

# Socio-Philosophical Aspects of the Neuro-Digital Noosphere Formation and Development

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**Abstract.** At present there is more than half of the world population who is currently using the Internet, due to which it seems relevant to develop not only technical, but also humanitarian and metaphysical views and theories that can serve the basis for the analysis of this phenomenon. The aim of these areas of studies should be rethinking of the role and place of man in the structure of modern society, as well as the role and place of the society in human life. The methodology for these processes comprehension lies in the plane of ontology, social philosophy and anthropology, based on the integration of the latter with cybernetics and mathematics, synergetics and mathematical modeling. Systemic and historical methods are inevitably capable of synthesizing the results of such a methodological approach, leading to the appearance of neologisms, the explication of new notions that most adequately reflect the essence of modern processes. The article illustrates a number of phenomena that should be studied with the aim of forming a person not as an object, but as a subject of global digital communication.

## 1 Introduction

Space and time as the concepts that embody the physical model of the world, demonstrate at present a number of surprises. The conceptual power of philosophy and physics, which had been fully formed by the beginning of the previous century, at the beginning of the 21st century turned out to be in the state that can be characterized as “unstable”, since, along with old methodologies fundamentally new ones are being created due to a number of objective circumstances.

Time, conventionally recognized by physicists as the fourth dimension, “behaves” nevertheless differently, that is not as the “dimension” itself, however maintaining at the same time its conditional linearity, but not its homogeneity. Once within the coordinate system of 3-dimensional space, which would either become denser or would stretch, we would lose the feeling of objective reality, i.e. the reality of the objective world.

However, this is exactly what happens when we are in the digital world. This is an objective process, whose analogues have not been known by the history yet. The space-time continuum, which we perceive to a certain degree, conflicts however with the ontology of the digital world, not excluding in this case our ideas about the matter and consciousness.

Indeed, both here and there we rely on the notorious “observer”, whose absence removes all cognitive meanings. And if in the physical world of E. Fermi and M. Plank, with the help of this observer all the important discoveries were made that enriched the person’s knowledge, in the digital world we have every reason to continue these traditions and even expand them, considering that as of 30.06.2019 there are 4,536,248,808 outside observers in it [1].

The digital world ( or the neuro-digital noosphere) is, of course, one of the varieties of the noosphere (the notion of “noosphere” was introduced into the science by French scientists, namely mathematician E. Leroy, philosopher P. Teilhard de Chardin as well as by V.I. Vernadsky [2]), which we observe quite differently at present. We are, i.e. exist and act, in the space that has long been called the cyberspace [3] and it should be noted that the metaphor of this term is only partial. This is a space of events, each of which takes place in its own time and in its own place. And this is a space in which the Law of Gravity, for example, is almost not relevant. At the same time, in this space, we can fully state the presence of relativism, since all the events are interconnected and mutually determined, and all the systems of coordinate are also relative.

Relativism of network events is also unconditional just like the events of the objective world, whose essence has now been reduced to the term “off-line”.

Thus, the metaphysics of the digital world shows us both similarities and differences with the world which is outside the cyberspace. This fact has both pros and cons in terms of comprehension of the studied object. The "escape from the reality", i.e. the thing the adherents of the digital world – the interman (or the posthuman [4]) – are usually blamed for, is in fact a conscious transition to another reality, whose parameters and conditions are more suitable for a certain person. At the same time, this reality is the factual reality experienced here and now.

The reality of the neurodigital noosphere is as much indisputable and topical as its close relationship with the off-line world, but their fundamental differences lie in the degree of relativism and the dynamics (speed) of ongoing processes. And here, speaking of time, one should keep in mind that in the digital world time is significantly more manageable, projective, and regulated than that in the off-line world.

In the ordinary world, a person is able to shape his/her future in accordance with his possibilities and abilities. However, at the same time, what has been done can no longer be fixed. In the digital world, there are such opportunities [5]. Of course, they are not unlimited, but there are definitely more of them.

Thus, the fundamental attributes of the network spatial-and-temporal continuum determine the existence of a person-in-network, thus influencing the nature of his/her social existence, realizing his/her hidden abilities, which, under previous conditions, might not be objectified within the dimensions of socially regulated activities.

