

Conference Paper

The Need for Sociotechnical Turn in the Study of Society Digitalization

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Abstract

This study investigates the conditions of digital society development. All probable unintended consequences of digitalization require the development of a science-based approach to manage this digital development. However, there is a problem associated with the divergence in the assessment of the digitalization effects by representatives of the information technology sector responsible for the new technologies development and by representatives of social sciences studying the impact of digitalization on social relations, institutions and processes. Authors propose a new approach to understanding new digital reality based on so-called sociotechnical turn, which is a purely integrative approach aimed at solving a tough common issue. Moreover, the article proposes a theoretical analysis of sociological and technological discourses of the society digitalization problem. To define and structure the set of differences, there were conducted 5 in-depth interviews with specialists from the technical field, aiming to gather information both from applied experts and more science-oriented participants. The study has revealed that those who perform tasks set under the digitalization agenda may not be aware of the social consequences of their work. They follow a linear technical logic of computers and do not consider ethical or more complex social issues in their daily activity. This discovery supports our claim that it is of paramount importance to separate terms of digitization, meaning a technical view of the issue, and digitalization, implying a cross-field approach including both social and technical sciences.

Keywords: digitalization, digital society, sociological turn, technology, social digitalization

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1. Introduction

For the last decade the global scientific community is preoccupied by a new stage of social development. In scientific circles we are talking not about developed post-industrial or even informational society, but about a rapidly emerging digital one. Today in sociological sources and in other social sciences one can find a variety of proposed terms for this stage of social development, however, a single definition of society digitalization has not been established and conceptualized. That is why the goal of this research is to validate the need for a theoretical and methodological understanding of

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the digitalization problem through a *sociotechnical turn* — an integrated approach of technical and social sciences [4]. The capacity of such “turns” in sociology was proposed by J. Urry [7]. In the framework of a “complexity turn” he shows a scientific integration of social and natural sciences, based on the fact that they can have a common subject field. It doesn't mean the inability of sociology to solve digital issues. The problem is different: a radically rational and organized society began acquiring qualitatively different characteristics — a rapidly increasing complexity with a new generation of risks. To adequately analyze this complex world, one has to create qualitatively different paradigms based not only on the integration of sociological theories but also on a synthesis of sociological approaches with other sciences, in our case — with technical ones. It is justified by conducting 5 expert in-depth interviews with the representatives of technological field.

2. Methodology and Methods

The technological understanding of the digitalization process is reflected in several vectors of research. One of the most popular areas can be considered as the “Internet of things” (IoT) and related issues: the connection of things with each other and with a global network; IoT and non-network things and spaces; the degree of IoT autonomy and whether such autonomy is necessary. Another direction is computer extensions of a person and the convergence of people and computers in their functions, meaning the computerization of senses (computer vision, computer touch, orientation in space and on the ground), computer thinking (neural networks, decision making, algorithmization) and the possibility of using these extensions together with the human body (systems assistants for decision making and analysis, enhanced vision and hearing, augmented reality). Digitalization is also considered as the penetration of computer technology in professions (in terms of specific solutions for them), and it is also associated with a change in human behavior through interaction with abstract systems, “black boxes”, like online sales, algorithms of social networks and search engines, job search and hiring, gamification as a technological solution, software for research, accounting, analytics, state- and world-level systems. Areas of science that study digitalization in terms of technology are generally programming, physics, biochemistry, medicine, mathematics, meaning the whole range of technical and natural science fields. It should be noted that the technological discourse of digitalization is rarely fully concerned with the consequences for public systems having in mind tasks providing solutions for queries, implementation in terms of physical infrastructure and principles of data management.

Technological research in this area is more focused on the field of purely technological environment, and the only time they come close to social sciences is when it comes to legal issues and certification. Ethical issues of digitalization are considered, but are never central to technical researchers.

When it comes to defining digitalization, we can only map its characteristics through phenomenological analysis of practice. It is usually defined by three core characteristics:

1. All types of information are moving from analog, physical and static to digital, while becoming mobile and personal. At the same time, the individual gets the opportunity to control information that is sent to them, create information request, and form an individual trajectory of informational activity.
2. A transition is being made to simple communication technologies (technology becomes only a mean, a communication tool), the leading characteristic being the ability to control these technologies and devices.
3. Communications become heterogeneous: vertical, hierarchical communication loses relevance. There is a transition to the network structure of communication.

