affecting more than one significant adaptive trait simultaneously (pleiotropic), evolving in different directions and at different speeds.

Its partial empirical manifestations are the growth of the genetic load (gene-culture co-evolution) and increase of the scope and depth of civilization ecological crisis (techno-humanitarian balance). Both of these options can be used as parameters of the actualized evolutionary risk of SESH. However, linear approximation, implies the adoption of alternative risk component equal to a constant. It prevents us from adequate assess of its (evolutionary risk) value. In addition, both parameters, although characterize integral population adaptability, but are determined by the individual (genetic load) and group (the environmental crisis) adaptability – effective mechanisms for the implementation of the biological and socio-cultural component of SESH. Finally, in addition to genetic load individual adaptability is determined not only by genetic but socio-cultural heredity (way of life).

Due to these reasons we need to introduce a new concept – adaptive differential (D_a), which in this context means the impact of this evolutionary innovations on the adaptability of other innovation, already existed and registered in the population. The adaptive differential of the individual adaptations of this complex may have a different character and a different value with respect to other adaptations, regardless of their nature. So,

$$D_a = \frac{|\Sigma(A_k - Ai)|}{N},$$

where A_k, A_i – relative adaptability of this inherited innovation (biological, cultural or rational) and of other innovation from their *N* totality.

Values $\boldsymbol{D_a}$ lie in the range from zero to one, and with the approach of the $\boldsymbol{D_a}$ to unity, it makes relatively greater contribution in the total amount of adaptability. Considering the hierarchy of the speed of the separate components of SESH, the adaptive differential of innovation (socio-cultural and technological) that are evolving more quickly increases. However, more slowly evolving components supply adaptation, which are the substrate basis for the more quickly evolving ones.

Consequently, the tension in the overall system of SESH is growing and this process continues until the disintegration of meta-structure of adaptive complex providing functioning and possibility of further transformations of the social, cultural and technological components. Obviously, evolutionary risk is the property of any self-organizing (evolving) systems. For example, in cognitivist and evolutionary epistemology famous theory of «cognitive load», according to which the assimilation of the new data, which is not hereditary in a biological sense, is possible by ultimate in size informational fragments, not exceeding seven elements. With all the differences of this situation, we are talking about similar information processes, since the acquisition of new knowledge, adequate to reality, is equivalent to the generation of adaptive information by living organisms. After that there is an avalanche removal or replacement of components of adaptive strategies. The end result will be either complete elimination of carriers of this SESH, or the emergence of a new SESH

Informational and semantic components of the organization of the stable evolutionary strategy of Homo sapiens

The mechanism of the effect of each module on the evolution of the two remaining modules of SESH a priori can be embivalent:

1. Direct selective pressure, i.e. the change of the adaptive values of the individual features/innovations that are controlled or supported genetically, technologically or through training;
2. Semantic co-evolution, i.e. the change in the qualitative or quantitative expression of a particular trait during its implementation as a result of contact with the factors that are the adaptive elements of other SESH modules.

With regard to the gene-cultural co-evolution the examples of selective pressure, which consists in changing of gene frequencies in populations with changing socio-cultural environment, were given in this study more than once. Semantic co-evolution in this case involves epigenetic modification of the process of realization of genetic information under the influence of sociocultural factors (ethical imperatives, rituals, beliefs, behavioral acts, etc.). All similar factors have the potential to cause psychosomatic response and, over time, to become self-sustaining cycles. In some sense, the mechanisms of interaction of genes and culture of this kind is similar to the placebo effect. The latter, as it is known, is a

certain psychosomatic therapeutic action or acts of communication, rituals, physical acts that have no direct pharmaceutical value. According to the recent, though still hypothetical builds, the placebo effect may be due to the changes in the activity of the nerve centers of the brain and activation of the synthesis of various neurotransmitters. Under the action of the latter, the synthesis of specific information molecules (RNA, proteins) either is activated or inhibited (Hall K.T., Loscalzo J., Kaptchuk T.J., 2015). As a result, the functional relationship between behavioral act and physiological response, which is based on the initial psychological pre disposition is established. Introduced by the authors of the cited work, the concept of «placebo» (placebome), in our opinion, can be a particular description of more general phenomenon – the existence of a common epigenetic intermediate mechanism through which adaptive interaction between sociocultural and biological SESH module is installed. It is important to note that in this way not only co-evolutionary links between genes and elements of culture are formed, but to each of them a certain adaptive value is assigned.

Separation of the category «adaptivity» on two parameters (introduced by us) -objectively-spontaneous (evolutionary efficiency) and subjective-teleological (evolutionary correctness) allows, in our view, to transfer the semantic concept of co-evolution into the sphere of empirical verification. According to the views of its author (S. D. Cousins, 2012) the integrity of the co-evolutionary binary opposition of genes–culture is supported by the informational correlations as well as semantic correspondences. If in the first (informational) aspect the co-evolutionary connection between two areas (modules in our terminology) of adaptive information is provided by the correspondences between informational modules (adaptations) that are supported by biological and socio-cultural inheritance, in the second (semantic) aspect we are talking about rules of such conformity.

In the framework of the three-module model of SESH the co-evolutionary semantics is interpreted as analysis of the informational code that is being changed in the course of human evolution and providing inter-modular interaction within a coherent system of SESH. Therefore, we are talking about the evolution of the double mutual connotations between elements of biological and socio-cultural, socio-cultural and techno-rationalistic modules. Because of such interactions, that are changing in the course of evolution, a peculiar picture of substantial relations is set: the elements of biological module serve as the substrate basis, providing the substrate foundation for the available pool of socio-cultural adaptations; the elements socio-cultural module serve as a selective filter that quickens or hinders the development of technological innovation.

This transmissional mechanism by which the system of adaptations of one module pre-forms selective topos of another one, S. D. Cousins (as in the center of his attention there is culture as a set of psychological intentions and pre-dispostions) names the *intendant*(Cousins S.D. , 2014). From our point of view, more adequate and lexically neutral in different linguistic context will be such term as «*operator*». But in any case the content of this term is revealed through ideal image, that emerged spontaneously or rationally, of the totality of objective targets

that pre-determines self-replicating (in future) structure of relationships of adaptability/disadaptability of separate elements of each module. This structure further indicates the direction of SESH evolution in whole and its individual elements in particular.

So, a specified model of the three-module model of organization of SESH includes (1) three informational modules (bio-, cultural – and techno-rationalistic), each one with its own system of generating, encoding and inheritance of adaptive information and (2) three semantic operator (transmission mechanism) that connect the modules to each other, and semantic connotations of the members of the co-evolutionary bundle vary in time.

In socio-humanitarian and natural-science conceptual and categorical framework of evolutionary theory, meta-semantic compliance of the categories of paradigmatic significance in which the system of objective interests and evolutionary correctness – systems of values – corresponds to the evolutionary efficiency is established. Thus two pairs of categories provide the intersection of socio-prescriptive and descriptive parts of the transdisciplinary theory of anthropogenesis (due to overlapping of their content).Configuration of semantic code is determined by the system of value priorities and the system of rationally justified interests (techno-rationalistic module). A priori we can assume that the semantic code of inter-module interaction is going through periods of relative stability followed by periods of uneven rearrangement initiated by the reconstruction of the value system (socio-cultural module) or objective knowledge and its practical application (techno-rationalist module. (Change of the semantic code that defines the correspondence between the statuses of the individual modules, by definition, is initiated by the module, the rate of evolution of which is greater.) Such restructuring of the semantic connotations is fraught with sharp adaptive intensification of conflicts by increasing the size of the evolutionary load and evolutionary risk. The size of the risk reaches an existential level, when the trends of evolutionary efficiency and evolutionary correctness are incompatible (antiparallel).

Therefore, semantic analysis can be applied equally to all co-evolutionary cycles (operators) inside SESH – to gene-cultural co-evolution, and the techno-humanitarian balance, and to the forming cycle of techno-biological transformations. The study of the semantic differences between the elements of binary techno-cultural and genetic cultural bunches serves as the basis for defining the current trend of the evolution and size of the current evolutionary risk of Homo sapiens.

Rational and techno genesis as the form and the mechanism of adaptation supposes availability of a cognitive (semantic) code. Its unique feature is the hegemony of random system of correlative correspondences between thoughts (interpretants), serving as promoters for the adaptively important behavioral acts, and as appropriate symbols. The availability of interpretants joins the mechanisms of functioning of the socio-cultural and rationalistic part of SESH. The difference between them consists in random coding system of adaptive behavioral acts that is

capable to change physical, social or mental reality by increasing or reducing individual and/or group adaptability of their carriers. This idea is not something fundamentally new. In 1987, for example, in one of the articles it was claimed that the basis for the evolutionary uniqueness of man is the ability to conceptually abstracted from the situations modeling of the actions necessary to achieve the objectives that correlate with adaptation. The ability, speaking the language of the theory of cognition, to create the idealistic rationalistic models of objective reality, is called the «cognitive niche» (Tooby, J., DeVore I., 1987). Given argumentation of the specific (not to say uniqueness) of SESH can be formulated as a postulate about ***rationalization of the process of adaptogenesis of Homo sapiens*** and other hominids. Metaphysical statement about teleological anthropogenesis with the emergence of the technologies of controlled evolution (NBIC-technological complex, convergent technologies, High Hume technology in a broad metaphorical meaning which doesn't change the essence) became quite compatible with the concept of the objective nature of the evolutionary process. Moreover, the observation of the simultaneous existence of several conjugate evolving systems of generation and inheritance of adaptive traits, on the assumption of the inequality of the speeds of adaptaciogenesis in each of them, makes teleologicy quite «natural».

Co-evolutionary semantics of evolutionary risk

As a result, the second aspect of the implementation of the SESH functions is constituted – it is semantic aspect. Co-evolutionary semantics is a time-varying code of correspondence between members of pairwise co-evolutional bunches. The role of the operator that sets the rules of the biological and socio-cultural, socio-cultural and rational-technological, rational-technological and biological informational areas performs either the system of objectified ***interests*** (praxeologically oriented knowledge), or the system of subjective ***values*** (psychological pre-dispositions). Replication of the interests is carried out in the framework of the rational-technological module based on the mechanisms of symbolic inheritance, value priorities – within the framework of socio-cultural module and, accordingly, socio-cultural inheritance (cultural tradition). If the main «purpose» of interests is material survival of the carriers of SESH (evolutionary efficiency), then the content of the same parameter (evolutionary correctness) of values is determined by their ability to ensure self-identity preservation.

