Increasingly Complex Techno-Digital Realities in the Dynamics of Scientific Discourse

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ABSTRACT

The article analyzes how factors of accelerating and complicating development of science and technology lead to changes in people's living conditions and, consequently, scientific discourse. The stage of industrial modernization was dominated by monodisciplinary knowledge with pronounced boundaries, which was rather functional for analyzing the realities of specific spheres of human life under the conditions of relatively slow development of the social and natural worlds. Scientists sought to identify "solid" technological, social, and economic correlations, to substantiate "universal" laws of socium and nature in the context of the mechanical picture of the world. However, the acceleration and increasing complexity of the development of science and technology have contributed to start the transition from monodisciplinary to interdisciplinary knowledge. The state of affairs changed significantly in the period of 'reflexive modernization' (Beck, Giddens, Lash), which was expressed in scientific 'turns' – qualitative changes in the production of knowledge in the form of permanently complicating scientific discourse. The 'turns' implied a different methodology of cognition, the rejection of "solid" correlations and "universal" laws, the transition to the interpretation of "liquid" realities (Bauman), the reflexion concerning the "runaway world" (Giddens). The post-modernization, the becoming of 'digital society' mark a radically different trend in the systems of knowledge production and the transition to a post-disciplinary scientific discourse. The main factors of this discourse are: the increasing complexity of acceleration; the formation of a unique socio-technonatural reality, which possesses the qualities of a complex system and develops non-linearly; the complication of risks in the transition from a "risk society" to a "world risk society" (Beck); "new" catastrophes of a "liquid" nature in the form of side effects of pragmatic human activity; the emergence of global cosmopolitanism as a supranational reality; the birth of complex forms of metamorphosis development; the formation of "post-humanism" and the appearance of new approaches to the essence of humanism. However, in the emerging post-disciplinary discourse the limits to knowing in the form of diminution of the intrinsic value of social beings and living entities are still preserved. That is why the author argues for a humanistic turn in all sciences and for post-disciplinarity with a humanistic pivot.

INTRODUCTION

The spread of digital technologies has had such a significant impact on practically all spheres of people's lives that researchers have begun to talk about the emergence of the realities of the digital society, the digital economy, the digital education and socialization, and, consequently, the formation of a new social type of a digital person. These realities have become so popular and "fashionable" that there has emerged *a fundamentally new discourse of knowing society* through the prism of the influence of *techno-digital factors* that determine the nature of *accelerating and complicating* social and natural changes.

This discourse is based on methodological innovations that include both radically new approaches to the analysis of post-modernization processes and "old" modernization paradigms with their rather "solid" technological and economic determinism, which retains the dominance of the "world" of machines. In this sense, the discourse of digitalization still supports the postulates of formal rationalism and pragmatism, through which the industrial, informational, and network societies were analyzed. At the same time, the complex technological and digital realities, whose side effects radically change the human being, society, biosphere and climate are being born. This prompted scientists to re-discover the role of technology in social development in the context of the materialistic turn (Latour, 2005; Latour, Woolgar, 2013) and the digital one (Mosco, 2017; Marres, 2017; Vanderburg, 2016). As a result, the dynamics of scientific knowledge develops from monodisciplinarity through the interdisciplinary discourse of modernization based mainly on the integration of *related disciplines* to the post-disciplinary discourse directed to study the realities of post-modernization which includes the achievements of *a large variety* of social, economic and natural sciences.

For our part, we propose to consider the realities of the currently emerging digital society through the prism of the inclusion in the post-disciplinary discourse *the achievements of the humanities as a pivot* – that will allow us to move to the trend of systematic study of the mutual influence of the human beings, society, biosphere, and the becoming "world" of complex techno-digital machines. At the same time we agree with the opinion that "we need both: disciplinarity and interdisciplinarity, autonomy and engagement" (Burawoy, 2013, p. 10) adding to that *post-disciplinarity*. The usage of any specific scientific discourse depends on whether the investigated phenomena are complex or relatively simple.

1. THE DYNAMICS OF THE DISCOURSE OF MODERNIZATION: FROM MONO DISCIPLINARITY TO COMPLEX INTERDISCIPLINARITY

Relying on M. Foucault's concept of "archeology of knowledge", we understand discourse as "practices obeying certain rules", which form both the content of the dominant subject matter in the knowledge and the ways of reflection of the subject and can be used as managerial and power models. The social power is exercised over discourse: "in every society the production of discourse is at once controlled, selected, organized and redistributed according to a certain number of procedures, whose role is to avert its powers" (Foucault, 1969, pp. 138, 216).