## **2 Materials and Methods**

This study presents the results of a 15-year scientific work related to the socio-philosophical comprehension of the processes of formation and development of the electronic digital society [6], as well as related to the formation of a new type of person (the interman) under the present-day conditions. To carry out the undertaken research we applied systemic and dialectical approaches, methods of induction and deduction as well as analytical-and-synthetic methodology, taking into account the features of globalism and at the same time of locality of the object under study. The research is based on a fundamental ontological approach that serves as a starting point for further discussion.

On the basis of the notions being conventional in science, we advance the following terms as methodological innovations: “Internetics”, or the Internet studies (i.e. a scientifically and methodologically justified system by which a person can master the

techniques and methods of self-realization in a sociocultural and professional Internet environment) and “the interman” (i.e. a personality formed under conditions and under the influence of a neurodigital noosphere).

The following works serve as a theoretical and methodological basis of the undertaken study: M. Castells, D. Tapscott, V. Vernadsky, M. McLuhan, V. Gibson, M. Spitzer, P. Sparrow, R. Brandoma, E. Panarina and L. Strelnikova, F. Fukuyama and A. Toffler, N.A. Berdyaev and Yu. Yu. Petrunin.

For objective reasons, the study of the mentioned objects inevitably relies on some methods and concepts of such sciences as cybernetics and mathematics, like algorithmization, series, Petri nets as well as the methods of formal logics.

### **3 Results**

Within the processes that take place in the developed information society, we are to point out several methodologically important aspects that can outline the contours of new relevant areas of social philosophy and philosophical anthropology. The formation of cyber society, objectively taking place in a number of developed countries, has already brought to life a whole series of new scientific trends that are trying, if not to get ahead, but at least to catch up with a virtual network social reality. The specificity of these areas formation lies in their scientific interdisciplinarity viewed as a cognitive determinant that excludes any possibility of using previous orthodox paradigms and categorical apparatus.

It should be noted here that as a result of the ideology of inter-existences primacy prevailing within the Web, there has been formed a very specific multicultural social environment that over the past ten years has been permanently cultivating a completely new person. At the same time, the existential essence of the interman is directly in experiencing the whole range of varieties of moments of being-in-the-network, beginning from sluggish, stochastic and aimless web-surfing to the virtual love passion; from non-commitment communication with quasi-friends to the intense and effective professional freelance activities that brings to life the urgent need to develop and implement the methods assessing the degree of his/her cyber efficiency, as well as the level of cyber integration into the Network.

It is generally accepted that a virtual network society (cyber society) is the result of the evolution and growth of a homogeneous professional community of people who previously represented the hi-tech elite of humanity and turned into a multi-billion heterogeneous, multi-ethnic and self-organizing community of modern users of personal computers and smartphones, being represented at present by people of all ages and social strata. The need for purposeful and organized joint activities being inherent to any society is clearly manifested in cyber society and successfully mutates within it into various forms of co-adaptation and, as a result, of self-realization.

However, since cyber society is obviously the most complex (the sphere of public consciousness) high-tech product of a technocratic society, along with qualitative and quantitative solution of some issues it inevitably faces the set of similarly acute social problems, some of which underwent significant acceleration or modification with the transition to the environment of a virtual network society. Starting as a subculture, cyber society quickly overtook and outgrew all its previous analogies and completely absorbed them, adding to them, of course, its own defects.

In particular, the elementary communicative structure, consisting of human intelligence and polymorphic interactive cyberspace (the neuro-digital noosphere), from the very beginning of their interaction, makes the human intellect adapt to the succinct and fast logic of the rigidly formalized and never-resting polycentric cyber-social environment. Ratings, bots, questionnaires, hashtags, imposed ready-made estimates, automated guessing of

interests and expectations (or the filter bubble [7]) of the major part of the network content lead to a difficult phenomenon, which we call a “reflexive formalization”. Every person, after “having settled” on the Web, is changing. And, above all, the nature, intensity and effectiveness of his/her mental thinking processes are qualitatively changing. Cyber society has evolved into a living, digitalized environment of interactions, in which a mass active user is often forced, with different degrees of success, to use the extensive apparatus of a scientific methodology to solve his/her tasks of effective self-realization.

