

MANAGEMENT OF SOCIAL PROBLEMS OF EXPANSION OF MODERN DIGITAL REALITY IN SOCIO-TECHNICAL LANDSCAPES

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Evolution of human groups in certain territories and in various time leads to emergence and life in the habitat socio-technical landscapes, the using various practitioners and digital technologies. In process of industrialization transition from an intensification of innovations of digital technologies to their expansion is observed. There are problems of formation of various scenarios of social management of new situations in socio-technical landscapes on the basis of various criteria – for example, values of risks. In work briefly are considered: classification of socio-technical landscapes, questions of formation of necessary components for calculation of numerical values of risk, the equation of dynamics of risk, the characteristic of modern digital expansion, questions of digital transformation is given, the generalized scheme of use of expert system for damping of consequences of digital expansion within the Industry 4.0 is provided. In the conclusion the conclusion about need of an intensification of scientific and practical researches in the field of development of a philosophical mathematical apparatus of assessment of numerical values of risks for use of the systems of support, those at design, of the correcting decisions realizing various scenarios of management is drawn. Work is performed with assistance of Grant by RSF No. 19-18-00504.

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In process of development of society in a certain territory in various relations of production and historical conditions synergetic processes are resulted by certain structures – the socio-technical landscapes (STL) [1–3]. As they can be classified as live and open systems, we will apply the principle of a steady disbalance of Bauer to them.

Research of questions of evolution, modeling and forecasting of STL much attention as, in our opinion, the functional condition of various STL in many respects causes stable development of society with optimization of relative entropy at the level of golden ratio is paid now.

If to consider chronology of development of STL within the theory of economical and political formations of society, then it is offered to allocate its following types:

1. Socio – closed;
2. Territorially caused;
3. Socio – open;
4. Territorially independent;
5. Synergetic;
6. Bifurcation.

At the most initial stage of development of society there was a requirement for the formalized description of the relation of various structures for it for the purpose of optimization of development to enter concepts: “number”, “account”, “calculation”. Thus, there are first digital technologies. Development first of all of technical protection against unpredictability of the habitat, led, the final result, to modern expansion of computer, computing, information and analytical outlook and Miro of management in development domination as Mankind in general, and separate societies, including,

socio-technical landscapes. Thus, technologies of the Industry 4.0 appear so far.

In development of the digital Mankind technologies there passed the set of evolutionary, revolutionary and regression stages (for example – loss of technologies of development of the Moon, loss of manufacturing techniques of the computer almost for 70 years, loss of the Sumer account, etc.).

Development of new methods and means of digital technologies, to be exact their application, causes changes of the main characteristics of human life: health, mortality and birth rate, congenital malformations (as the first reaction of society to possible mutational processes), education (scientific and spiritual knowledge of the World), racial and civilization connections and wars, fight for existence against and the Nature (the Darwin principle), a coexistence phenomenon for joint survival (“anti-Darwin” the principle).

Life cycle of new digital technologies, certainly, in concrete STL causes emergence of certain processes π_i . Then the description of risk R emergence and development π_i in time and space can be presented in the form a set:

$$R(\pi_i, \text{tex}_j, L\pi_i(\tau), \text{Ob}_i, \text{Sob}_i), \quad (1)$$

where π_i – process; tex_j – j set of technologies; $L\pi_i(\tau)$ – function of life cycle of process, Ob_i – objective changes, Sob_i – subjective perception, $R \in [-1, 1]$.

Assessment of risk is carried out by subexpert system or a consultation.

As, generally, the risk changes in time, the hypothesis is made: the intensification of innovative processes of digital technologies

influences the speed of risk of emergence of processes or the phenomena in STL, expansion – influences acceleration, an ekstensifikacija – damping.

(It is possible for this reason now “ocean” of digital expansion “spreads on many rivers and floodplains” public the practician and institutes – the Mankind protects stressful influence of fast dynamics of risks.)