Such organization is able to spontaneous increase of system complexity, and at different stages of socio-anthropological genesis the role of the leader is taken by some of its components. Approximately 350-400 years ago as a result of transmutation of the socio-cultural component of the SAS the technological civilization emerged, the main feature of which is a permanent extension of the «socio-ecological niches» (sphere of control) of Homo sapiens and parallel escalation of risks of the anthropo-technological impact.

Postponed effects of genetic conflicts within biological module of SESH and between biological module on the one hand, and technological and socio-cultural

modules on the other stretched out on millenniums. For example, changing a habitual way of eating (diet), that was peculiar to man until the Neolithic revolution, caused a modification in the metabolism of lipids, proteins, carbohydrates that emerged in late – and post reproductive age. These effects, therefore, are closed for the effect of the biological forms of natural selection. As it is supposed now, the increase of frequency of cardiovascular (stroke, heart attack, atherosclerosis), oncological pathology, diabetes of type II, etc. are linked exactly to them. In addition to this, there is imbalance in the development of the sexual sphere, manifested in the discrepancy between the timing of the start of the menstrual cycle and other components of puberty of women. All this is a clear trend of size of the evolutionary risks inherent in a Western type of technological civilization. (The details of these problems are outlined in a recent book by the Swedish nutritionist, adept of the evolutionary medicine Stefan Lindeberg (2010); the coupled evolution of the human genome and culture, causing to the genesis of the «diseases of civilization» are also examined in the book by Daniel Lieberman (2013). Both researchers consider the transition to a non fruit diet, that was determined by socio-cultural heredity, as a systemic factor that reformatted the structure and meaning of the relationship between biological and behavioral, and then non-genetical adaptations. Later, using the arguments of these researchers we will try to justify the semantic concept of co-evolution as an explanatory model of the transmission mechanism between SESH modules.)

The rating of reduction of adaptability according to this indicator on reaching a certain threshold zone of values or as a result of the same threshold of changes of ecological and cultural environment is cable of fast growth, that demands the immediate adaptive response (solving of the problem of survival). Such leap, in fact, is the ***actualization of evolutionary risk***. One of the symptoms of this updating is a systemic effect – distribution beyond the bounds of the initial module to the other components of SESH. So the above-mentioned diseases of Western civilization during the past twentieth century was transformed from a purely medical (i.e. directly related to the biological module) problems on the areas that guide the evolution of socio-cultural module (including the economy).

The evolutionary risk reaches the maximum size in case of antiparallelly of dynamics of changes in evolutionary efficiency and evolutionary correctness, when the characteristic size of risk very quickly crosses the boundaries of «physical» sense ($R_{int} > 1$). Reaching this point means irreversible semantic destruction (destruction of the system of value priorities, the central core of which is the concept of ***humanity*** and ***human nature***).

It seems logical to make two clarifications. The periods of abrupt increasing of the size of evolutionary risk, obviously, are coherent to the periods of «scientific-technological revolution» and to the periods of radical reconstructions of value systems prevailing in the society. Exactly then the structure of the co-evolution connections between the elementary adaptations of different modules of SESH and actually adaptive value of each element is destabilized and prone to unpredictable stochastic fluctuations.

The system of value priorities dominant in society has several-level structure – the individual (unconditional) interests, group (conventional) requirements, an abstract (universal) values [K. Prehn et al., 2015; Kohlberg L., 1969). Here, primarily in the field of group norms and predispostions regarding specific attributes of humanization/dehumanization, relatively rapid reconstructions radically changing the semantic of relations between cultural module and biological and techno-national ones are possible. As a result, the adaptive landscape, in which evolution of, for example, biological module (adaptive significance of individual elements) takes place, is quickly reformatted. As an example we can take a radical revision of value priorities on group and individual level towards traditional and non-traditional sexual orientation in the Western mentality in 1970s-2015s. Universal values are practically not involved in this, not-yet-finished process of transformation of socio-cultural and psychological predispostion.

Thus, we can assume that out of three levels of values priority (and their corresponding socio-cultural predispostions) individual interests, group norms and universal values, the most susceptible to evolutionary transformations are the group norms.

More stable are the individual interests (as most closely associated with the vital needs, determined by biological module) and universal values (as the most abstract, distant from objective reality and close to the rationalistic module). However, the effect of perturbations of group norms – attributes of humanization/dehumanization – diffuses by the means of evolutionary semantic transmission mechanism on the biological module, destroying, in its turn, the rules, of semantic matching of this module with two remaining. Because of this secondary effect the elements of the biological module of SESH are distributed first to the system of objective «interests» and then to other levels of the socio-cultural module. The fixation of a particular set of group norms and then the review of universal values, as the latter are projective reflection of the group norms and individual interests, are taking place.

So, a certain part of the biological adaptation in a new socio-cultural context becomes the elements of genetic load (maladaptive or selectively neutral), and, conversely, a part of harmful or selectively neutral components of the genome are aquire adaptive value. With regard to the technological innovation, together they are definitely aimed at the fragmentation of the biological adaptive complex.

If the value of scientific and technological revolutions (shifts of paradigms) has been investigated (suffice it to recall the classical monograph of Thomas Kuhn of 1962), the evolutionary significance of social and cultural transformation begins to clear up only now. Meanwhile, the socio-cultural inheritance is also able to radical rearrangements of its structure and composition. It takes only to mention the radical change of predispostion regarding sexuality that has occurred in the Western mentality over the past half century. Relative independence of each module is an additional complicating circumstance, as the result of this independence, for example, «macromutation» of the system of cultural and psychological predispostions aimed primarily at preserving the structural

distribution of subcultures within a given civilization type, and only then, at the selection of relevant biological elements of SESH module.

However, in the conditions of the relative balance of genetic-cultural («Gene-culture co-evolution».) and techno-cultural («Techno humanitarian balance».) co-evolutional semantics and the lack of direct preformative impact of techno-rationalist SESH module on the two left (biological and sociocultural), the configuration of the entire system also did not allow an uncontrolled jump of risk to the existential level.

In our previous works we have already formulated the terms of such semantic stability in terms of socio-humanitarian knowledge: the core of the mentality of the West is the desire of a person to a certain maximum ideal («Per aspera ad astra – through the thorns to the stars»). It is complemented by the second pivotal construction, paralyzing and, simultaneously, challenging the limits of this ideal («Ad imaginem suam ad imaginem Dei – In the image and likeness of God») and focuses on the chosen-ness, the absolute priority of the uniqueness of the human person («Unus ex nobis – One of us» as God says about Adam). Thus the actualization of the desire to bring together the world as it is and the world as it should be gains the character of the movement towards the absolute, the ultimate goal («the omega point», as named by Teilhard de Chardin).

In objectified, dismissed from the metaphors form the same argument boils down to the statement that one of the basic predispostion of mentality of industrial civilization in its Western form, is a trend to release the social roles and social status of an individual from the preformation by conditions of his biological substrate (the genome) as a criterion of social (and evolutionary) progress. This trend, in turn, is balanced by the irrational fear of a possible intervention in the human psyche from the outside that violate the free will of the individual and forcing him to act against his «human nature». This trend can be traced back at least to biblical times and legends about werewolves and vampires, through the Gothic novels of the eighteenth century to modern thrillers and science fiction of the most recent years.

The sociocultural system of counterweights, ensuring the self-identity of *Homo sapiens*, turned out to be very stable, but only until the birth of the technologies of driven evolution, when ontological antinomy Evolution versus Intelligent Design was finally overcome. As a result, the restrictions arising from the limited technological means for reality transformation turned to be overcome, at least *in potentio.* The only built-in inside SESH stabilizer of the current of global evolutionary process remains the semantic code of humanization/dehumanization, which in itself allows significant stochastic fluctuations, and is open to technological interventions and therefore needs continuous monitoring.

With the emergence of High-Hume technologies the level of risk is reached the existential level of significance. At this existential level of technological risk means by definition evolutionary risk, because it leads to the genesis of the possibility of the extinction of mankind as a species (but not necessarily intelligent life and the noosphere).

Conclusion

In the era when evolution itself becomes a subject of rational control and/or manipulation, it is necessary to calculate when making a projection and determining the amount of innovative risk those features of social response to scientific and technological development, which stems from the substantial foundations of human consciousness and culture and are the result of the previous biosocial evolution.

Modification of techno-cultural balance, which is an adaptive response of the SESH sociocultural component to the processes described above, led to the transformation of classical science to its postacademic form. In the framework of the same global-evolutionary transformation we have to consider the emergence of bioethics as one of the varieties of contemporary (trans-disciplinary) scientific concept, which combines the features of the Humanities, classical scientific theory and social utopia. Not so long ago E. Kunin was very observant when diagnosed a curious feature of the explanatory models of modern evolutionary biology: all of them are narratives with more or less, but always available portion of teleology. Consciously or not they have, in explicit or implicit form, logical constructs such as «arise for...», the language of these narratives (though it contradicts the methodology of classical not modern, transdisciplinary science) best suits to the describe evolutionary processes and phenomena, and the creation of hypotheses which can be verified by experience (Koonin E.V., 2011).

Especially it is true for the modern phase of the evolution of SESH, which is characterized by a universal process of rationalization and technologization of the course of evolution., The introduced concept of evolutionary risk, in which objective and scientific (evolutionary efficiency) and subjective and humanitarian (evolutionary correctness) criteria of the value of this parameter combines, in accordance with the principle of subsidiarity serves as the example of such an explanatory model.

The problem of evolutionary risk and its components is coming within the conceptual field of anthropic principle, since one of the parameters of the equation of the doomsday simultaneously becomes not only a global constant that is crucial to the human genesis in the Universe, but also a derivative from the characteristics of sociocultural and biological evolution. It did not fail to specify one of the pioneers of the anthropic principle Brandon Carter (2012) didn't fail to point at this fact.

In 1960-th Heinz von Foerster has formulated the law of hyperbolic growth in the number of Homo sapiens, also known under the non-academic title «Doomsday Equation». In accordance with the Foerster's equation, the population growth for approximately the last 10 thousand years, obeys an equation of the hyperbola, i.e. increases with increasing acceleration and about up to 2025 will be infinite, i.e. loses physical meaning. It will mean the end of the evolutionary history of Homo sapiens, although not necessarily imply the death of intelligent

life at all. Rather, it means the passage of a certain point of the evolutionary singularity, the achievement of the value of evolutionary risk close to unit.

