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SOCIAL SPACE OF THE INFORMATION TECHNOLOGY DEVELOPMENT

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ABSTRACT

The article is devoted to the contextual parameters identification of information technology development in their social dimension. The author suggests using sociological concept "social space" for this purpose. This concept is interpreted as a three-level unity. The first level is an infrastructural one ("physical space") and is the level as close as possible to the real physical and spatio-temporal coordinates where information technology is localized. The author describes this localization to possibly be either real or virtual. The second level is a pragmatic one ("genuine social space") representing the social actualization of information technology and including actors (individuals, groups, institutes), connections between them, their activity and its results. The third level, or reflexive ("mental space"), is the one that represents the level of social reflection of information technology and its explications. It reveals in the form of evaluating their role in social life, risks and perspectives. The result of this reflection is expressed in the form of trivial and scientific knowledge.

All in all, as the author concludes, all three levels form a materially-semiotic network composed by subjects and objects of various origin: social, natural, symbolic. He emphasizes that breaches between the network elements (actors, institutes, recourses) lead to its functioning destabilization and the actualization of risk factors.

Key words: information technology, social space, social space level, subject, actor.

Introduction.

Informational technology pierces our life, and we cannot imagine everyday individual communication as well as the existence of institutional governing on the state level without it. At the same time we can consider information technology not only as an important factor of social development, but also as an important actor of this development. This arises an essential problem - studying special conditions of the development and functioning of information technology in modern society. This problem assumes the lodgment of informational technology with subjectivity in the aspect of its interaction with the space that later on is called social space. What are its core parameters? What is its structure? What is the logic of information technology functioning in the society? All these questions are vital and yet have no answers. However some aspects of the problem arisen have already been studied in social and human sciences.

The study of information technology has a comparatively long history and is connected with the classical postindustrial [1] and network society [4] theories. The

general theory of NBIC technologies, as well as the methodology of their social-systematic and social-synergetic analyses can be found in the works of M. Roco, W. Bainbridge [5], V. Budanov, I. Aseeva [3], H. Haken [8], N. Luhmann [13] etc. The role of information technology in general and social networks in particular has been observed in our works [6-7]. The problem of living world (space) in biological and phenomenological dimensions has been studied, accordingly, by J. von. Uexkull [15] and A. Schutz [14]. Social space as a construct characterizing the conditions of actualization some social practices has been described by P. Bourdieu [2]. At the same time the question of studying the social space of information technology development and functioning as well as the one of defining its core contextual parameters that determine its internal logic, perspectives and developmental risks remains unrevealed. So our purpose is to fill in this blank.

Our hypotheses is as follows: risk factors related to the development of informational technology objectivate in the breaches of different network elements structural conjunction that leads to errors in its functioning because of the integrity loss.

Materials and methods.

In this work we rely on general scientific methods such as abstraction, analyses and synthesis, idealization. Fruitful ideas for studying informational technologies as one of the crucial components of NBIC technologies in context the general civilization development that produces new modifications of antropal, technical and social subjectivity can be found in the works of actor-network theory (ANT) representatives - J. Law, B. Latour [11-12]. General methodological base of this research is formed by fundamental ideas of synergetic and self-organization of complex (socio-technical as well) systems that were reported in the works of H. Haken [8], V. Budanov, I.Aseeva [3], N. Luhmann [13]. These methodological approaches help point out the most stable characteristics of social space of information technology development.

Results.

Information technologies cannot be considered apart from the general context of their functional, ontological and practical connection to other NBIC technologies. At the same time they possess their own ontological status. In this case we can give a kind of subjectivity to the information technology in the context of the general "human-nature-technology" system complication. We highlight that the outline of information technology subjectivity are social and are represented in practice. Although we do not speak about the lack of social context in the development of information technology and do not doubt its social nature, we consider that under the condition of general complication in the system "human-nature-technology" the latter can be discussed as an all-sufficient data center of principally non-reducible ontology. Information technology in our research is considered as a relatively independent actor in the network of its interaction with the other components of the space. It is a principal point that technology is not above, but among the other parts of the social, that means that information technology as a functional and developmental subject is closely related to its space. In this case we raise a problem of studying the general information technology condition development.