Then, in the first approach the specified process is modelled by the equation:

$$R_t'' + (c - b) \cdot R_t' + (c - a) \cdot R_t = Sl, \quad (2)$$

where a – expansion coefficient; b – intensity coefficient; c – extensiveness coefficient; Sl – the constant defining jet features of STL.

At a certain stage of development of humanity (not STL), when overcoming a certain threshold of population density, not personal amplifier of universal intelligence, for example, on the basis of computer technologies (first of all, local and global networks) or development of monotheist religions is created.

Thus, synergetic processes led to development of information society which semantic description included a lot of the new various concepts characterizing modern expansion of digital external control and transformation of STL (including, destructive):

- intensifications in time of internal information and power metabolism of STL expressed first of all digitalizations of an internal, autonomous control system;
- reorganization of the relations between elements of structure of STL;
- deformations of internal cyclic processes of STL defining its development according to Bauer’s principle.

If to consider transformation of STL in philosophical and methodological aspect, then the theory of complexity can be the most relevant approach. From a position of the theory of complexity of STL is multielement system. Initially elements are understood as “a black box” of difficult system in which the rules regulating their individual behavior are known. Rules which elements follow can be simple concerning a complex and to be determined, probabilistic or stochastic. It is obvious that elements are independent, purposeful or have any value at external influence by other elements. Moreover some elements have intelligence, mental qualities, have conditioned and unconditioned jet reflexes.

Let’s notice that if to present to STL in various models to describe in the form of the count, then the complexity in this case is quantitatively estimated according to the theory of

the count (for example, [4]). And, depending on type of the chosen model there are different types of difficulties identified by the modelled values.

Nevertheless, long local actions have the global consequences influencing in a complex system in general. Such global consequences, by definition, are impossible at the level of an element within an emergentism: they cannot arise from local rules (qualities) which define behavior of elements. It is more clear within the following observations. As target agents are mutually independent, they can be in a condition of the conflict: action which, directly will lead to the purpose A hinders achievement of the goal In, and, therefore, causes the active resistance of agents of Century. Local actions can extend the influence step by step to more removed agents, thus, extending on all system of social management formed by elements and their relationship. The same actions will have in general various effects in any parts of system at different times.

Thus, social management is difficult, open system with four possible positive scenarios of events:

- 1) digital expansion happens without external participation of the subject (in ideal conditions), and under the influence of an external or internal factor (element), is regulated by means of external or internal factors (elements);
- 2) digital expansion happens without external participation of the subject (in ideal conditions), and under the influence of an external or internal factor (element), is regulated by the subject;
- 3) digital expansion happens under external participation of the subject, but is regulated internal by factors (elements) of system;
- 4) digital expansion happens under external participation of the subject and is regulated by it.

Digitalization represents the total trend of development of science and technologies which is appropriately influencing activity of the person and society today. The digitalizations of change happening in connection with distribution affect the sphere of social management.

Digital expansion causes a fierce debate among politicians, economists and leaders of branch about its influence on society. As digitalization “gets” into various structures of society (especially in the most elementary and the least protected – for example, family), the concern grows on the subject of how it influences such factors as: jobs, salary, inequality, health care, efficiency of use of resources and safety.

Digital expansion already created new roles – professions (search optimization managers and managers of social networks), new types of the organizations (providers of cloud computing and the agency of social networks) and even new sectors of economy (digital safety and science about data). Digitalization influence also served as the catalyst of growth of employment in wider economy. For example, in India, by estimates, three-four workplaces for each work in sectors of outsourcing of business processes and IT services are created.

Thus, external digital expansion is in fact the modulator of various processes in STL, acting, at the same time, as the synchronizer of various STL for the solution of criterion function of STL of higher hierarchical level. For example, the last solutions and actions of the Government of the Russian Federation for digitalization of economy, health care, telecommunications, administrative management through economic regional forums stimulate growth of digitalization on the following (first of all social and territorial) levels: technical and personnel equipment by the advanced computing and information and intellectual technologies of concrete public health and educational institutions, local authorities (administrative structures) and others social and institutes of technology and “the local level”.