In the Foerster's equation there is the parameter T*, which had been empirically calculated by the authors and according to them was about $2 \cdot 10^{11}$. Brandon Carter in the work cited above considers this option as a member of the pool of world constants that determined the emergence of human and the formation of the laws of nature of civilization that are able to reflect. In his understanding this value is a function of the amount of information (10^{10} bits) contained in the human genome and the duration of existence of one generation (20 years). By reducing this parameter below the threshold value, the transition from biological to sociocultural, and then technological phases of anthropogenesis (phases II-III in our periodization of the evolution of SASH) becomes impossible.

Andphenomenologicalinterpretationandexplanatorymodeloftheorster's DoomsdayEquationquiteconsistentwiththenotionabouttheorganizationofSASHandt hemechanismsofformationofevolutionaryrisk, advocatedinthepresentstudy.

On the one hand, the population growth increases the frequency of techno-rationalist and socio-cultural innovations/adaptations and the speed of their distribution in the population, which in accordance with Lamarck's module flows through contagious mechanism. Thereby the ecological niches available for the development of *Homo sapiens* are expanded, and the conditions for further acceleration of population growth are created (korotaev A.B et al., 2005).

On the other hand, the integrity of the structure three-module SASH means the availability of some inter-module communicational correspondences between the elements of biological and socio-cultural modules of the co-evolutional semantics. Even under the condition of the ambiguity of semantic connections between modules with exceeding of a certain threshold in the number of adaptive socio-cultural elements in comparison with the pool of biologically determined signs, that are comparable to them, the efficiency of genesis of adaptation decreeses sharply. Externally it is manifested in the accumulation of genetic and cultural imbalances, inconsistencies between the demands of the sociocultural environment and psycho-physiological capabilities of the organism (evolutional load). In the first approximation, the threshold, beyond which the area of the fracture of the curve of population growth begins will be attainment of the volume of adaptive information that is replicated with the help of socio-cultural inheritance, the value comparable with the volume of information accumulated in the genome. This situation has two fundamental but alternative evolutionary solutions.

The first («hard») decision means the technologization of biological evolution of human, i.e. the improvement (enhancement) of Homo sapiens through genetic engineering, etc. technologies, resulting, as already mentioned, in the completion of the evolutionary history of humanity (the loss of self-identity of generations of intellect carrier).

«Soft» solution involves the creation of a radically transformed version of the evolutionary semantics for regulating the flow of gene-cultural co-evolution

and techno-humanitarian balance. The newly established co-evolutionary semantics should provide the best match of the biological and techno-rationalistic modules to the so-called universal value priorities, preserving the self-identity of the carriers of the mind.

This final observation, in turn, determines civilizational and evolutionary function of bioethics. Bioethics is largely methodological one. In other words, it is a metatheory, which, we hope, can serve as a stabilizer for the system of attributes-identifiers of human self-identity, as well as for the system of cultural-mental predispostions formed on their basis. This system maintains the existence of the current version of evolutionary semantics NBIC-technological complex within the «universal values», ensuring the preservation of humanity in the process of permanent development of technologies, directed to the subject of the evolutionary process.

Bibliography

[1]Zizek S. Living in the and of times. L.: Verso, 2010. 416 p.
[2]Coeckelbergh M. Human Being and Risk. Enhancement, Technology, and the Evaluation of Vulnerability Transformations. Dordrecht; N. Y.: Springer, 2013, 218 p.
[3]The Anthropocene: a new epoch of geological time? / J. Zalasiewicz, M. Williams,A. Haywood, M Ellis // Phil. Trans. Royal. Soc. Ser.A. 2011. Vol. 369, No 1938. P.835-841.
[4]Cheshko V.T. Ivanitskaya L.V. Glazko V.I, Prospects for the Vernadsky concept of noosphere // Herald. Natural Sciences Acad.. 2010. № 4. p. 49-58. (In Russian.)
[5]Crutzen P. J. Geology of mankind // Nature. 2002. Vol.415. P. 23.
[6]Kahneman D. Maps of Bounded Rationality: Psychology for Behavioral Economics // American Economic Review. 2003. Vol. 93, No 5. P. 1449 – 1475.
[7]Kaebnick G. E.Human Nature without Theory //The Ideal of Nature. JohnsHopkinsUniversity. 2012. P.50.
[8]Popper K.The Open Society and Its Enemies. 2-ed. – M .: Phoenix, 1992. Vol. 1 – 448 p.; – Vol. 2. – 528 p. (In Russian.)
[9]Glazko V.I,QUOVADIS, HOMO? (Instead of foreword)// Cheshko V.T. Stable adaptive strategy of Homo sapiens. Biopolitical alternative. The problem of God: Monograph. – H .: PH «INZHEK», 2012. P. 10-16. (In Russian.)
[10]Fukuyama F. Our post-human future. – M .: AST, 2004. – S. 25, 35.. (In Russian.)
[11]Pagano U. Love, war and cultures: an institutional approach to human evolution // J Bioecon. 2013. Vol. 15. P.41–66.
[12]Steinberg L. The influence of neuroscience on US Supreme Court decisions about adolescents' criminal culpability // Nature Reviews Neuroscience. 2013. Vol. 14. P. 513.
[13] War, space, and the evolution of Old World complex societies / P. Turchin, Th.. E. Currieb, E. A. L. Turnerc, S. Gavriletsd // Proc. Nat. Acad. Sci.2013. Vol. 110,No. 41. P. 16384-16389.
[14] Modelling and forecasting of the global dynamics / V.A. Sadovnichii, A.A.Akaev, A.V.Korotaev, S.Yu.Malkov. Scientific Programme Board Presidium Economics and sociology of knowledge. - M .: ISPR, 2012. – 359 p. (In Russian.)
[15]HomoNovus– AHuman Without Illusions / Ed. Ulrich J. Frey · Ch.Sturmer,K.. Willfuhr/ Berlin: Springer, 2010. 292 p.
[16] Cavalli-Sforza L.L., Mendozzi P., Piazza A. The History and Geography of Human Genes. Princeton: Princeton Univ.Press, 1994.342 p.
[17] Cavalli-Sforza L.L. Genes, Peoples and Languages. N.Y.: Penguin, 2001.228 p.

[18]McDermott R., Hatemi P.K. Political Ecology: On the Mutual Formation of Biology and Culture // Advances in Political Psychology. 2014. Vol. 35, Suppl. 1. P. 111-127.
[19]Man Is by Nature a Political Animal. Evolution, Biology, and Politics // P. K. Hatemi, R. McDermott. Chikago: Univ.Press, 2011. 318 p.
[20]Sterelny K. The Evolved Apprentice: How Evolution Made Humans Unique. Cambridge (Mass.); L.: Bradford, 2012. 264 p.
[21]Baldwin J. M. Social and ethical interpretations in mental development: A study in social psychology, 5th, reprint 1913 ed. Vol. 1-2. Bristol, England: Thoemmes Press, 2001.
[22]Burman J.T. Updating the Baldwin effect: The biological levels behind Piaget's new theory // New Ideas in Psychology. Vol. 31, No 3. P. 363–373.
[23]Young J. L. The Baldwin Effect and the persistent problem of Preformation versus Epigenesis // New Ideas in Psychology. 2013. Vol. 31. No 3. P.355–362.
[24]Jablonka E., Lamb M.J. Evolution in Four Dimension. Cambridge (Mass): MIT, 2005. – 262 p.
[25] Jablonka E., Lamb M. Soft inheritance: challenging the modern synthesis // Genet. Mol. Biol. 2008. Vol. 31, No.2. P. 389-395.
[26] Mesoudi A. Cultural Evolution: How Darwinian Theory Can Explain Human Culture and Synthesize the Social Sciences. Chicago; L.: University of Chicago Press, 2011. 264 p.
[27] Bonduriansky R., Crean A. J., Day T. The implications of nongenetic inheritance for evolution in changing environments // Evol. Applications. 2012.vol. 5. P.192–201
[28]Mameli M. Nongenetic selection an nongenetic inheritance // Brit. J. Philos. Sci. 2004. Vol. 55. P. 35–71;
[29]Beyond DNA: integrating inclusive inheritance into an extended theory of evolution / Danchin, A.Charmantier, F.A. Champagne, A. Mesoudi, B. Pujol, S. Blanchet// Nature Reviews Genetics. 2011. Vol.12. P.475-486.
[30]Ivanitskaya L. Cheshko V.T. Glazko V.I/ Evolutionary and genetic approaches in the works of N.D. Kondratiev // Herald. Natural Sciences Acad., 2011. № 4. p 115-124. (In Russian.)
[31]Richerson P., Boyd R. Not by genes alone: how culture transformed human evolution. Chicago: University of Chicago Press, 2005. 342 P.218.
[32]The mystery of missing heritability: Genetic interactions create phantom heritability / O. Zuk, E, Hechtera, S.R. Sunyaeva, E.S. Lander // Proc. Nat. Acad. Sci. USA. 2012. Vol. 109, No 4. P.1193-198.
[33]Bush W.S., Moore J.H Genome-Wide Association Studies. PLoS Comp. biol., 2012. 8, No 12. Publ e1002822. doi:10.1371/journal.pcbi.1002822.
[34]Bush W.S., Moore J.H Genome-Wide Association Studies // PLoS Comp. biol., 2012. 8, No 12. Publ e1002822. doi:10.1371/journal.pcbi.1002822.
[35]Eigen M., Winkler R: The Laws of the Game: How The Principles of Nature Govern Chance, Princeton University Press. 1983, p.100