None of the modernization has started and passed in any way functionally for the society without the presence of the *objective factor* – material conditions and technological innovations, which was justified by K. Marx, as well as the cultural, spiritual and ethical readiness of the *subjective factor*, the significance of which was pointed out by M. Weber who considered the traditional, irrationality, and community values as essential obstacles to modernization. Scientific modernization discourse as a way to conceptualize a certain type of social development began to be formed in the XVIII-XIX centuries and included a variety of theoretical and ideological directions, reflecting the *ambivalence of industrial modernization*.

To Marx, modernity was marked as by the advances brought about by the transition from traditional societies to capitalism as well as being new forms of exploitation and alienation. In Weber's view, modernity manifested itself in the expansion of formal rationality and challenges caused by the iron cage of irrational rationality. According to G. Simmel, the effect of money on the modern world brings various advantages to people, but at the same time the gap between objective and subjective culture grows producing "the tragedy of culture".

It should be emphasized that at the initial stage of its formation the basis of the modernization discourse was made up of *monodisciplinary approaches* to the interpretation of society, culture, economy, and technology. Their methodology was dominated by logocentrism, formal rationalism, pragmatism, technological and social determinism according to which the decisive role in social development is given to the development of technologies, which formed *a mechanical picture of the world* latently diminishing the self-value of the human life, as well as other living entities. For all their diversity and concrete manifestations the emerging discourse of modernization was characterized by *linear and "universalist"* statements about the development of society, i.e. it seemed that all societies go through the same stages from the "lowest" levels to the "highest" ones.

That model was accepted as a certain idealized version of Western civilization, which surpassed other civilizations in terms of technological and economic development, military power and opportunities for external expansion that was considered as an expression of the modernity. Accordingly, the institutions, social structures and cultural values of Western society were also treated as "reference". They can be characterized as attributes of the emerging modern society, and their core is the market and free enterprise, the class structure of the capitalist society, individualism and attainability, political democracy, secularism, scientism, pragmatism and formal rationalism. Thanks to the modernization the corresponding *ambivalent changes* occur in public and scientific knowledge: on the one hand, the ideas of progress in the form of the triumph of rationalism, the omnipotence of science and technology, the growth of well-being, the realization of human rights and freedoms giving rise to the "desire to be modern", which is the driving force of innovation and entrepreneurship, but on the other hand – the abandonment of previously functional values and traditions, the emergence of side effects destroying the life-worlds of people and forming *antimodernization ideas*. Initially, modernization and antimodernization, in fact, were *two opposing sides of one discourse*: almost at the same historical time there were ideas of the benefits of the modernization and the visions emphasizing its side effects.

Unlike the very stable and "solid" discourse of the traditional society dominated by religious dogmas, the modernization discourse was initially subjected to *permanent changes*, which led to the replacement of one scientific discourse by another, and each subsequent discourse was *increasingly short-lived*. That process was influenced by three main factors. The first one – the *increasing speed of the development* of science, technology, and society. P. Virilio argues that there was no industrial revolution, but, in fact, there was a "dromocratic revolution" (Virilio, 2006, p. 46). T. Kuhn put forward the ideas of accumulation of knowledge within the increasing speed, which leads to *gaps of knowledge* and, consequently, to *scientific revolutions* and to the transition from "old" paradigm to a new one (Kuhn, 1970).

The passage to the speed development of scientific knowledge via paradigms evoked *additional constant criticism* of the existing scientific discourse of the modernity. As a result, a *relatively simple interdisciplinarity* that involved the synthesis of knowledge of the *related social sciences* has been established in the modernization discourse. Thus, in the theory of modern societies T. Parsons used the integrated achievements of sociology, anthropology, economics, culturology, and even psychology that took into account the consistency of motivation of people with functional connections of their social actions (Parsons, 1971).

The second factor is *the general growing complexity* of all the matter including social, economic and natural realities. According to I. Prigogine's theory of 'arrow of time', all material and social

worlds are being developed in a more complex way (Prigogine, Stengers, 2018). In a nascent industrial modernity the owners themselves generally exercised control over the labour force. However, the increasing sophistication of technology undermined the unity of the ownership and management that was finally destroyed by *the managerial revolution*: the power shifted from the owners of the means of production to those who managed the industrial relations – that Marx did not foresee (Burnham, 2014). Then there came the "great transformation" (Polanyi, 2001): the power shifted from managers to "teams", "coalitions", "influential people", "networks" that further changed and complicated the scientific discourse of modernization (Block, 2003; Dale, 2010; Zarubina, 2015, pp. 34-35).