The general idea of some vital space, significant context of being, can be found in J. von. Uexkull's works [15], who introduces the concept "Umwelt" to mark special world that reflects the relationship built between the living being and the space, which at last can be reduced not to things but to actions. Suchlike concept (Umwelt), in our view, can be as well applied to the general parameters of information technology development and functioning analyses. However, further on we are going to use a more common sociological concept "social space" in this meaning. Social space is important not only as a medium where information technology function, but also as a summary of other actors that form a kind of material-semiotic network with information technology that includes objects and subjects of different origin(social, natural, signal).

A great methodological value for us are the core ideas of actor-network theory (ANT), which studies various social structures and artifacts as a result of network "interobject" interaction of heterogeneous actors - individuals, material objects, gadgets, animals, etc- that possess the characteristics of equality and symmetry. A special attention should be paid to the principal idea of actor-network theory - the social topology by J. Law [11].

J. Law marks out two spaces: physical (geographical) and network (sensible). The maintenance of stable network relations between actors in each space makes the object topologically contrast. In this study we are more interested in network space, where the interaction between actors is determined by the stability and integrity of the object's sensible relations core. Of top importance is determining the conditions of breach (or "catastrophe" in terms of topological theory) between actors that makes the network become unstable and lose its self-identity.

Returning to our research, we can suppose that information technology social network is determined by the permanency of sensible relations that are formed by the actors it consists of, which supports information technology ontological status. This role can be played by subjects of different nature but taken as equal: users, moderators, owners of Internet recourses, cellular communication and Internet providers, energetic infrastructure objects (electricity, etc), scientists, public opinion and other. This list is not thorough and can be amplified. What is principal is the multiplicity and heterogeneity of network forming actors.

Let us now consider the fundamental substantial characteristics of information technology development and functioning social space with help of the corresponding social space levels analyses. Our analyses will be based on pointing out the network's key elements on every level of social space(core actors, links between them, practices, interfaces, activity results, institutes, resources and risks), stable conjugation between which provides successful functioning of information technology because of saving the homeomorphism. At the same time the breach of established links leads to the destruction of the network and the actualization of risk factors.

According to the model offered the social space of information technology development and functioning includes three levels: infrastructural ("physical space"), pragmatic ("social space itself") and reflexive ("mental space").

Let us discuss them accordingly.

1) Infrastructural level

Infrastructural level can be represented in real as well as virtual dimension. The real infrastructural level (real physical space) includes technological characteristics, peculiarities and conditions that make the functioning of information technology in its material-instrumental dimension possible. First and foremost real physical space is organized and distributed among material objects, technological and energetic infrastructure - computers, means of communication, servers, modems, electric networks etc. On this level we can see the maximum "reality" of physical space and its dependence on external factors. Risks that arise on this level are connected to natural or technogenic influence on the information infrastructure objects (natural disasters, fires, technical malfunctions and breakdowns, blackouts etc.)

The other dimension of infrastructural level is a virtual one. Virtual physical space can be characterized as the space "on the other side of the screen", i.e. information world's virtual reality (computer games, web-sites). Virtual physical space is a place where various everyday practices happen (communication, work, and entertainment) with the help of information technology. In other words it is the space of program scripts, codes and caused by them virtual equivalents of real actions. The external influence on the participants is limited; in most cases the practices of this space's deployment are localized in the sphere of subject-object interaction "human-technology". On this level become crucial risks connected with computer viruses, informational attacks, as well as the difficulty of ontological distinguishing between the virtual and the real. These risks are caused by the ambivalent nature of virtual reality (for instance, the Internet surface) and complex structure of its informational filling.

We can't but mark that on the level of physical space we only talk about the interaction in "technology-nature", "human-technology" and "human-nature" systems. Any genuinely social actions (for example, interpersonal interactions) do not actualize themselves on this level that is why various social, political and legal risks arise only on the pragmatic level that is discussed further on.