[36]Gavrilets S. Collective action and the collaborative brain. // Journ. Royal. Soc.Interface. 2015. Vol. 12, No 102. [http://dx.doi.org/10.1098/rsif.2014.1067.
[37] Transformations of Lamarckism: From Subtle Fluids to Molecular Biology / ed. S. B. Gissis,E. Jablonka. Cambridge, (Mass.); L.: The MIT Press, 2011. 474 p.
[38]Barton C. M. Complexity, Social Complexity, and Modeling // J Archaeol Method Theory. 2014. Vol. 21, No 2. P. 306-324.
[39] Campbell D. T. Evolutionary Epistemology // The philosophy of Karl R. Popper. Ed. by P. A. Schilpp. LaSalle: Open Court, 1974. P. 412-463
[40]Campbell D. T. Unjustified variation and retention in scientific discovery // Studies in the philosophy of biology: Reduction and related problems. Ed.by Fr. J. Ayala,Th. Dobzhansky. London; Bastingstoke: Macmillan, 1974. P. 141–161.
[41] Popper, K. Objective knowledge. Evolutionary Approach / Trans. from English. DG Lakhuti – M .: EditorialURSS, 2002. – 384 p.
[42] Thomson P. Evolutionary Epistemology and Scientific Realism // Joumal of Social and Evolurionary Systems 1995 Vol. 18, No 2. P. 165-191.
[43]HodgsonG. M.,KnudsenTh. Darwin's Conjecture. The Search for General Principles of Social and Economic Evolution. Chicago, London: The University of Chicago Press, 2010. P. 290.
[44]Whiten A., Erdal D. The human socio-cognitive niche and its evolutionary origins // Phil. Trans. Roy. Soc. 2012. Ser. B. Vol. 367. P. 2119-2129.
[45]Runciman W. G. The Theory of Cultural and Social Selection- Cambridge: Cambridge University Press. 2009. P. 257.
[46]BiroD., HaslamM., RutzCh.Tooluseasadaptation // Phil. Trans. R. Soc. Ser. B.2013. Vol. 368, No 1630. doi:10.1098/rstb.2012.040.
[47]Cheshko V.T. Stable adaptive strategy Homo sapiens. Biopolitical alternative. The problem of God: Monograph. – Kharkiv: PH «INZHEK», 2012. – 596 p. (In Russian.)
[48]Lewis H. M., Laland, K. N. Transmission delity is the key to the build-up of cumulative culture // Phil. Trans. Roy. Soc. 2012. Ser. B. Vol. 367. P. 2171–2180.
[49] Trimble M. Why Humans Like To Cry: Tragedy, Evolution, and the Brain. OxfordUniv.Press. 2012. 220p.
[50]BerneE. Sex and the human love M .: EKSMO. 2003, p 3-4. (In Russian.)
[51]System analysis and scientific knowledge / ed. D.I.Gorskogo, A.A.Vetrova, A.I.Uemova, V.S.Chernyaka. M .: Nauka, 1978 – 230 p. (In Russian.)
[52]Melville Yu The semiotics of Charles Peirce // Philosophical Sciences. 1965. P.83-82. (In Russian.)
[53]Tooby, J., DeVore, I. The reconstruction of hominid behavioral evolution through strategic modelling // The evolution of human behavior: primate models. Ed. W. G. Kinzey, N.Y.: SUNY Press.1987. P. 183–227.
[54]McKay R.T., Dennett D.C. The evolution of misbelief //Behav. Brain Sci. 2009. Vol. 32. P. 493–561.
[55] Burt A., Trivers R. Genes in conflict: the biology of selfish genetic elements. Cambridge, Mass.; L.: The Belknap Press of Harvard University Press, 2006. 602 p

[56] Mind the Gap Tracing the Origins of Human Universals / Ed. P.M. Kappeler, J.B. Silk. Heidelberg; Dordrecht; L.; N.Y.:: Springer, 2009. 502 p.
[57]Crespi B. J. The origins and evolution of genetic disease risk in modern humans // Ann. N.Y. Acad. Sci. 2010. Vol. 1206. P.80–109.
[58]Wells J.C.K. Ecological Volatility and Human Evolution: A Novel Perspective on Life History and Reproductive Strategy // Evolutionary Anthropology. 2012. Vol. 21. P.277–288.
[59]Applied Evolutionary Anthropology.Darwinian Approaches to Contemporary World Issues. N.Y.; Heidelberg; Dordrecht; L.: Springer, 2014.P.299.
[60]Many human accelerated regions are developmental enhancers / J. A. Capra, G. D. Erwin, G. McKinsey, J. L. R. Rubenstein, K. S. Pollard // Phil. Trans. R. Soc. Ser.B, 2013. vol. 368, No. 1632. doi:10.1098/rstb.2013.0025
[61]Vavilov, N. I. Selected works. M.: Nauka, 1966. p. 169.(In Russian.)
[62]Leydesdorff, L., Franse, S. The Communication of Meaning in Social Systems // Systems Research and Behavioral Science. 2009. 26, No 1. P. 109-117.
[63]Odum, H. T. Environment, Power, and Society for the Twenty-First Century: The Hierarchy of Energy. New York: Columbia University Press. 2007. P.418.
[64]Abel Th. Culture in cycles: considering H.T. Odum's 'information cycle' // International Journal of General Systems. 2014. Vol. 43, No 1. P. 44-74. http://dx.doi.org/10.1080/03081079.2013.852188
[65]ZubovA.A.Formation and initial resettlement of genus Homo/ZubovA.A.St. Petersburg: Aletheia, 2011 224 p. (In Russian.)
[66]Chudek M., Henrich J. Culture–gene coevolution, normpsychology and the emergence of human prosociality // Trends in Cognitive Sciences. 2011. Vol. 15, No. 5. P. 218-226.
[67]Davis E. Tehnognozis: the world of magic and mysticism in the information age. -Ekaterinburg: Ultra-cultura, 2008. -480 p.(in Russian.)
[68]GarinE. Problems of the Italian Renaissance. Tran s fromengl. -M.: Progress, 1986. -P. 331.. (In Russian.)
[69]Jaspers K. The meaning and assignment history. -M.: Republic, 1994. – P. 370-371.. (In Russian.)
[70] Berdyaev N. The origins and meaning of Russian communism. -M.: Nauka, 1992, p. 116. . (In Russian.)
[71]Smith B.D. A Cultural Niche Construction Theory of Initial Domestication // Biol Theory. 2011. Vol. 6. P.260–271.
[72]Savelirff S.V. Variability and genius/. — M.: VEDI, 2012. — 128 p.: ill.. (In Russian.)
[73]Shamay-Tsoory S. G. The Neural Bases for Empathy // The Neuroscientist. 2011. Vol. 17, No 1. P. 18–24.
[74]Kidd D. C., Castano E. Reading Literary Fiction Improves Theory of Mind // Science. 2013. Vol. 342, No. 6156. P. 377-380.

[75]VasilievV.V. A hard problem of consciousness. M.: Progress-tradition, 2009, 272 p. (In Russian.)
[76] O'Brien M. J., Bentley R. A. Stimulated Variation and Cascades: Two Processes in the Evolution of Complex Technological Systems // J Archaeol Method Theory. 2011. Vol. 18. P. 309–335.
[77]Bentley R. A., O'Brien M.J. Cultural evolutionary tipping points in the storage and transmission of information // Frontiers Psychol. 2012. Vol. 3. Article 569. P. 1-14.
[78]Jantsch E. T e Selforganizing Universe: Scientifi c and Human Implicatory of Emerging Paradigm of Evolution. – Oxford, 1980.
[79]KarpinskayaR.S., Liseeff I.K., Ogurtzoff A.P. Philosophy of nature: co-evolutionary strategy. -M., 1995, p. 154. (In Russian.)
[80]Ogurtzoff A.P. Philosophy of Science: the twentieth century. Concepts and issues. In 3 x Pt. SPb.: Mir. 2011, Pt. 1-504 p. Pt. 2-496 p. Pt 3-336 p. (In Russian.)
[81]Markoff A. The evolution of human. Vol.1-2 M.: Astrel, 2011. Bol. 1.464 p. Vol. 2. 512 p.(In Russian.)
[82]Greitemeyer T., Kastenmüller A.,Fischer P. Romantic motives and risk-taking: an evolutionary approach // Journ. Risk Res. 2013. Vol.16, No 1. P.19-38.
[83] Laland K. N., Brown G. R. Sense and Nonsense. Evolutionary Perspectives on Human Behavior. Oxford; N.Y.: Oxford University Press, 2002. 369 p.
[84]Odling-Smee J., Laland K., Feldman M. Niche construction: the neglected process in evolution. Princeton,PrincetonUniv.Press. 2003. 472 p.
[85]Odling-Smee J. Niche construction in evolution, ecosystems and developmental biology // Mapping the future of biology. Dordrecht: Springer, 2009. P. 69-91.
[86]Wilson D.S.Darwin's Cathedral: Evolution, Religion, and the Nature of Society Chicago: The University of Chicago Press, 2002. 280 p.
[87]Wilson D.S., Wilson E. O. Rethinking the Theoretical Foundation of Sociobiology // The Quarterly Review of Biology. 2007. Vol. 82, No. 4.P. 327-348.
[88]Pratkanis, A. R., & Aronson, E. . Age of propaganda: The everyday use and abuse of persuasion. New York: Henry Holt. 2001.
[89]DosiJ. An economic coordination and dynamics: some features of an alternative evolutionary paradigm//Questions of economy. 2012. No 12. P. 31-60. (In Russian.)
[90]Laland K. N., O'Brien M. J. Niche Construction Theory and Archaeology // J Archaeol Method Theory. 2010. Vol. 17. P. 303–322.
[91]Kuzawa C. W., Bragg J. M. Plasticity in Human Life History Strategy Implications for Contemporary Human Variation and the Evolution of Genus Homo // Current Anthropology. 2012. Vol. 53, Suppl. 6. P.S369-S382
[92]Shinobu Kitayama, Park J., Cultural neuroscience of the self: understanding the social grounding of the brain // Soc Cogn Affect Neurosci., 2010. Vol.5. No 2-3. P. 111-129.