The third factor – *civilization rigidity* became evident: the developing countries did not want and could not copy the Western type of modernization, which gave impetus to the emergence of pluralism of modernities. One of the first scholars who began developing the theory of alternative modernizations and complex modernity was S.N. Eisenstadt. He was engaged in cross-cultural analysis of various societies, which included the criticism of Eurocentrism and the justification of non-Western types of modernities (Eisenstadt, 1966; Eisenstadt, 1973). In the same vein: A. Abdel-Malek advanced the theory of alternative social development, F. Brodel substantiated the multiplicity of the essence of social time. As a result, the increasingly complex interdisciplinary discourses regarding non-Western types of modernization were approved.

At the end of the 20th and at the beginning of the 21st centuries new factors of accelerating and complicating development emerged, which prompted scientists to come to the conclusion about the transition to a *qualitatively different stage of modernity*, interpreted in terms of 'reflexive', 'radical' or 'late' modernity in relation to the industrial modernity. Among a number of these factors we will highlight five as the most significant. The first one is the *increasing dynamics* of large-scale changes at the global level. Thus, A. Giddens speaks about the *"runaway world"*, bringing profound innovations and reshaping our lives while moving along through time and over space (Giddens, 1999). The second one – the *"reflexive modernization"* (Beck, Giddens, Lash, 1994). The reflexivity and self-organization have led to the creation of theories aimed at studying *agencies* (Bourdieu, Wacquant, 1992) and *actants* (Latour, 2005).

The third one – the creation of technologies that function in networks through *'timeless time'* and *'placeless space'*. M. Castells argues that *the rise of informational networks and a network economy* are at the center of a modern network society (Castells, 2010). The fourth one – *living with liquidization*. According to Z. Bauman's views, liquids "neither fix space, nor bind time" (Bauman, 2000, p. 1). And the fifth one – reflexive modernity manifests itself in a 'risk society'. According to U. Beck, *all* people have to live with risk management and calculation of risk-taking (Beck, 1992).

As a result, a theoretical and methodological turn was made to interpret the realities of reflexive modernity and an innovative discourse based on *more complex* interdisciplinarity was in demand. In particular, it implies a synthesis of the achievements of almost *all* social sciences and methodological approaches that seemed incompatible with each other earlier were used. The complex interdisciplinarity included such turns as the linguistic turn (Rorty, 1967), the cultural turn (Alexander, 2003), the practice turn (Schatzki, Knorr-Cetina, Savigny, 2001), etc. At the same time, the influence of monodisciplinary discourse still persists that creates obstacles for the process of cognition of complex realities. "Our science is organized by means of disciplines, each specializing in one category of phenomena". The problem is that "the influence of one category dominates the influences of all others so that the latter can be neglected... discipline-based science will encounter significant limitations when examining human life, society, and the biosphere because it will tend to treat them as if they have the characteristics of non-living entities" (Vanderburg, 2016, pp. 3-4). Moreover, according to our own interdisciplinary story many educational activities that are even based on interdisciplinarity neglect the role of the humanities.

2. THE BECOMING OF A DIGITAL SOCIETY: THE DEMAND FOR POST-DISCIPLINARY DISCOURSE WITH A HUMANISTIC PIVOT

The post-disciplinary discourse is *qualitatively different* from the interdisciplinary discourse: a) it is based on the notions of the absence of any dominant determinism in socio-economic development; b) it calls into question a definite vector of transformation, suggests a non-linear nature of development of the complex social and natural realities (Kravchenko, 2013, pp. 3-12); c) it denies the basic characteristics of the theorizing of modernist paradigms; d) it rejects the legitimacy of disciplinary boundaries; e) it is identified with learning rather than with any set of disciplines; f) it has to do with rather specific complex problems than with concrete phenomena; g) it interprets the realities inherent in a complex "digital society" through the prism of postmodernist methodology. Its main followers, in our opinion, are: M. Foucault, J. Derrida, F. Guattari, Z. Bauman, J. Urry, U. Beck, and A. Giddens. We will highlight seven major factors forming the post-disciplinary discourse that make up its specifics.

A. Social and cultural dynamics acquire the trend of the *complex acceleration*. H. Rose proposed the theory of a "high speed society" according to which social acceleration is an attribute of the modernity (Rosa, Scheuerman, 2009; Rosa, 2013). The *fetishism of speed* is confirmed. Nowadays, it is not the rising social mobility that is important for greater and different life chances, but *the acceleration itself*. At the same time, new realities of the complex acceleration have ambivalent consequences: on the one hand, the social distance and time are reduced, which gives people living in different regions of the world higher and qualitatively new life chances; but on the other hand, there appear challenges for public and individual consciousness in the context of which there is a reassessment of the importance of previous work and life styles. Thus, 'digital nomads' were born – mobile workers employed on flexible schedules. They have a peculiar lifestyle, which is based on the ideology of "playing by their own rules", self-development and self-expression, following the hedonism of the digital sense.