2) Pragmatic level

At this level we can talk about actors (individuals, groups, institutes) that provide their interaction with material-instrumental objects, as well as the social practices and links arising between them. The main social actors that interact at this level are the developers, producers of information technology, consumers, sellers, managers, mind leaders, providers, etc. The interaction between actors on this level is localized in practice of interpersonal communication, cultural consuming, institutional practices in the spheres of governing, science, education, business. The risks that become actual at this level, are, first of all, the socio-cultural and political-legal ones caused by the social interaction between actors, i.e. their orientation on other subjects such as individual, group etc. These risks are: forming Internet and information technology addiction, socio-cultural risks of general communication level decrease, broadcasting forbidden, dangerous for society (for example, extremist) content, copyright violation, using information technology as a means of political mass consolidation (meetings, revolutions).

3) Reflexive level

On this level becomes actual actor's (technology experts, lawyers, consumers, government members) social and mental reflection of information technology. This reflection can have two forms:

- expert evaluation of risks and tendencies of information technology development, among which imposing institutional prohibiting measures and legal regulation;
- consumer evaluation that is reduced to analyzing only utilitarian (consumer) qualities of information technology and that influences the consumers' behaviour forming.

The first step of reflection is drawn towards expert examination and ideology, while the second one is closer to mythology (for details see [9-10]).

It is significant that one of the most important actors on this level is public opinion as a social institute, as well as the idea of information technology being a global social metaconstruct. The synthesis of expert and consumer evaluation forms a unique image of information technology and determines its social acceptation parameters. As a result we can talk about the idea of information technology in context of social evaluation and measures taken by the governors. The risks at this level are as follows: ideological ones connected with artificially forming the public opinion needed, and strategy development ones caused by taking strategically wring decisions in economic, technological and ecological spheres.

The generalized information on the contextual parameters of information technology is introduced in table 1.

Table 1. The analyses of information technology social space contextual parameters:

Analyses criterion	Social space level			
	Real infrastructural	Virtual infrastructural	Pragmatic	Reflective
Key actors	Media, technology, energetic infrastructure objects	Program scripts, codes, content	Technology producers and developers, users, social organizations and institutes	Technology experts, lawyers, consumers, governing structures, public opinion
Links between actors	Energetic, technological	Informational, anthropic-technological	Communicative	Discursive
Practices	Object-object	Subject-object	Subject-subject	-
Interfaces	Technology - nature	Human-technology. Human -nature	Human- human	-
Activity results	Supporting technology functioning	Creating/ consuming information context	Establishing social links and contacts, broadcasting ideas and values	Expert examination, consumers' opinion, legislative decision
Institutes	Industry, economics	Education, science, culture	Politics	Public opinion, government
Resources	Energetic, technological	Human, intellectual, informational	Social capital	Ideological
Risks	Natural, technological	Informational	Social and cultural, legal and political	Ideological risks of strategic development

As can be seen from the table, every next level complicates and compounds the previous one (from the left to the right), bearing in mind the elements of the previous level (actors, recourses, institutes) as necessary. At the same time the elements mentioned at this level are the most important as they form its outline, while the elements of the previous levels are not as important or are supported as existing a priori. In other words, the elements mentioned at every level are not the only ones, but they become actual at this very level and it makes them the most important for this level. Dash means that there is no further complication on the level.

Discussion.

However, it should be mentioned that the data collected is just the preparatory step to creating the general concept of social space development. The model built allows us answer the question about strong structural links existing in this space and contributes to working out the adequate parameters of its analyses. At the same time a number of problems remain unsolved: Can we use this model with other NBIC-technologies? Will all the components of the model correspond to them or not? Our primary hypothesis has partially been proved, however, a further research direction of particular interest is working out empirical indicators and their further verification. Actual remains the question of studying the links between social spaces of different NBIC technology development.

CONCLUSION

The social space of information technology development is complicated and consists of several levels, every of which can be considered with a number of criterion. At these levels, starting with the infrastructural and ending with reflective one, we can see successive complication of social links, practices and forms of subjectivity. Harmonic and successful information technology development is possible only as a result of coordinated structural conjunction between the elements of social space that together form a network. If not, the network becomes disintegrated and different risk factors (natural, technical, informational, ideological) actualize. Building a model of information technology possesses a great practical value for social science. It can contribute to making qualified social expert examination and forecasting NBIC technology development on the grounds of pointing out their general tendencies and internal links.

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