The pragmatic significance of reflective formalization, underlying the very method of existence of semantic objects in an interactive information environment and creating the possibility of such a theoretical form of compression of scientific information, can be termed as the information hypothesizing of consciousness. Its philosophical semiotic content is as follows. The traditional text (and the corresponding type of reality, including scientific one) are formed and objectified on the basis of introducing abstractions of ever higher potential and of direct formalization (i.e. theorizing, schematization, mathematization, physicalization, etc., up to the algorithmization and computerization of scientific and any other research). This vector of scientific evolution in epistemology, for instance, is aimed at achieving, first of all, the absolute truths and essences of the process under study during the implementation of the accumulative progress of knowledge and the objective dialectics of the absolute and relative in any scientific knowledge. The epistemological basis of the direct form of theoretical formalization is the objectification of scientific abstractions based on the principle of reification.

On the contrary, in the virtual network reality of the neuro-digital noosphere, the determinant is the semantic distribution of knowledge of various kinds. Therefore, the evolution vector of any interactive activity on the Internet is focused, first of all, on the pragmatic use of relative truths, being reliable and self-sufficient within the essentially limited epistemological content of specific tasks of applied, situational, economic and practical nature.

Interactive cyberspace, as well as cyber society, is of a secondary nature and of a primary character in terms of its impact on the human’s psyche and intelligence in the process of virtual network communications.

The cybernetic informational basis for organizing a global computer network can unfold to the researcher its regularity, i.e. that the Network is a continuous series of probabilistic states of resources that exists and unfolds in real time and does not have a definite hierarchy or intentionality.

The human brain as a biological neural system acts as the main essential basis for the processes of changing that control ANNs (artificial neural networks). The interactive environment of intentions, or, to be more precise, of interactions of the Internet is a multi-vector field, whose study presupposes the analysis of tendencies and trends as the resultants of certain intentional vector fields (zones, resources), which are also the resultant vectors of a huge number of more elementary intentional vector fields and so on up to the simplest element, i.e. the single user with his/her individual intentionality (which, in turn, must undergo a thorough analysis by human sciences).

The process of studying the self-organization of the neuro-digital noosphere is essentially the study of the set of processes of self-organization of biological and artificial neural systems, or networks (BNS and ANN), viewed in interconnection and development. Thus, a series of probabilistic states of cyber society that continuously develops in time represents an infinite discrete-and-continuous stream of instant results of the integrated BNS-ANN interactions, which are fixed, or “photographed” for the research methodological purposes within an infinitesimal (elementary) time intervals.

The fact of considering and expanding the explication of the BNS function as a distributed core of the global information network is natural, since a person is its direct

creator and the source / filler of all its resources and laws, or, in other words, is a system-forming factor.

However, considering the BNS within the structure of the ANN, we came to the conclusion that the human being has not been studied yet neither as a simple element of the ANN subsystem, nor as a partner of the ANN, i.e., the interman has not been methodologically included in the structure of social anthropology as an active and effective nucleus of the cyber society. Given the recognition of the facts of reflexive formalization, algorithmization, and even mathematization of the thinking processes of an active user of the network (the interman), we come to realize that the problem field of philosophical anthropology should be expanded to the fundamental research of the interaction of BNS and ANN in all their existential diversity.

The experience of social anthropological research tells us that we should be careful as to different kinds of formal theories and schemes. The life of people is always more diverse than this can be taken into account in the models of today's extreme complexity. The reflexive formalization of human intellect and consciousness is a phenomenon that, with all its apparent simplification of the human problem, actually only complicates it.

The socio-technical image of the information society should be supplemented with socio-anthropological features, thus registering the appearance of the "Network Man", or the interman. She/he changes, adapts to the information system in the "field" of her/his own interactions. New virtual technical interactions change the person's lifestyle, his/her consciousness and worldview as well as they cannot but change the nature of human life in the "traditional" forms.

The technical and information equipment of a person requires an appropriate sphere of its effective application. This is how social and natural reality is changing, "adapting" to a new person, a cyber-actor, for whom the ethical imperative, for instance, ceases to be important. A person begins to act as an element of informational reality, being not only a subject, but also a digitized part of the virtual space (bio-object).