The acceleration factor *radically changes the nature of social mobility* making it so complex that its adequate interpretation becomes possible only from the standpoint of post-disciplinary methodology. J. Urry justified "a 'mobility turn', a different way of thinking through the character of economic, social and political relationships. Such a turn is spreading in and through the social sciences, mobilizing analyses that have spatial 'social structures'. Contribution from cultural studies, feminism, geography, migration studies, politics, science studies, sociology, transport and tourism studies and so on are hesitatingly transforming social science and especially invigorating the connections, overlaps and borrowings with both physical science and with literary and historical studies. The mobility turn is post-disciplinary" (Urry, 2008, p. 6).

Some representatives of the social, economic and natural sciences emphasize the special importance of this acceleration with which knowledge, information, symbols and technologies are disseminated that leads, at times, to the erasure of referents: there is a characteristic effect of *permanent instability* in the assimilation and representation of knowledge. In our opinion, the acceleration factor should be extended to the dynamics of scientific knowledge – one of the criteria for its validity is the *speed of diagnosis and theorization* of changes in society, technology and nature. The need to *rediscover* social reality is an indicator of the validity of the existing knowledge (Kravchenko, 2014, pp. 27-37). Under the influence of the complex acceleration a paradoxical ambivalence of scientific activity arises. On the one hand, the educated scientist consciously and rationally accepts the existing institutional reality, strives to follow the values and norms of culture, which makes the results of his work, as a rule, desirable, predictable and functional for societies.

However, on the other hand, such creative scientist has a critical beginning, which obviously or latently reproduces traumas and gaps in knowledge, innovative challenges to the existing scientific order, expressed both in new risks and hopes for the improvement of this or that concept or justification of new theoretical tools (Kravchenko, 2018, pp.191-202; Zarubina, 2018, pp. 114-115).

But in the context of the complex acceleration and its extension to almost all spheres of life it is impossible to change only something specific in a particular scientific field. Immediately there appear emergences, coincidences in the functioning of the surrounding scientific fields which today represent a set of networks. The "improvement" of even one cell of the chain can become a "butterfly effect" and unintentionally cause chain reactions in terms of increasing functionality or dysfunctionality in other cells of the chain giving rise to specific challenges for scientific knowledge and scientific reviewers.

As a response to these challenges of the acceleration within the framework of post-disciplinary discourse, *"quantum" theories" of consciousness* emerged, which consider the decision-making of social actors in the form of an open system in which operate both internal factors such as value orientations, beliefs, feelings, preferences and external ones, expressed in the dynamics of the socio-technical environment. "Quantum theories" of consciousness that are based on the achievements of quantum physics, mathematics, psychology (Yearsley, Busemeyer, 2016) create prerequisites for the transition from a linear-mechanical to a *non-linear picture of the world* reflecting more adequately the consequences of the acceleration for man, society, and the biosphere. It is important to note that a holistic, rigid scientific discourse with strong references and long-lived theories cannot be good for understanding the realities of high-speed and complex society.

The disciplinary monism with clearly defined boundaries is applicable only to the interpretation of Newtonian, mechanical picture of the world – it is a utopian vision of the prospects of scientific development. The post-disciplinary discourse, on the contrary, allows us to create a fundamentally new perspective of ordering knowledge about the modern dispersion picture of the world in the context of the "end of certainty" (Prigogine, 1997). Its adoption implies the interaction of different theories, accelerating the creation of scientific meanings with their play and confrontation. There appears a dynamic scientific network order based on openness that is suitable for cooperation of representatives of different sciences.

B. Nowadays, the process of formation of a unique *socio-techno-natural reality* has become more visible. This reality possesses the qualities of a *complex system* developing non-linearly both under the influence of social and 'natural' factors including climatic changes. J. Urry argues: "I embedded society, and hence sociology, as a subject within the analysis of climate change, and more generally within a world of objects, technologies, machines and environments. A strong claim is made here that the social and the physical / material worlds are utterly intertwined and the dichotomy between the two is an ideological construct to be overcome" (Urry, 2011, p. 8). For a valid interpretation of this socio-techno-natural reality the integralism of related social sciences is no longer sufficient – *the synthesis with the natural sciences* is necessary. At the same time, the limits of the possibilities of any scientific discipline for cognition of the complex reality became obvious. Correspondingly, post-disciplinary discourse presupposes a blurring of boundaries among scientific disciplines and their *mutual enrichment*.