[93]Culture, distress, and oxytocin receptor polymorphism (OXTR) interact to emotional support seeking / H. S. Kima, D. K. Shermana, J. Y. Sasakia et al. // Proc. Nat. Acad. Sci. 2010. Vol. 107, No. 36. P.1571–1572.
[94]Gene Coexpression Networks in Human Brain Identify Epigenetic Modifications in Alcohol Dependence / Ponomarev I., Shi Wang, Lingling Zhang, Adron Harris, R. Dayne Mayfield // J. Neurosci. 2012. Vol.32, No 5. P.1884 –1897.
[95]WhiteL. Selected works: The Evolution of Culture / Trans. from English. - M .: ROSSPEN, 2004. - 1064 p. (In Russian.)
[96]Cole S. W. Social Regulation of Human Gene Expression // Current Directions in Psychological Science. 2009. Vol. 18, No 3. P. 132-137.
[97]Waal F. B. M. De. The Bonobo and the Atheist: In Search of Humanism Among the Primates. N.Y; L.: Norton, 2013. 308 p.
[98] Norenzayan A. Big Gods: How Religion Transformed Cooperation and Conflict. Princeton: Princeton University Press, 2013. 226 p.
[99] Mechnikov I. I. Sketches of optimism. -M.: Nauka, 198(In Russian.)8. -329 p. (In Russian.)
[100]Šatalkin A.I. «Philosophy of Zoology» by Jean Baptiste Lamarck: a view from the 21st century. Moscow: KMK. 2009. 606 p. (In Russian.)
[101] Nazaretyan, A.P. Unlinear future. Mega-historic synergetic, cultural and psychological conditions of the global forecasting. M.: Institute of Oriental Studies of the Russian Academy of Sciences, 2013. 439 p. (In Russian.)
[102]Kautsky K.. Reproduction and development in nature and society. — Kiev , 1910 — 239 p. (In Russian.)
[103] Naisbitt, J. Megatrends: Ten New Directions Transforming Our Lives. N.Y.: 1988Warner Books / Warner Communications Company 178 p.
[104]Rodin S.N.The idea of co-evolution-Novosibirsk: science, 1991. (In Russian.)
[105]Richerson Peter J., Boyd R, Henrich J. Gene-culture coevolution in the age of genomics // Proc. Nat.Acad.Sci. 2010. Vol. 107. Suppl. 2. P. 8985–8992.
[106]Laland K. N., Odling Smee J., Myles S. How culture shaped the human genome: bringing genetics and the human sciences together // Nature Review Genetics. 2010. Vol. 11. P. 137-148.
[107]ButovskayaM. Anthropology of sex. Fryazino: 21-cent., 2013. 256 p. (In Russian.)
[108] The evolution of lactase persistence in Europe. A synthesis of archaeological and genetic evidence / M. Leonardi, P.Gerbault, M. G. T., J. Burger // International Dairy Journal. 2012. Vol. 22. P.88-97.
[109]Dudley R. The drunken monkey: why we drink and abuse alcohol / R. Dudley. Berkeley; Los Angeles; L.: University of California Press, 2014. 179 p.
[110]Barthes J., Godelle B., Raymond M. Human social stratification and hypergyny: toward an understanding of male homosexual preference // Evolution and Human Behavior. 2013. Vol. 34. P. 155-163.
[111]The Evolution and Functional Impactof Human Deletion Variants Shared with ArchaicHomininGenomes/ Yen-LungLin,P.Pavlidis, E.Karakoc,J.Ajay, O.Gokcumen // MolBiolEvol 2015. doi:10.1093/molbev/msu405

[112]O'Brien M. J., Laland K. N. Genes, Culture, and Agriculture: An Example of Human Niche Construction // Current Anthropology. 2012. Vol. 53, No. 4. P. 434-470.
[113]GrininL.E. The State and the historical process. The era of State formation: the overall context of social evolution in the formation of the State. M.: Com-Book, 2007. 272 p. (In Russian.)
[114]MoiseeffN.N. The fate of civilization-the path of reason.-M.: MNÈPU, 2000.-360 p. (In Russian.)
[115]Waal F. B. M. De.The Antiquity of Empathy // Science. 2012. Vol. 336, No. 6083. P. 874-876.
[116]Chiao Joan Y., Blizinsky Katherine D. Culture–gene coevolution of individualism–collectivism and the serotonin transporter gene // Proc. Royal. Soc.2010. Ser.B/ Vol. 277. P529-537.
[117]Schinka J.A., Letsch E.A., Crawford F.C. DRD4 and Novelty Seeking: Results of Meta-Analyses // Amer. Journ. of Med. Genet. 2002 Vol. 114. P. 643–648.
[118]The association of DRD4 and novelty seeking is found in a nonhuman primate model / Bailey JN, Breidenthal SE, Jorgensen MJ, McCracken JT, Fairbanks LA // Psychiatric Genetics, 2007. Vol 17, No 1, P. 23-27.
[119]Genetic variation in preferences for giving and risk taking / D. Cesarini, C. T. Dawes, M. Johannesson et al. // The Quarterly Journal of Economics, 2009. Vol. 124 (2). P. 809-842.
[120]The genetic architecture of economic and political preferences / D.J. Benjamin, D. Cesarini, M. J. H. M. van der Loos et al. // Proc.Nat. Acad. Sci. USA. 2012. Vol. 109. No. 21. P. 8026-8031.
[121]Friendships Moderate an Association between a Dopamine Gene Variant and Political Ideology / J. E. Settle, C. T. Dawes, N. A. Christakis, J.H. Fowler //The Journal of Politics, 2010; Vol. 72 No 4, P. 1189-1198.
[122]The role of culture gene coevolution in morality judgment: examining the interplay between tightnesslooseness and allelic variation of the serotonin transporter gene / A.J. Mrazek, J.Y. Chiao, K.D. Blizinsky, J. Lun, M.J. Gelfand // Culture and Brain. 2013. Vol. . 1, No 2-4. P. 100–117.
[123] Norenzayan A. Explaining Human Behavioral Diversity // Science 2011. Vol 332. P.1041-1042.
[124] Crespi B. J. Oxytocin, testosterone, and human social cognition // Biol. Rev. 2015. doi: 10.1111/brv.1217
[125]Large-Scale Psychological Differences Within China Explained by Rice Versus Wheat Agriculture// T. Talhelm, X. Zhang, S. Oishi, C. Shimin, et al. // Science. 2014. Vol.344. P. 603-608.
[126]Henrich J. Rice, Psychology, and Innovation // Science. 2014. Vol. 344, No 6184. P.593-594.
[127]Culture and Systems of Thought: Holistic Versus Analytic Cognition / R.E. Nisbett, K. Peng, Incheol Choi, Ara Norenzayan // Psychological Review. 2001, Vol. 108, No. 2. P. 291-310

[128]Henrich J., Heine S.J., Ara Norenzayan. The weirdest people in the world? // Behav.Brain Sci. 2010. Vol. 33, P. 61–135.
[129]Stern M. D. Patrimony and the Evolution of Risk-Taking // PloS ONE. 2010. Vol. 5, No 7, e11656. P. 1-7 DOI:10.1371/journal.pone.0011656.
[130]The Genetic Legacy of the Mongols / T. Zerjal,Yali Xue, G. Bertorelle et al. // Am. J. Hum. Genet. 2003. Vol. 72, No 3. P.717–721.
[131]Chuan-Chao Wang, Hui Li. Inferring human history in East Asia from Y – chromosomes // Investigative Genetics 2013.Vol. 4, No 11. P. 1-10j/ http://www.investigativegenetics.com/content/4/1/11.
[132]Y-chromosome descent clusters and male differential reproductive success: young lineage expansions dominate Asian pastoral nomadic populations / P.Balaresque, N.Poulet, S.Cussat-Blanc et al. // European Journal of Human Genetics.2015.http:\ doi:10.1038/ejhg.2014.285.
[133]A recent bottleneck of Y – chromosome diversity coincides with a global change in culture / M. Karmin, L. Saag, M. Vicnteetal. // Genome Res., 2015. Vol. 25. P. 1-8.http://www.genome.org/cgi/doi/10.1101/gr.186684.114.
[134]Chagnon, N. Life histories, blood revenge, and wadare in a tribal population. Science. 1988. Vol. 239, No 4845. P.985-992.
[135]Chagnon, N. Manipulating Kinship Rules: A Form of Male Yanomamo Reproductive Competition // Adaptation and Human Behavior An Anthropological Perspective / Ed.L.Conk,N. Chagnon, W. Irons. N.Y.: 2000. P.115-132.
[136]History of the body. / A. Korbin et al. Vol.. 1. From the Renaissance to the enlightenment. M.: Novoe literaturnoe obozrenie. 2012.480 p. (In Russian.)
[137]Banzhaf W. Genetic Programming and Emergence // Genet Program Evolvable Mach. 2014. Vol. 15, No 1. P.63–73.
[138]Leier A. Emergence in simulated evolution // Genet Program Evolvable Mach. 2014. Vol.15. No 1. P. 79–81.
[139]Diet and Our Genetic Legacy in the Recent Anthropocene: A Darwinian Perspective to Nutritional Health / M.D. Lucock, C.E. Martin, Z. R. Yates, M. Veysey // Journ. of Evidence-Based Complementary and Alternative Medicine. 2014. Vol 19, No 1. P.68-83.
[140]Genome flux and stasis in a five millennium transect of European prehistory / C. Gamba, E.R. Jones, M.D. Teasdale et al. // Nature Communications. 2014. Vol.5. Publ.5257/ DOI: 10.1038/ncomms6257 | www.nature.com/naturecommunications.
[141]Lindeberg S. Food and Western Disease: Health and nutrition from an evolutionary perspective. Oxford: Wiley-Blackwell, 2010. 370 p.
[142]Lieberman D. The story of the human body: evolution, health, and disease. N.Y.: Pantheon.2013. 480 p
[143]Foley R., Gamble C. The ecology of social transitions in human evolution //Trans. Royal. Soc. 2009. Ser.B. Vol. 364. P., 3267-3327.
[144]Bickerton D. Adams Tongue. How Humans Made Language, How Language Made Humans. N.Y.: HillWang, 2009. 304 p,
[145]Tomasello, M.. Origins of Human Communication. Cambridge; l.: MIT Press2008. 408 p.

[V]BurlakS.A. The origin of language. Facts, research hypotheses. M.: Astrel. 2011.464 p. (In Russian.)

[147] Barulin A. N. Semiotic Rubicon in glottogenesis //Questions of linguistic kinship. 2012. No. 8, pp. 33-74. (In Russian.)

[148]Jablonka E., Ginsburg E., Dor D. The co-evolution of language and emotions // Trans. Royal. Soc. Ser.B. Vol. 367, No. 1599. P. 2152-2159.

[149]Pinker S. The language instinct: The new science of language and mind. – L.: Penguin UK, 1995.

[150] Efroimson V.P. Genetics efroimson ethics and aesthetics. Spb.: Mascot, 1995. — 288 p. . (In Russian.)

[151]Christiansen, M. H., Chater, N. Language as shaped by the brain // Behav. Brain Sci. 2008. Vol.31. P. 489–558.

[152]Dor D. Language as a communication technology: a proposal for a new general linguistic theory. 2011, http: // people.socsci.tau.ac.il/mu/danield/?les/2010/11/abstract-for-site3.pdf.

[153] Shipman P. The Animal Connection and Human Evolution // Current Anthropology. 2010. Vol. 51, No. 4. P. 519-538.

[154]Shigeru Miyagawa, Berwick R.C.,Kazuo Okano. The emergence of hierarchical structure I n human language // Frontiers in Psychology. 2013.Vol. 4. Article 71. P. 1-6.

[155] Peretz, I. The nature of music from a biological perspective // Cognition. 2006. Vol.100. p. 1–32.

[156] Dediu D., Levinson S.C.On the antiquity of language: the reinterpretation of Neandertal linguistic capacities and its consequences // Frontiers in Psychology. 2013. Vol. 4, Article 397. P. 1-17.

[157]Sweller J., Ayres P., Kalyuga S. Cognitive Load Theory. N.Y.; Dordrecht; Heidelberg; L.: Springer, 2011. 292 p.

[158]Festinger, L. A Theory of Cognitive Dissonance. Stanford, CA: Stanford University Press. 1957..