In fact, digital expansion plays the leading role in neuroprogramming of a certain society and the certain people entering it as elements of some structure. Changes both in the interpersonal relations, and in psychosomatic changes of certain people result. Perhaps in due time to monitor these changes with monitoring:

- physiological changes in an organism;
- mental changes of individuals (monitoring of levels of mental diseases in certain STL);
- psychological changes (monitoring by Lyusher’s tests, an unknown animal, etc.);
- changes of the interpersonal relations.

Emergence of changes in various types of the relations as the phenomenon can be analysed by means of complexity theory of V.I. Arshinov [5] and multilevel representation of crisis of V.V. Zherikhin and A.S. Rautian [6]. The specified approaches and results of monitoring allow to allocate unstable, destructive and organizational stages of emergence of change and social management.

The unstable stage is characterized by hypersensibility to some change due to digital expansion. Drawing an analogy to the theory of complexity, we note that this phenomenon represents the characteristic of a complex-

ity theory – instability [7]. Destruction at this stage is poorly expressed and defines the initial stage of emergence of some change. The same is observed also at the beginning of a destructive stage. Irreversible destruction is shown at a destructive stage when digital expansion gains global character and passes through the level of stability of system if to speak language of the theory of complexity.

This stage represents digital transformation. At a destructive stage the new quality of system characterizing the happening changes and STL providing digital transformation arises. When registration of new quality comes to the end also the social management expressing the organization or self-organization of system begins to prevail over destruction, transformation of STL is characterized by a prompt set of poorly ordered changes. This stage is defined as “subsiding of changes” under the influence of social management.

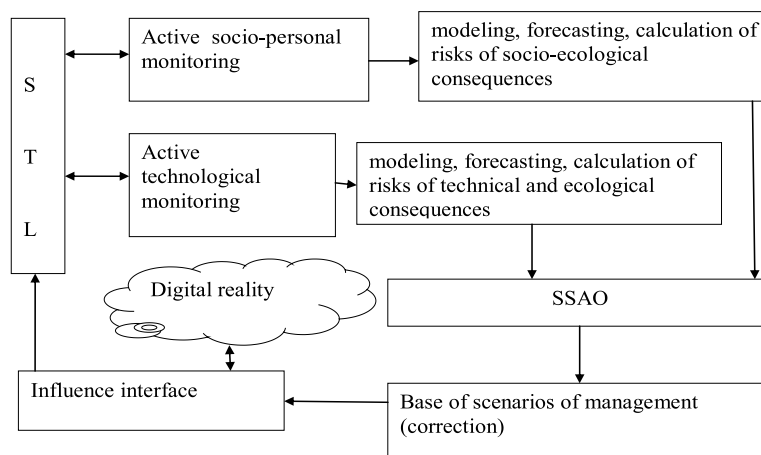
Minimization of consequences of digital expansion of reality is characterized by an organizational stage. At this stage all processes in system stop, the new quality is fixed, and there are changes, both in the interpersonal relations, and in psychosomatic changes of certain people (system elements). In other words, the positive result of transformation of STL by results of which there is a formation of one of scenarios of problems of social management, expansion of digital reality connected with consequences then again there is an unstable stage is observed.

Thus, this process is multicyclic (ritmickadny) with emergence of new scenarios of problems of social management, the expansion of digital reality connected with consequences.

As STL interacts with the external environment, there are problems of forecasting of its development realized including, by means of the automated systems of support of decision-making (expert systems) allowing to carry out the following scenarios of a koevolvytion of STL:

- 1) To limit / broaden the territory;
- 2) To limit / expand a required subject;
- 3) To limit / exclude/expand physical impact;
- 4) To limit / exclude / expand psychological influence;
- 5) To notify / not to notify / inform the institutes realizing expansion of digitalization about negative or positive changes (feedback).