J. Urry proposed a very valid interpretation of global warming. In his opinion, "'warming' is a simplifying term since what may happen in different parts of the world may be very different, with possibly significant cooling occurring in some places. Indeed the problem of the term *warming* stems from the sheer difficulty in predicting long-term future climates". It should be emphasized that climate changes of a turbulent nature have contributed to the awareness of the limitations of monodisciplinarity and fragmentation of sciences: "There is no single 'science' of climate change, partly because science itself is divided into many *specialisms*. There are varied scientific processes and groups of scientists involved, with much competition and rivalry between them over content, form and procedures. This fragmentation of science slowed down understanding of how climates worldwide could in fact be changing" (Urry, 2011, p. 23). This awareness works for the formation of post-disciplinary discourses.

Essential contribution to post-disciplinarity was made by A. Giddens who notes that the pending hazards did not arise suddenly, not spontaneously, as it may seem at first sight, but as a result of *pragmatic, mercantile* activities of people who "exploited" nature for a considerable period of time without taking into account its environmental sensitivity. He gives an interpretation of these man-made dangers in the context of the effect, which he called honoring his name, "Giddens's paradox". The essence of it is that the "end of nature" now has come – the material world has ceased to be something external for a man. Accordingly, the traditional division of the natural and social sciences is now losing its sense. However, linear thinking and specialisms in knowledge are still retained. This leads to a distorted perception of contemporary challenges: "people find it hard to give the same level of reality to the future as they do to the present" (Giddens, 2009, p. 2). It concerns both everyday problems of ordinary people and global environmental challenges that should be analyzed through post-disciplinarity.

C. There is a qualitative complication of risks in the transition from a "risk society" to a "world risk society". U. Beck distinguishes three characteristics of the *newest complex risks* of the XXIst century: 1) *delocalization*: their causes and consequences are not limited to one geographical location or space; 2) *incalculability*: their consequences are in principle incalculable; 3) *non-compensatability*: the logic of compensation is breaking down and is being replaced by the principle of *precaution through prevention* (Beck, 2010, p. 52).

There appear opposite reflexive tendencies to adapt to theses complex risks – *riskophobia* and *riskophilia*. A certain number of people who prefer to make careful decisions about risk-taking tend to avoid the consequences of a number of risks that they see as extremely unfavorable to life, seeing salvation from them in routine social practices. At the same time, riskophilia has emerged which is gaining ground (Kravchenko, 2017, pp. 3-12). S. Lyng proposed the edgework theory for researches on voluntary and conscious risk-taking, which is essentially a challenge for "normal, rooted" human interactions (Lyng, 2008). The choice of riskophobia or riskophilia is ambiguous – determined by a set of various *interference factors* that influenced the character of socialization of individuals. We believe that while interpreting people's reflexions in relation to riskophobia and riskophilia it is more optimal to use the post-disciplinary discourse of "quantum theories" of consciousness that study the interference of various elements of decision-making (Ashtiani, Azgomi, 2015).

D. There have been born *"new" catastrophes* to which the socio-techno- natural reality is exposed. Their essence could be seen in the specifics of modern vulnerabilities treated as a growing structural dysfunction of the complex system of society and/or the techno-natural system. This dysfunctionality might be caused as by person's external activity as well as by internal reflexivity of the system itself. It depends on the system's ability to withstand external and internal burdens of emergent and turbulent nature which implies the uncertainty of a catastrophe. The post-disciplinarity is required to understand the complexity of these phenomena. J. Urry declares: "I examine a new trend in thinking about the future of societies, which I term the 'new catastrophism'". The essence of this trend lies in the increase of potential catastrophes within *complex systems* that "generally do not move towards equilibrium", although "the equilibrium models dominant in most economic system analyses".

Minor actions within a complex society are capable of causing *avalanche-like consequences*: "systems are characterized by a lack of proportionality, or 'non-linearity' between apparent 'causes' and 'effects'"; "movement from one stage to another may be rapid, with almost no stage in between"; "food and water security are increasingly significant" (Urry, 2011, pp. 36, 41–43). In contrast to traditional "old" calamities that are limited in space and time the tragic consequences of "new" catastrophes manifest themselves globally. The "new" catastrophes are most evident in the *vulnerabilities of the complex socio-techno-natural systems,* whose functionality implies non-linearity between the possible (external and internal) causes of a potential catastrophe and its consequences. Ch. Perrow metaphorically named modern vulnerabilities "normal accidents" that

are caused not by false management of personnel, but by everyday functioning of complex systems that periodically fail "normally". That is, serious incidents are inevitable even with the best management and full attention to safety (Perrow, 1999).