[159]Perlovsky L. A challenge to human evolution-cognitive dissonance // Front Psychol. 2013. Vol. 4. Article 179. P. 1-3.

[160]Bogdanov A.A. Tektology: (universal organizational science). In 2 vol. M.: Economics, 1989. Vol 1.304 p.; Vol. 2 351 p.(In Russian)

[161]Heyes C. Grist and mills: on the cultural origins of cultural learning // Phil. Trans. Roy. Soc. 2012. Ser . Vol. 367. P.2181–2191.

[162]Powell A., Shennan S., Thomas, M. Late Pleistocene demography and appearance of modern human behavior // Science. 2009. Vol. 324, No 5932. P. 1298–1301.

[163]D'Errico Fr, Stringer Ch. B. Evolution, revolution or saltation scenario for the emergence of modern cultures? // Trans. R. Soc. 2011. Ser. B.Vol. 366, No. 1567. P. 1060-1069.

[164] Mellars P. Why did modern human populations disperse from Africa ca 60,000 years ago? A new model // Proc. Natl Acad. Sci. USA. 2006. Vol.103, No 25. P.9381–9386.

[165] Csibra, G. , Gergely, G. Natural pedagogy as evolutionary adaptation Phil. Trans. Royal. Soc. 2011. Ser. B 366. P. 1149–1157.
[166]Pagel M. Wired for culture: Origins of the Human Social Mind. N.Y.; L.: Norton, 2013. 416 p.
[167] Huxley J. New Bottles for New Wine, L.: Chatto and Windus, 1957. P. 13-17.
[168]Potter V.R. Bioethics: bridge to the future. Kiev: Vadim Karpenko, 2002. 216 p.
[169]Handbook of Research on Technoself: Identity in a Technological Society / Ed. Lippinchini R., Hershey: IGI Global. 2013. 741 p.
[170]Sex differences in the structural connectome of the human brain / M.Ingalhalikar, A. Smith, D.Parker, T.D. Satterthwaite et al // Proc. Nat. Acad. Sci.USA, 2014. Vol. 111, No 2. P. 823–828.
[171]Glazko V.I., Ivanitskaya L. Crises and revolutions-genetic-cultural paradigm // Academy Of Natural Sciences Herald. 2010. No 4. P.95-109.
[172]Persson I., Savulescu J. Unfit for the Future. Oxford: University Press, 2012, 143 p.
[173] Late lessons from early warnings: the precautionary principle 1896–2000. Copenhagen: European Environment Agency, 2001. 210 p. (EEA Report. 2001. No 22).
[174] Late lessons from early warnings: science, precaution, innovation. Copenhagen: European Environment Agency, 2013. 746 p. (EEA Report. 2013. No 1)
[175] Risk, Media and Stigma: Understanding Public Challenges to Modern Science and Technology / Ed. P. Slovic, J. Flynn, H. Kunreuther // L.: Routledge, 2004. 416 p.
[176]Pinker S. The Better Angels of Our Nature. Why Violence Had Declined. N.Y.: Penguin. 1026 p.
[177]Waal de F. Origins of morality In Search of Humanism among the Primates / translate from engl. — M.: Alpina non-fiction, 2014. — 376 p. (In Russian.)
[178]Lock R. Developing a methodology to support the evolution of System of Systems using risk analysis // System Eng., 2012. Vol.15, No 1. P. 62-73.
[179]Cultural transmission and the evolution of human behavior: ageneral approach based on the Price equation / C. El Mouden, J. B.Andre, O.Morin, D. Nettle // J. Evol. Biol. 2014. Vol.27, No 2. P. 231–241.
[180]Koonin E. The Logic of Chance: The Nature and Origin of Biological Evolution. N.Y.:Pearson, 2014.. – 527 p.
[181]Derex M., Godelle B., Raymond M. How does competition affect the transmission of information? // Evolution & Human Behavior. 2014. Vol. 35 No 2. P. 89-95.
[182]Heywood J.S. An exact form of the breeder's equation for the evolution of a quantitative trait under natural selection. Evolution. 2005. Vol. 59, No 11. P. 2287–2298.
[183]Risk, mobility or population size? Drivers of technological richness among contact-period western North American hunter–gatherers. / Collard M., Buchanan

B., O'Brien M.J., Scholnick J. // Phil. Trans. R. Soc. Ser. B. 2013. Vol. 368, No 1630. doi:10.1098/rstb.2012.0412.

[184]Henrich J. Demography and cultural evolution: why adaptive cultural processes produced maladaptive losses in Tasmania // Am. Antiquity. 2004. Vol. 69, No 2. P.197–218.

[185]Kline M.A., Boyd R. Population size predicts technological complexity in Oceania // Proc. R. Soc. Ser. B. 2010. Vol. 277, No 1693. 2559–2564.

[186]Cheshko V.T., GlazkoV.I.High Hume (Biopower and biopolitics in the risk society). M.: RGAU-MTCHA, 2009. 319 p. (In Russian, summary in English)

[187]Gilles R.J., Verduzco D., Gatenby R.A., Evolutionary dynamics of carcinogenesis and why targeted therapy does not work // Nature Reviews Cancer. 2012. Vol.12. P. 487-493.

[188]Danchin E., Pujol B., Wagner R.H. The Double Pedigree: A Method for Studying Culturally and Genetically Inherited Behavior in Tandem. PLoSONE. 2013. Vol. 8, No 5. Publ. e61254. doi:10.1371/journal.pone.0061254.

[189]Dzolo E. Democracy and complexity: a realistic approach. Trans.from engl. M.: Higher School of Economics. -320 p.. (In Russian)

[190]Glazko V.I., Cheshko V.T.. Organization and evolution of agrarian civilization. The creative biography of A.V. Chayanov and modernity//Social Economy. 2009. No 3-4. P. 58-75.

[191]Harris J. Enhancing evolution: The ethical case for making better people. Princeton: PrincetonUniversityPress. 2007. 266 p.

[192]Turchin A. A structure of global catastrophe. A joint project of the Center for civilizational and regional studies Institute of the Russian Academy of Sciences and Transhumanist movement. -M.: 2008. -p. 9.

[193]Favorov M. Parasitizing on the ecology of the planet://polit.ru/article/ 2013/05/10/ps_sc_20_favorov/

[194]Johnson D.D.P. , Fowler J.H. The evolution of overcondence // Nature 2011 Vol. 477, No 7364. P. 317–320.

[195]The evolution of error: error management, cognitive constraints, and adaptive decision-making biases / D.D.P. Johnson D. T. Blumstein J. H. Fowler M. G., Haselton // Trends in Ecology and Evolution. 2013. Vol. 28, No. 8. P. 474-481.

[196]On evolutionary explanations of cognitive biases / J.A.R. Marshall1, P. C. Trimmer, A. I. Houston, J. M. McNamara // Trends in Ecology and Evolution. 2013. Vol. 28, No. 8. P. 469-473.

[197]Fisher R.A. The genetical theory of natural selection. – Oxford: Clarendon Press, 1930. P. 22.

[198]Kimura Moto. Molecular Evolution: theory of neutrality. M.: Mir, 1985. 394 p.

[199]Lesecque Y., Keightley P.D.,Eyre-Walke A. A Resolution of the Mutation Load Paradox in Humans // Genetics. 2012. Vol. 191. P. 1321–1330.

[200] Mechnikov, Etudes about human nature. -Moscow: USSR Academy of Sciences, 1961. -290 p. (In Russian.)

[201]Crespi B. J. The emergence of human-evolutionary medical genomics // Evolutionary Applications. 2010. Vol. 4. P. 292–314.
[202] Show B. Complete collection pieces. Vol. 1. M:Iskusstvo, 1979-650 p.
[203]Evaluating environmental risks of genetically modified crops:ecological harm criteria for regulatory decision-making / O. Sanvido, Jo. Romeis, A. Gathmann et al. // Environmental Science and policy. 2012. Vol.15. P. 82–91.
[204]VERDI. Valuating environmental impacts of genetically modified crops – ecological and ethical criteria for regulatory decision-making / Olivier Sanvido, Andreas Bachmann, J. Romeis, Klaus Peter Rippe, Franz Bigler Zurich: VDF, 2013. 192 p.
[205]Glazko VI Genetically - modified organisms, from bacteria to humans. - K .: RBITS, 2002. P.43. (InRussian.)
[206]Utanov N., Pereslegin S. Letters To The Roman Club//J. Forrester World dynamics. M.: AST, 2003. S. 291-376.
[207]Kosterev V.V. Reliability of technical systems and risk management: a training manual. -M.: MIFI, 2008-280 p. (In Russian.)
[208] Hall K.T., Loscalzo J., Kaptchuk T.J. Genetics and the placebo effect: the placebome // Trends in Molecular Medicine. 2015. P. 1–10 http://dx.doi.org/10.1016/j.molmed.2015.02.009
[209]Cousins S.D. The semiotic coevolution of mind and culture // Culture & Psychology. 2014. Vol. 20, No 2. P. 160–191.
[210]Cousins S.D. A semiotic approach to mind and culture // Culture & Psychology/. 2012. Vol.18, No 2/ P. 149–166.
[211]Haslam N., Loughnan S. Dehumanization and Infrahumanization // Ann. Rev. Psychol. 2014. Vol. 65. Publ.5.P. 1–25.
[212] Kuzyk B., Yakovets U.V. Civilization: theory, history, dialogue, future. Vol. 1. Theory and history of civilizations. M.: Institute of economy policies, 2006. -110 p. (In Russian.)
[213]Tarnas R. The history of Western thought. M: EEK-press, 1995.(In Russian.)
[214]Coeckelbergh M. Moral Craftsmanship // The Ethics Of Creativity. N.Y., 2014. P. 46-61.
[215]Wilson S.G., Haslam N. Humanness beliefs about behavior: An index and comparative human-nonhuman behavior judgments // Behav.Res. Meth. 2013, Vol. 45, No 2. P. 372-382.
[216]McWilliams, Nancy. Psychoanalytic diagnosis: Understanding personality structure in the clinical process. — New York: The Guilford Press, 1994.480 p.
[217]Shapiro D. Neurotic styles.— M.: Institute of Humanitarian Studies, 2000. – 83 p.
[218]Smith D.L. Dehumanization, Essentialism, and Moral Psychology // Philosophy Compass. 2014. Vol. 9, No 11. P. 814–824. Doi.: 10.1111/phc3.12174.
[219]Izard K. Psychology of emotion. SPb.: Piter, 2007. 327 p.
[220]Jonason P.K., WeeS., LiN.P. Thinking bigger and better about bad apples. Evolutionary industrial organizational psychology and the Dark Triad. Industrial and Organizational Psychology. 2014 Vol. 7. No 1. P.117-121.