In our opinion, an interman can be called a person of the 21st century, whose life is closely connected or tied to the Internet. The identity of the interman is formed within the Web and belongs to network communities and neuro-digital noosphere. The interman makes plans considering only the realities of the Network, he/she is intellectually and emotionally attached to it, depends on the processes occurring in the cyberspace, experiences delight and shock in terms with the events taking place on the Network, falls in love and hates through the Network, seeks help and support through the Network only. Psychologically, the interman is tied to the processes occurring on the Web and being directly related to him, since he/she considers only such events significant, real and worthy of his/her attention and time.

Thus, the interman becomes a system-forming factor, largely determining the network traffic, its nature and content.

It is well known that the machine or artificial intelligence (AI) was created for a certain reason following the image the human's one, which, in our opinion, is an insufficiently logical approach. A number of mistakes in the creation of artificial intelligence could have been avoided if we had started from the assumption that intelligence is a complex product of the continuous progressive evolution of the complicated adaptive behavior of biological systems.

It should be noted that the discrete continual nature of human thinking activities provides scientists with some unsteady guarantee of unrepeatability and irreproducibility of basic properties and qualities of biological life in general and the human mind in particular. But at the same time, any researcher should be a priori worried about the existence of limits as to the effectiveness of both AI activities and the ever-increasing quantity and quality of its interactions with the biological, human, and social factors. What has been recently

published about this issue can be clearly seen through the return to the sources, i.e. to the publications by N. A. Berdyaev, where he warned us that "...machine, technical civilization is dangerous in the first place for the soul" [8]. This leads to the conclusion that the processes of co-adaptation, integration, and, as a result, partial or complete merging of the human mind with AI, or the so-called cyborgization, should occur solely on the basis of the studies carried out at the junction of disciplines related to the undertaken problem field: "...the development of sciences that study the human mind substantiate the appearance of the notion of neurophilosophy". Under the dominance of artificial intelligence and artificial neural networks (ANNs), human intelligence and, consequently, his/her intentionality are closely tied to the specificity and regularities of the growth and development of new social neural network clusters, which involve the whole logic as well as all relevant event and trend aspects of network space and time, i.e. of the being-in-the-network.

Neurophilosophy as a scientific direction has recently become popular in Western philosophy. It can also be stated that in the 21st century this study direction begins to explicitly and implicitly acquire a dominant position in philosophy since the advent of the 6th technological structure is directly related to the large-scale integration of the artificial intelligence and neural networks into the evolutionary chain starting from the internet of things to the internet of everything.

The reason and basis for this phenomenon lies in the very essence of the process of merging of the human mind with the ANN, since the stronger and deeper its formalization is and there have been built more direct and backward connections, the more efficient is the interaction of the natural mind with various kinds of neural networks and with the artificial intelligence. The essence and social nature of the existence of such a mutated "hybrid" can be defined as the mass appearance of pseudo-cyborgs (without a direct physical interference with the biological integrity of the organism, i.e. the physicality of the individual) viewed as an integral component of the future cyber society.

Does the mutating human mind being the subject to reflective formalization and cyber socialization correspond to the level necessary for solving modern socio-historical problems? What is the existentiality of a completely formalized human consciousness, which is forced to "archive" its continuity, creativity, sensuality, and intuitiveness? The apotheosis of such an antinomy, in our opinion, can be considered concentrated, highly formalized intelligence, ideally cyber-adapted and trained to solve a certain class of logical problems aimed at optimizing cyber-social infrastructure projects. And the very "training samples", beginning from the input to the output signal, which are usually used to "train" the neural networks, will be included in the training programs for future specialists, engineers, and technologists in order to unify the interaction process. This will complete the formation of the social layer of pseudo-cyborgs, cyber technocrats of the new generation, who are much better prepared intellectually in comparison with other members of the society and are not burdened with the excessive imagination, because any, even situational, "sliding down" into continuity will slow down the speed and will lead to the violation of the logic of thinking processes.

We deliberately aggravated the apparent dialectical contradiction presenting itself in front of our eyes, made a mind's experiment to try to understand and foresee the kind of solution the history can push us to. Do we have the enough reasons to expand the range of judgments as to the cognition or non-cognition of the world up to the opportunities of including into the cognitive process of AI and ANN? These questions are by no means simple, especially when it comes to the formation and development of a new social reality, new educational, social and state institutions.