Through time vulnerabilities are becoming *even more complex*: "concentrations of hazardous materials, populations, and economic power in our critical infrastructure make us more vulnerable to natural disasters, industrial / technological disasters, and terrorist attacks". At the same time he stresses that this is a *potential catastrophe,* not accidents caused by human error: "Normal Accident Theory (NAT) argued that if we had systems with catastrophic potential that might fail because of their sheer complexity and tight coupling, even if everyone played as safe as is humanly possible, these systems should be abandoned". The scientist points out that water-related disasters are the most persistent.

They reproduce permanent "normal accidents": "great rivers and coasts have the most temperate climates, the fisheries, and the transportation… We keep the water away with human constructions, such as dams and dikes and levees, and when these fail there is disaster. But it is unrealistic to expect to keep the people from water; salt or fresh, it is lifeblood for most of the people on the earth. But we can limit the concentrations and thus defend them better" (Perrow, 2011, pp. VI, XXII, 15).

"New" catastrophes have also emerged in *food systems*. It is very important to look at the component of nutrition in which the significant contribution is made by global-network agribusiness whose functionality is predisposed to "normal accidents" in the form of an ever increasing production of genetically modified products. Vulnerabilities of food are pre-conditioned and produce the potential of "new" catastrophes in the *planet's frame of resources,* which primarily relates to "dead land and water" (Sassen, 2014, pp. 149–210). If the "dead" land is a soil saturated with a large quantity of chemicals, the water becomes "dead" because of a lack of oxygen due to a variety of contaminants. Naturally, the possibilities of the biosphere to renew land and water are significant, but in the modern complex systems they are permanently diminishing.

Many "new" disasters manifest themselves in the form of "liquidity" which leads to an increase in uncertainties in all spheres of people's living and brings as manifest as well as latent consequences for people. These consequences are acute today and so they'll be in the future if the current *pragmatic* trend of scientific development persists. As far as we can see it, the main challenge of "normal accidents" lies not in concrete catastrophes as they are, but in their *liquid nature* which in essence reproduces "liquid fear" (Bauman, 2006).

Many scientific innovations within the paradigm of "new catastrophism" are already aimed at studying the becoming socio-techno-natural realities to find ways to minimize vulnerabilities, to stop the increase in the scale of "dead land", "dead water", and "normal accidents". This knowledge, of course, cannot illuminate the "new" catastrophes, but it can lay foundations to studying their complex nature and, accordingly, minimize the negative consequences. J. Urry advocates "inter-connection of sociology with the various physical and environmental sciences" (Urry, 2011, p. 37). The efficacy of these approaches is in integrating the achievements of social and natural sciences in a post-disciplinary effort, including the "scientific 'non-knowledge'" (Beck, 2010, p. 115). However, their weakness is in preserving the principles of formal rationality and pragmatism that diminish the chance of including into post-disciplinary the humanities in full volume. For our part, we favor a *broad synthesis* of scientific knowledge designed to contribute to the development of post-disciplinary science, which can unite the efforts of various scientists in search of ways to neutralize the negative effects of "new" catastrophes.

E. *Global cosmopolitanism* has emerged as a *supranational reality* that also requires a post-disciplinary approach. Global risks, threats of terror, and challenges to the biosphere do not know national borders.

There are processes of globalization of politics, economic, legal, cultural relations, communications and sports games, various network interactions. "The important fact now is that the human condition has itself become cosmopolitan" (Beck, 2007, p. 2). Moreover, the boundaries among the worlds are blurred: "The old concepts of the First, Second and Third World are also turning into zombie categories. This means, first of all, that the context of globality is now everybody's starting point...this eliminates the plural oppositions between peoples and states" (Beck, 2007a, p. 107).

Accordingly, the national-centered social sciences are not suitable for interpreting the realities of cosmopolitanization. A fundamentally new *cosmopolitan methodology* based on post-disciplinarity is in demand, which, according to U. Beck, should replace the national, monist vision of socium – *methodological nationalism*. «Until now it has been dominant in sociology and the other social sciences, such as history, political science and economics, which analyzed societies on the assumption that they are nationally structured. The result was a system of national-states and corresponding national sociologies that define their specific societies in terms of concepts associated with nation-state. For the national outlook, the nation-state creates and controls the 'contain' of society, and thereby at the same time prescribes the limits of 'sociology'". Thus Marx discovered British capitalism in British society, Weber universalized the experience of the Prussian bureaucracy into "the ideal type of modern rationality" (Beck, 2007, pp. 2, 28).

The national social science discourse is essentially excludes the cosmopolitan one. In the circumstances of global era U. Beck argues for the New Critical Theory the main tasks of which are: to expose the forms and strategies by which cosmopolitan realities are rendered invisible; to criticize national circularity; to overcome the ahistorical self-perpetuation of social scientific sets and research routines by creating alternative concepts and research strategies; to establish the difference between the national outlook of political actors and the cosmopolitan outlook of the political and social sciences; to take into consideration the effect of "collective murder as an unintended side effect of scientific, technological, military and political action" (Beck, 2007a, pp. 33-34, 253). The pure enumeration of the tasks displays the fact that they could be interpreted and solved on the bases of post-disciplinarity.