Each of 5 scenarios of the offered scenarios is characterized by a concrete set of actions in certain regional conditions.



The generalized scheme “counteractions” of digital reality

As development of concrete scenarios demand the analysis of a large number of the current, retrospective and predictive information, there is a need of development of the corresponding expert system of support of adoption of the operating (correcting) decisions (SSAO) which prerequisites of design are presented, for example in [8]. The generalized basic scheme “counteractions” is shown to digital expansion on the basis of SSAO in the figure.

For example, if STL is considered in city scale, then the described system of support of acceptance of the correcting influences can recommend certain scenarios in various directions of development of city structures and the welfare relations, modifications of geometrical forms of information and power communications depending on city “type”: boundary, protecting, industrial, – agrarian, means concentrating, the funds distributing, operating kadrostitelny, rational, “clever”, “wise”, social, “historical – the reserve”, etc.

From the point of view of holding the correcting actions for optimum use of modern expansion, the system of support of decision-making can recommend to undertake in STL, for example, the following reforms: social, political, economic, modernization, etc.

And, for each STL element (striations, practitioners, ontologies, subsystems) recommendations carry on the one hand concrete, with another – two-three alternative character for a possibility of the choice of the most optimal variant.

Thus, the problems of the analysis and management (adjustment) of situations and processes considered in work in STL resulting from “digital expansion” cause need of an intensification of scientific and practical researches as in the field of development of a philosophical

mathematical apparatus of assessment of numerical values of risks of emergence and development of situations, and in the field of design of the corresponding systems of support of the correcting decisions. Eventually, it has to promote development of strategy of the Industry – 5.0 (refusal of society of consumers).

References

1. Budanov V.G. Metodologija sinergetiki v postklassicheskoj nauke i v obrazovanii. M.: LENAND, 2017. 272 p.
2. Budanov V.G., Kamenskij E.G., Arshinov V.I., Aseeva I.A. Sociotekhnicheskij landshtaf v uslovijah cifrovizacii: k probleme koncepta i metodologii issledovanija. Izvestija Jugo-Zapadnogo gosudarstvennogo universiteta. Serija jekonomika, sociologija, pravo. 2019. T.9, № 3(32). – P. 213-225.
3. Artemenko M.V., Rodionova S.N. Sociotekhnicheskie landshtafy – predstavlenie i opisanie na regional'nom urovne // Social'no-jekonomicheskoe razvitie Rossii: problemy, tendencii, perspektivy, sbornik statej HVIII Mezhdunarodnoj nauchno-prakticheskoj konferencii. Kursk, 2019. P. 29–32.
4. Harari F. Teorija grafov. M.: Lenand, Editorial URSS 2015 304 p.
5. Arshinov V. I., Svirskij Ja. I. Slozhnostnyj mir i ego nabljudatel'. Chast' vtoraja // Filosofija nauki i tehniki. 2016. T. 21, № 1. P. 78–91.
6. Kotljakov V.M., Zherihin V.V., Rautian A.S. Anatomija krizisov. Gl. III: Krizisy v biologicheskoj jevoljucii. M.: Nauka, 1999. P. 29–51.
7. Arshinov V. I., Svirskij Ja. I. Slozhnostnyj mir i ego nabljudatel'. Chast' pervaja // Filosofija nauki i tehniki. 2015. T. 20, № 2. P. 70–84.
8. Artemenko M.V. Predposylki proektirovanija jekspertnyh sistem analiza i upravljenja sostojaniem i jevoljuciej sociotekhnicheskij landshtaf v uslovijah cifrovoj real'nosti // Mediko-jekologicheskie informacionnye tehnologii – 2019: sbornik nauchnyh statej po materialam HHIII Mezhdunarodnoj nauchno-tehnicheskoj konferencii; Jugo-Zap.gos.un-t.-Kursk, 2019. P. 114-119.

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