In the structure of these institutions and a social cybernetically organized system, the human beginning and a humanistic principle (*au revoir, de la Renaissance!*) as well as philosophical anthropocentrism shrink, losing its position and giving way to

“optimization”, “intellectualization” and successful “logistic efficiency” of complex socio-economic and sociocultural movements and interactions. The predominantly discrete nature of the neuro-digital noosphere leads to the need to adapt the methods of mathematics, cybernetics, and management theory to the formation of a fundamentally new social reality with its participants and infrastructure.

## 4 Discussion

In the course of the development of mathematical discourse on Petri nets it should be noted in the context of this study that the mathematical models reducible to rhizome-like networks, which are the ultimate goal of this project, must reflect the complexity, implicitness, randomness and variability of the object.

Modeling in Petri nets is carried out at the event level. It is determined which actions take place in the system, which states precede these actions, and which states the system will acquire after the action is completed. Depiction of the event model within Petri nets describes the behavior of the system with a sufficient degree of reliability. The analysis of modelling results can define the states in which the system used to be as well as predict which states are unattainable for the system. This is the very complex medium which we deal in cyberspace with.

Hierarchical interactions within the system implemented by cybernetics methods should thus provide “softening wave correlations” within rigidly defined algorithmic sequences, albeit being consistent formal and logical circuits. The real structure of social being, now directly interacting with the cyber society, is forced to adapt to it, objectively losing its attributes of continuity, variability, smoothness, implicitness, and inconsistency. The series of events, branching and arbitrarily expanding in socially significant directions cannot be comparable with the numerical ones, even if they are of Fourier series.

Let us take, for example, Gödel’s second theorem on the incompleteness of formal theories. Formal arithmetic as a formal axiomatic theory is based on a formalized predicate calculation. At the same time, the consistency of the fundamental theory cannot be proved by the means of this theory. However, it may well happen that the consistency of one theory can be fixed by more advanced means of another theory, which, in turn, will require the same procedure. An endless series of sequences of necessary proofs inevitably leads us to continuity in its anthropomorphic dimension.

The aspiration to anthropomorphism is one of the most difficult, but real ways of solving the contradiction between the human and made by the human (“Check the harmony with cybernetics”, or else, strive for the opposite).

## 5 Conclusions

As is known, the ontological status of consciousness has always been considered by scientists as the antithesis of materiality, as a kind of clearly intangible mentality inherent only to the human brain, i.e. to the highly organized matter. However, what exactly happens to the interman’s consciousness when it comes into contact with, co-adapts and “merges” with the “digital collective consciousness”, i.e. the neuro-digital noosphere? At present there is an intensive development of Neuronet, and it seems that a similar network of a new level, using nanotechnology and having a new topology, will be able to easily enslave, subjugate the consciousness even of an adult, not to mention the children’s. New algorithms, cybernetic control circuits, quickly trained neural networks, building a semantic rhizome” of the network space-and-time continuum, already adding smells to our perception, will be able to subdue the younger generation, thus depriving us of the future.

We are observing a completely material process generated by an extremely complex sociotechnical system and having a very detrimental effect on the intangible consciousness of the interman.

What are the constructive socio-historical solutions to this problem? Neurophilosophy, which is gaining its popularity in the West, is rather a representative and clearly scholastic side of a mosaic-like neuro-technocratic monster, being ready with the help of nanotechnology to absorb and dissolve the individuality of both the present and the future person, making him/her an obedient formalized element (a bio-object) of the self-organizing super-system, which will become a collective digital consciousness as a continuously functioning controlling nucleus of the cyber society, some kind of a passionless cyber moderator.

Thus, the Internet studies or internetics as a scientific and educational discipline tackles a wide range of socio-cultural and economic issues, connected with the prospects of modern society's sustainable development. Active socially-mediated structuring of the Internet allows identifying the essential features of a new type of society, of both renovated and new social institutions, fundamentally different socio-economic structures, consistently and naturally replacing the traditional ones according to the principle of necessity. A new social environment has emerged and is developing following the systemic software-determined principles, at the same time reflecting and adapting to some extent the structural and functional foundations of the traditional "paper" information environment, however, the degree of interactivity, speed, and intensity of many events and processes occurring in these two systems are fundamentally different.

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