F. There have appeared *new complex metamorphoses,* which do not fit into the previous ideas about evolution, revolution, reforms and transformations. Among them: a) *traumatic development* manifested itself in the form of unintentional gaps of society and culture as a result of formally rational, pragmatic transformations of society and nature by man, as well as scientific and technological innovations of mercantile orientations, which deform and dehumanize people's life-worlds; b) the development in the form of *"new" catastrophes,* liquid in nature, permanently changing the living and non-living nature, the structure of soil, water, air and dissocializing human relations; c) *metamorphosis development itself,* which carries, let's emphasize, not only misfortunes, turbulence of society, nature, and climate, but also *potential benefits and hopes* associated with the transition to more perfect, humane trends of life.

According to U. Beck, «digital metamorphosis is essentially different from digital revolution. Digital revolution describes a mainly technologically determined social change that captures the increasing degree of interconnectedness and global exchange. The notion of revolution suggests that change is intentional, leaner and progressive... Digital metamorphosis, on contrary, is about non-intentional, often unseen side effects, which create metamorphosed subjects – i.e. digital humans... whose metamorphosed existence questions traditional categories, such as status, social identity, collectivity and individualization" (Beck, 2016, pp. 145-146). We emphasize that the sociologist is talking about *radical changes* in the nature of society and man. Both scientific research and social practices need to be adapted to these metamorphosis changes.

To start the study of metamorphosis development, we will propose the following judgments. It is necessary to reorient the scientific interest to really becoming *fragmented social associations*, even if their functioning is limited by space-time boundaries (young families, fan organizations,

representatives of precariat). We believe that in the educational sphere there is a need for a transition to complex knowledge about the side effects of the digitalization of society, economy and people, which is possible only in the context of post-disciplinarity.

The role of digital socialization and 'metamorphosis of generation' is particularly noteworthy, leading to the fact that 'generations of side effects' are affirmed in the 21st century (Beck, 2016, p. 188). Historically, the younger generation was always socially and materially dependent on the older generation, which actually led to conflicts between fathers and children. However, under the circumstances of life in one socio-cultural space and one historic time these contradictions were softened and settled quite successfully. Today the socialization is acquiring a *digital character* that is not directly related to specific life-worlds of people, their former statuses and roles.

If traditionally the socialization means the transfer from the older generation to the younger generation the values and norms that are necessary to enter the existing social and political order and making young people social beings themselves, now with the digital socialization there is a very complex metamorphosis: new 'generations of side effects' "incarnate the digital *a priory* – yet not at the end but at the beginning of their socialization". The young generations "were already born as 'digital being'. What has been packed into the magic word 'digital' has become part of their 'genetic outfit'" (Beck, 2016, p. 189). Accordingly, the discourse of knowledge is changing, and the relationships between parents, teachers who have not undergone the digital socialization and young people are being transformed.

The consequences of the digital socialization are ambivalent. The benefits of the digital socialization and education are multiple: digital technologies are "enabling and generating a new response-ability to both students and educators" (Bustillos, 2017, p. 159). However, on the other hand, the digital socialization develops side effects and frees young people from social and cultural ties, from life-worlds of their parents ultimately producing the "digital human beings". "Each new generation must gradually be socialized into a technical order, even through doing so begins with entering what little remains of the culture-based connectedness… children and teenagers become more dependent on 'googling' everything, causing them to leave behind what little they have acquired of a symbolic universe of sense" (Vanderburg, 2016, pp. 261, 263).

G. There emerged the *"post-humanism"* (Braidotti, 2013) and, consequently, of a *new scientific discourse of humanism*. The main reason for this is that since the Enlightenment, when the basic principle of humanism "Man as the measure of all things" was formed, radical changes have taken place in man, society, technology and the biosphere. These processes significantly change the nature of humanism and the knowledge of it, accordingly, people's attitudes towards each other, as well as to living and non-living nature.

Z. Bauman believes that humanistic views, principles and practices are now being "eroded" and are becoming "liquid". Moreover, *humanism and anti-humanism, good and evil coexist in the same space and time*. And the manifestations of anti-humanism grow and become more complex. "Deregulation, resulting in planetary lawlessness, and armed violence feed each other"; "instead of great expectations and sweat dreams, 'progress' evokes an insomnia of full nightmares" (Bauman, 2009, pp. 8, 11). There appeared a "global epidemic of nostalgia, an affective yearning for a community with a collective memory" (Bauman, 2017, p. 3).