[221] Valuing myself over others: The Dark Triad traits and moral and social values / P. K. Jonason, G.L. Strosser, Ch.H. Kroll, J.J. Duineveld, Sh.A. Baruffi // Personality and Individual Differences. 2015. Vol. 81. P.102–106.
[222]Persson I., Savulescu J. Moral Transhumanism // Journal of Medicine and Philosophy. 2010. Vol. 35, No 6. P. 656–669.
[223]Terner B.S. The Body and Society. Explorations in Social Theory. 3rd ed. L.; LosAngelesetal.: SAGE, 2008. 286 p.
[224]FoucaultM. The will to truth: beyond the knowledge, power and sexuality. The work of different years. M.: Kastal, 1996. -448 p.
[225]Rand D. G., Greene J. D., Nowak M. A. Spontaneous giving and calculated greed // Nature. 2014. Vol. 489, No 7416. P. 427-430.
[226]Forrester J. W. World Dynamics, Cambridge: Wright . – 1971.(in Russian: M.: AST, 2003. 379 p.)
[227]Marcus, G. F. (2008). Kluge: The haphazard construction of the human mind. N.Y.: Houghton Mifflin. 2008 (in Russian: Imperfect people. The randomness of evolution of the brain and its consequences. Moscow: Alpina non-fiction. , 2011-255 p.).
[228]Malinowski, B. A Scientific Theory of Culture and Others Essays. Chapel Hil:The University of North Carolina Press, 1944. Malinowski, B. (1944). A Scientific Theory of Culture and Others Essays. Chapel Hill, N. Carolina: The University of North Carolina Press (in Russian: M.: Joint Humanitarian Publishing, 2005. — 184 p).
[229]Sih A., Ferrari M.C.O., Harris D.J.Evolution and behavioral responses to human-induced rapid environmental change // Evol.Applications. 2011. Vol.4. P. 367-387.
[230]Kaiser S. M., Malik H. S., Emerman M Restriction of an Extinct Retrovirus by the Human TRIM5? Antiviral Protein // Science. 2007. Vol. 316, No 5832. P. 1756-1758.
[231]Evolutionary Trajectories of Primate Genes Involved in HIV Pathogenesis / M. Ortiz, N. Guex, E. Patin et al. // Mol. Biol. Evol. 2009. Vol. 26, No 12. P. 2865-2875.
[232]. Moiseev N. N. The fate of civilization-the path of reason.-M.: MNÈPU, 2000.-360 p.
[233]Helbing D. Globally networked risks and how to respond // Nature. 2013. Vol. 497. P. 51-59.
[234]Milbrath C. Socio-cultural selection and the sculpting of the human genome: Cultures'directional forces on evolution and development// New Ideas in Psychology. 2013. Vol.31, No 3. P. 390-406.
[235]Dediu D. Genes: Interactions with Language on Three Levels? Inter-Individual Variation, Historical Correlations and Genetic Biasing // The Language Phenomenon / Eds. P.-M. Binder and K. Smith. Springer-Ver: Berlin; Heidelberg, 2013. P. 129-161.

[236]Selective Sweep on a Deleterious Mutation in CPT1A in Arctic Populations / F.J. Clemente, A. Cardona, Ch.E. Inchley // Amer. Journ. Hum. Genet. 2014. 95. P.1–6. http://dx.doi.org/10.1016/j.ajhg.2014.09.016.
[237]Vogel F., Motulsky A. Human Genetics: Vol. 1-3. -Moscow: Mir, 1990.
[238]Benner S. Paleogenetics and the History of Alcohol in Primates // http://aaas.confex.com/aaas/2013/ webprogram/Paper8851.html. 2013.
[239]Jaeger; W. W.B. Paideia: The Ideals of Greek Culture,. Vol. 1. M.: Greco-Latin Account. 2001. 610 p.
[240]Mondimore F.M A Natural History of Homosexuality Baltimore: JHU Press, 2010.
[241]Cohn I. Human sexuality on the eve of the twenty-first century//probl. philosophy. 2001. No 8. S. 29-41. (InRussian.)
[242]Lev-StarowichZ. Sex in the cultures of the world. M: Mysl, 1991. – 255 p.. (In Russian.)

[243]Cohort of birth modifies the association between FTO genotype and BMI // J.N. Rosenquista, S.F. Lehrerb, A.J. O'Malleyd et al. // www.pnas.org/cgi/doi/10.1073/pnas.141189311
[244]Cederroth C.R., Nef S. Soy, phytoestrogens and metabolism: A review // Molecular and Cellular Endocrinology. 2009. Vol. 304. P. 30–42.
[245]Wolfe N. D., Dunavan C.P., Diamond J. Origins of major human infectious diseases // Nature. 2007. Vol. 477. P. 279-283.
[246]Thomas F., Daoust S.P., Raymond M. Can we understand modern humans without considering pathogens // Evolutionary Applications. 2012. Vol. 5, No 4. P. 368-379.
[247] Out-of-Africa migration and Neolithic coexpansion of Mycobacterium tuberculosis with modern humans / I.Comas, M.Coscolla, Tao Luo et al. //Naturegenetics. – 2013. – Vol. 45. – No. 10. – P. 1176-1182.
[248]Supotnickij M. V., Supotnickaya N. S. Essays on the history of the plague: Vol.1.: a plague of before bacteiology period. -M., 2006. -468 p.: ил.// http://supotnitskiy.ru/book/book3.htm. (In Russian.)
[249] Suntsov V., Suntsova N. Plague. The origin and evolution of epizootic systems (ecological, geographical and social aspects). -M.: KMK, 2006. -247 p.. (In Russian.)
[250]Herlihy D. The Black Death and the Transformation of the West – Cambrigde, Mass.: Harward University Press, 1997. – 117 p.
[251]Kelly J.The Great Mortality: An Intimate History of the Black Death. N.Y.: Harper Collins, 2006. 364 p.
[252] Beauvoir de S.The Second Sex. Vol.1-2. M.: Aleteya, 1997. 832 p.

[253]Zentner M., Mitura K. Stepping Out of the Caveman's Shadow: Nations' Gender Gap Predicts Degree of Sex Differentiation in Mate Preferences // Psychological Science. 2012. Vol. 23, No 10. P. 1176 –1185.
[254]Wohlrab S.,Stahl J., Kppeler P.M. Modifying the body: Motivations for getting tattooed and pierced // Body Image. 2007. Vol. 4. 87–95.

[255]Shilling C. The Body and Social Theory. London: SAGE, 2003. X + 238p.
[256]CheshkoV.T., IvanitskayaL., Glazko V.I. Post-industrial science of XXI century − rationalism versus irrationalism: evolutionary and philosophical aspect//Vestn. Academy Of Natural Sciences. 2011. No 3. p. 68-77. (In Russian)
[257]CheshkoV.T., KosovaYu.V. Social-human verification: basic measure science and high technology (casus bioethics)//Appl. Philosoph.. 2011 No. 1. p. 94-100; No. 2 p. 46-55; 2012. No 1. p. 59-69. (In Russian)
[258]Interdisciplinarity in biotechnology, genomics and nanotechnology // Science and Public Policy. 2012.: http://spp.oxfordjournals.org.sci-hub.org/content/40/1/97 doi:10.1093/scipol/scs070.
[259]Common Knowledge: The Challenge of Transdisciplinarity // M. Cockell, Jereme Billotte, F.Darbellay. Loussane: EPFL Press, 2011, 241 p.
Kuhn T. The structure of scientific revolutions. M.: Progress, 1977.
[261]Lakatos I. History of science and its rational reconstructions//structure and the development of science. M.: Progress, 1978. P. 203-269.
[262]Laudan, l. Science and values//Modern philosophy of science. M.: Nauka, 1994. s. 197-230.
[263]Maier D. S. What's So Good about Biodiversity? A Call for Better Reasoning about Nature's Value N.Y.: Springer, 2012. 568 p.
[264]GilarovA.M. Relationship of biodiversity with productivity (science and politics//Nature (Russian). 2001.No 2. P. 20-26.
[265] Cheshko V.T., Bespalov, Yu., Nosov K. Technology –drived evolution and the dichotomy of scientific knowledge (experience in conceptual modeling)//Practical filosofiâ. -2008. – № 1. -p. 16-26.
[266]Knobe, J. Intentional action in folk psychology: an experimental investigation. // Philosophical psychology, 2003. Vol. 16. P. 309–324.
[267]Beebe J. R., Buckwalter W. The Epistemic Side-Effect Effect // Mind & Language. 2010. Vol. 25, No. 4. p. 474–498.
[268]Toffler A. Future Shock. N.Y.: Bentam, 1970. – 562 p.
[269]Bestugev-LadaI.B. Social forecasting. Course.-M.: Pedagogical society of Russia 2002. — 392 p.
[270]Cacciatore M.A., Scheufele D.A., Corley E.A. From enabling technology to applications: The evolution of risk perceptions about nanotechnology // Public Understand. Sci. 2011. Vol.2, No 3. P. 385–404.
[271]ShalakV.I. Modern content analysis. Applications in the field of political science, advertising, sociology, economics, psychology, culturology. M: Omega-l, 2006 – 272 p. (In Russian)
[272] Krippendorf K. Content analysis: an introduction to its methodology / I Klaus Krippendorff.- 2nded. L.: SAGE, 2004. 344 p.
[273]Latour B.New time was not. Essay on symmetrical anthropology. -M.: Europes. University, 2006. -240 p.
[274]Persson I., Savulescu J. Getting moral enhancement right: the desirability of moral bioenhancement. Bioethics 2013. Vol. 27, No 3. P. 124-131.