According to the sociologist, no one has managed to overcome the global epidemic of nostalgia, to restore weakened human ties by replacing "bad" violence with "better" violence, and it is impossible to do so in principle. We need to move towards a different trend of humanism, *a culture of dialogue and unity between "We" and "They"*. Contrary to neoliberalism, its postulate of "there is no alternative", today more than ever it is necessary to realize that "we – human inhabitants of the Earth – are in the either / or situation: we face joining either hands, or common graves" (Bauman, 2017, p. 167). Humanity has a chance to make a choice in favour of a *renewed cosmopolitan humanism*.

The emergence of this type of humanism is linked to a re-discovery of the concepts of happiness, good and evil. "The old 'good' Devil represented solid evil with its symbolic logic of the quest for human souls and active engagement in human and earthly matters. Nowadays evil is not obvious and self-evident any more: "most toxic and execrable categories of evil – stretching from the bodily murderous, through socially devastating, to spiritually ruinous – can no longer be contained... they flow freely and easily penetrate each and any – natural or artificial boundary" (Bauman, Donskis, 2016, pp. 5-6, 19).

M. Wieviorka presents the modern evil as a social fact caused by the current global crisis which produces public pain, sometimes on a planetary scale: "Good and evil are not acts of God or of nature but are part of the reality of collective life" (Wieviorka, 2012, p. 13). The scientist pays special attention to the study of types of evil revealing four new challenges to humanism: a) xenophobia, b) "new racism" or "neo-racism", c) the return of anti-Semitism, and d) global terrorism. (Wieviorka, 2017, pp. 205-218).

In the context of the emergence of the new realities of humanism and anti-humanism, the post-disciplinary discourse cannot be a mechanical, linear compilation of cutting-edge scientific advances, especially if the dominant role is played by disciplines studding non-living entities. "For centuries we have looked for the living among the dead: first by mechanistic world view, which depicted life in terms of classical machines, and later by information-based world view, which depicts life in terms of computers" (Vanderburg, 2016, p. 4).

Therefore, in our opinion, not any post-disciplinary discourse is needed, but one in which *the unity of the tools of the social, natural and human sciences* becomes particularly important. It is a question of refracting the results of the study of the newest techno-digital realities through the prism of synthesis of rather many theories, in particular, the theories of chaos, complexity, quantum approaches to the consciousness of people, new paradigms of humanism, which produce the knowledge of the modern complex picture of the world. This knowledge includes in itself not only techno-digital realities, but emphasizes the importance of all living beings and basic factors that reproduce the life as such – clean soil, water, and perfect biosphere.

Such post-disciplinary approach to humanism would allow, on the one hand, to take into account all kinds of paradoxes, dispersions, metamorphoses, and turbulence of socium, developing in unity with living and non-living nature, including new digital technologies, and, on the other hand, to search for and assert the forms of any scientific research and innovation adequate to the new cosmopolitan vision of humanism, which is now becoming an ethical imperative.

CONCLUSION

Thus, the complex socio-techno-natural realities that have come into our life have not only brought with them social and cultural changes, but also radically transformed the nature of man, society, and technologies, freeing them from the influence of previous social and cultural roots. In a number of cases, the side effects of complex technologies and digitalization have a negative impact on life-worlds of people. In response to these challenges the scientific community has begun to develop new post-disciplinary discourses, including the humanistic one. In our view, this process is not yet adequate to the challenges directed to man, society, and the biosphere.

At the same time, there is a hope that the acceptance by scientists and then by politicians the achievements of the post-disciplinarity with a humanistic pivot can ensure the transition of civilizations and societies to a fundamentally different trend of development. Our optimistic forecast regarding these opportunities is based on the following assumptions: a) new actors of change in the form of world cities, environmental movements, and a number of scientific communities, studding ethical problems of preserving life, increasingly advocate the humanization of social, techno-digital

and natural realities; b) there is an awareness that a new world order is being formed. Its intellectual basis could be post-disciplinarity, emphasizing the self-value of human life, of all living things and of the resources that provide them; c) the existing very deep intergenerational conflict is not for ever: it is possible to predict that in a generation it will exhaust itself in its current forms. The future digital socialization will require mastering the values and norms necessary for living with the complex socio-techno-natural realities and with the emphasis on the demand to permanently humanize them and life-worlds of people; d) nowadays there appear individual and collective actors who are ready to manage conflicts between man and the digital. We believe that their role will increase; e) the moral climate is in demand, which implies the establishment of a new type of humanism, including cosmopolitan ethics, overcoming "liquid" fears, and the depragmatization of knowledge – that becomes a factor in the preservation of life on the planet.

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