[275]Sparrow R. Should human beings have sex? Sexual dimorphism and human enhancement // The Amer. Journ. Bioethics, 2010. Vol. 10. No 7. P. 3–12
[276] Sparrow R. Better than Men? Sex and the therapy/enhancement distinction. Kennedy Inst.Eth. Journ. 2010. Vol. 20. P.115–144.
[277]Casal P. Should Human Beings Have Sex? Sexual Dimorphism and Human Enhancement // J Med Ethics 2013. Vol.39. P.722–728
[278] Douglas Th. Moral bioenhancement, freedom and reasoning // J. Med. Ethics. 2014. Vol. 40. P. 359-360.
[279] If I Could Just Stop Loving You: Anti-Love Biotechnology and the Ethics of a Chemical Breakup / B. D. Earp, O. A.Wudarczyk, A.Sandberg, J.Savulescu // The American Journal of Bioethics, 2013. Vol.13 No 11. P. 3–17.
[280]Koch T. Enhancing Who? Enhancing What? Ethics, Bioethics, and Transhumanism // J. Med. Philos. 2010. Vol. 35, No 6. P. 685-699
[281]Public perceptions of agri-food applications of genetic modification. A systematic review and meta-analysis // L.J. Frewera, I. A. van der Lansb, A.R.H. Fischerb et al. Trends in Food Science & Technology 2013. No 30.142-152.
[282]The Role of Biotechnology in a Sustainable Food Supply. Cambridge; N.Y.: Cambridge univ. Press, 2012. 258 p.
[283] Einsele A. The Gap between Science and Perception: The Case of Plant Biotechnology in Europe // Adv Biochem Engin/Biotechnol. 2007. Vol. 107. P. 1–11.
[284]GM soybeans—revisiting a controversial format // Nature Biotechnology.2007. Vol 25, No 12 P. 1351-1355.
[285]EFSA.Final review of the Seralini et al. (2012a) publication on a 2-year rodent feeding study with glyphosate formulations and GM maize NK603 as published online on 19 September 2012 in Food and Chemical Toxicology. European Food Safety Authority // EFSA Journal. 2012. No 10 (11). Publ.2986. p.1-9.
[286]Long-term toxicology study on pigs fed a combined genetically modified (GM) soy and GM maize diet / J. A. Carman, H. R. Vlieger, L. J. Ver Steeg et al. // Journal of Organic Systems. 2013. Vol.8, No1. P. 38-54.
[287]Johnaton A.S. Rat reality show blurs quality control // Nature. 2013. Vol. 493. P. 304.
[288]Engdahl F.W. Cancer of Corruption, Seeds of Destruction: The Monsanto GMO Whitewash/ http: // www.globalresearch.ca/stench-of-eu-corruption-in-monsanto-gmo-whitewash/5316294.
[289]DDT: fifty years since Silent Spring / H, Bouwman, R. Bornman, H. van den Berg, H. Kylin // EEA Report. 2013. No 1. P. 272- 291.
[290]Zubrin R. The Truth About DDT and Silent Spring http://www.thenewatlantis.com/publications/the-truth-about-ddt-and-silent-spring.
[291]Tren R., Bate R. Malaria and the DDT Story. L.: The Institute of Economic Affairs, 2001. 111 p.
[292]Rubin Ch.T. Reading Rachel Carson http:// www.thenewatlantis.com/publications/reading-rachel-carson.

[293]Quantifying the consensus on anthropogenic global warming in the scientic literature / Cook J., Nuccitelli D., Green S.A, Richardson M. et al. // Environmental Research Letters. 2013. Vol. 8 (2). P.1-7.

[294] The Precautionary Principle in the 20th Century. Late Lessons from Early Warnings. L.: European Environment Agency, 2002. 268 p.

[295]Ziman J. Real Science. What it is, and what it means. Cambridge, UK: University Press, 2004. – P. 84.

[296] Maran T.,Kleisner K. Towards an Evolutionary Biosemiotics: Semiotic Selection and Semiotic Co-option // Biosemiotics.2010, Vol.3, No 2.P 189-200

[297] Maran, T., Kull, K. Ecosemiotics: main principles and current developments // Geografiska Annaler: Series B, Human Geography 2014. Vol. 96? No 1. P. 41–50

[298] Boryanskaya S., Yankovsky N. Combination of Genetic and Humanitarian (Cross-Cultural) Methods for the Identification of Human Genes Involved in the Process of Adaptation to Evolutionary New Environmental Factors
// Rusian Genet. Journ.,.2015. Vol. 51, No 4. P. 479–490.

[299]Glazko V.I. Shaping and microevolution: livestock formation, metabolomics, SubGenome // Farm animals. 2014. № 1. .20-32.

[300]PopulationgenomicsofBronzeAgeEurasia/ M.E. Allentoft, M.Sikora, K.-G.N. Sjougrenetal. // Nature. 2014. Vol 522. P.167-171.

[301] Kohlberg L. Stage and sequence: The cognitive-developmental approach to socialization. // Handbook of Socialization Theory and Research. Chicago: Ran McNally. 1969. P. 347–480.

[302] Neural Correlates of Post-Conventional Moral Reasoning: A Voxel-Based Morphometry Study / K. Prehn, M.Korczykowski, H.Rao, Zhuo Fang, J.A. Detre, D.C. Robertson // PLoS One. 2015. Vol. 3, No 10(6). Publ.e0122914. doi: 10.1371/journal.pone.0122914. eCollection 2015

[303] Carter B. Hominid evolution: genetics versus memetics // Intern.Journ. Astrobiol.2012. Vol. 11, No 1: P. 3–13.

[304] Von Foerster H., Mora P. M., Lawrence L.W.Doomsday: Friday, 13 November, A.D. 2026 // Science 1960. Vol. 132, No. 3436.P. 1291-1295

[305]Korotayev A., Malkov A. Khalturina D. A Laws of history. Mathematical modeling of historical macroprocesses. Demography, economy, war. M: URSS, 2005. -344 p. (In Russian)

[306] Kapitza S.P.Global population blowup and after the demographic revolution and information society. Hamburg: Global Marshall Plan Initiative, 2006. 272 p.

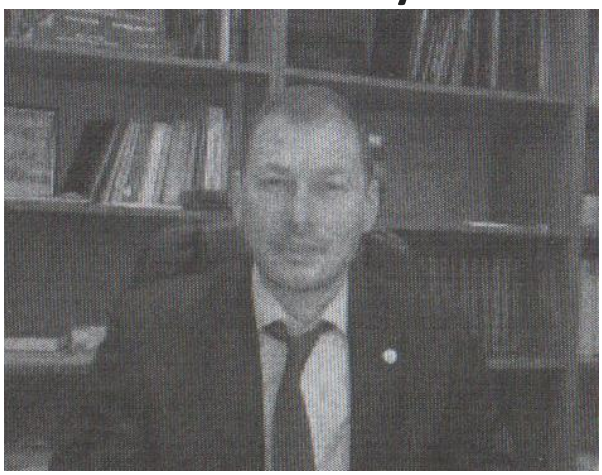
Valentin T. Cheshko

A leading researcher at the Institute of Biology of V.N. Karazin Kharkov National University; Professor of Philosophy and Political Science of S.Kuznets Kharkov National University of Economics. DS,professor,academician – Foreign Member of the Russian Academy of Natural Sciences. Member of the Editorial Board of the international scientific journal on history of genetics «Folia Mendeliana» (Brno, Czech Republic) and the editorial board of the journals "Social Economy", "Biological Bulletin" (Ukraine)

Research interests: philosophy and social history of science, human expertise of scientific development, bioethics, the theory of global evolution, theory of anthropogenesis.

Author of over 170 scientific publications on the philosophy and history of science, bioethics and biopolitics, theory of evolution, including 10 monographs.

. Gleb Yu. Kosovsky



Director of Federal state bugetery institution the Centre of experimental embryology and reproductive biotechnologies – doctor of biological sciences, Academician of the Russian Academy of Natural Sciencies.

Research interests: genomic and cell technologies, DNA-technologies, agriecologies, evolutionary genetics and genomics, bioinformatics.

Author of over 130 scientific publication including 2 monograph.

Valery I. Glazko

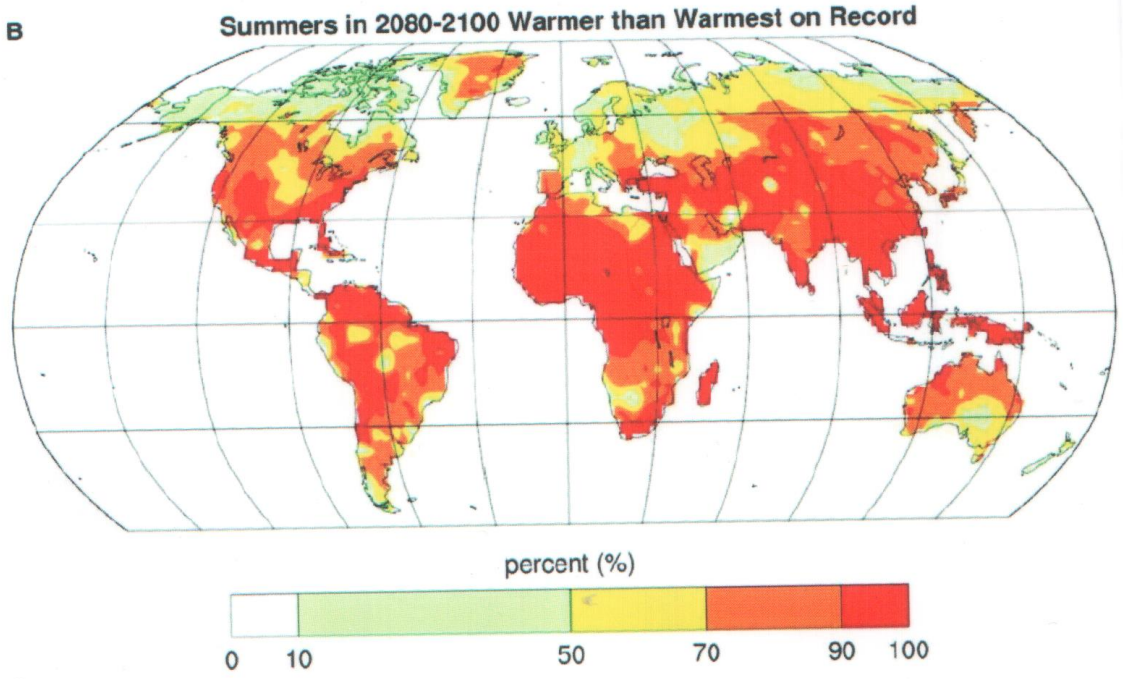
Head of the Center for nanobiotechnology of Russian State Agrarian University - K.Timiryazev Moscow Agricultural Academy, doctor of agricultural sciences, professor, academician of the Russian Academy of Agricultural Sciences (RAAS), Academician of the Russian Academy of Natural Sciences (RANS)

Research interests: nanobiotechnology and DNA-technology, agroecology, evolutionary genetics and genomics, bioinformatics.

Author of over 800 scientific publications including 48 monographs, textbooks islovarey

Anna S. Peredyadenko

A researcher at the Institute of Biology of V.N. Karazin Kharkov National University


B
Summers in 2080-2100 Warmer than Warmest on Record
percent (%)
0
10
50
70
90
100