One of the first sociologists who managed to evaluate the importance of information and technological changes was M. Castells. In the theory of the network information society he developed a discussion about changing the qualitative characteristics of society, in which the logic of the social structures of industrial modernity has been replaced by the logic of the network information flows structures. M. Castells draws public attention to the problem of a social shift from traditional mass media (television, print media, radio) to a system of horizontal network communication flows of the Internet, which Internet users themselves can streamline. He proposed the concept of mass self-communication to characterize new forms of interaction between individuals. It is a mass communication because of the ability to reach an unlimited number of Internet communicants around the world. The prefix "self" characterizes this type of communication as being independently formed and freed from possible intermediaries that accidentally or intentionally distort the interaction. In other words, any individual with access to the Internet can 1) create their own virtual space (personal pages on social networks, live magazines, video hosting), 2) edit it, filling with any (even distorted) data, and, if they wish to, 3) make it open to the general public, while no third party can influence it [2]. It is this accessible openness that explains the popularity of Wikipedia, Facebook, MySpace, Youtube video hosting.

Somewhat later, world sociologists came to the idea of already accomplished mobile revolution. The reaction to the massive spread of mobile Internet is the emerging

discourse in sociology of miniaturized digital mobility (miniaturized mobility), which in the early 2000s became a scientific occasion for the formulation of an innovative methodological approach by British sociologists J. Urry and E. Elliott. In particular, E. Elliot comes to the conclusion that mobile technologies, which, conditionally, fit in your pocket, facilitate instant communication, but at the same time lead to changes in social relations [3]. On the one hand, many everyday life areas are associated with managing the daily routine or remembering certain dates and events. On the other hand, technology replaces the natural “tools” given by nature: memory, logic, imagination, literacy. For example, it is easier to resolve a conflict face-to-face than on the Internet, including because it is difficult to determine the source of the conflict when the tone of voice, body language and facial expression are absent. This often takes place in text communication — a comment intended as a joke might get misinterpreted as an offensive remark. The anonymity and lack of facial clues and body language make cyber bullying easier than offline. A widespread cyber aggression among adolescents correlates with loneliness and social exclusion in everyday life.

Under the influence of new digital technologies, changes are taking place not only in the ways of communication and social relations, but also in the individual’s personality. Of particular interest in this context are the studies of the Australian sociologist D. Lupton in studying digital self. In her latest work “Data selves” the author discusses both personal data that ceases to belong to a person and the consequences of the tight integration of man and technology. The last problem bothers numerous researchers [6]. Although very positive ideas are formed in the public eye about the achievements and consequences of digitalization, sociologists are called upon to identify its side effects that negatively affect the functioning of society and people’s behavior. In particular, the formation of new realities of power and power relations, supervision, as well as the erosion of the boundaries of private life: the encoding of technology and people, therefore, the collection of personal data (including biometric) leads to the creation of Big Data Centers, giant monopolies that collect enormous amounts of information from almost all computers existing in the world. The power of global digital giants (Google, Apple, Microsoft, Facebook, Amazon), who have access to personal data and exercise total control over the digitalization processes in the world, “poses a fundamental threat to democracy”[5]. In the above-mentioned work by D. Lupton it is noted that the constant use of self-tracking devices and other digital technologies accumulates the personal data of millions of people which can be used for personal gain by third parties. As a rule, the majority of users with mobile ‘smart’ gadgets do not realize where their data goes or are simply not interested in it.

The separation of the terms of society digitalization and social digitalization is carried out by Western sociologists through word formation. The society digitalization, which means the transition from analogue to digital, is referred to as *digitization*. The social aspects of this transition are denoted by the term *digitalization*. Both processes have an impact on modern society; however, there are significant differences in their sociological understanding.

In order to separate the bifunctional (technical and social) purpose of the word, some Western scholars insist on the separation of the concepts of digitization and digitalization as fundamentally different and non-interchangeable definitions of the process of digitizing the social environment. In particular, American researchers S. Brennen and D. Kreiss proposed to understand by digitization the material process of converting information flows into digital bits, the very process of digitization that was discussed, and digitalization — the way in which many areas of the social life of individuals are restructured under the influence digital communication and media infrastructure [1]. The term digitization is associated with the perception of technology as an external tool that changes the usual realities. This approach is typical for experts making material, economic, legal decisions, where technology is a material participant in public life. Specialists in the technical field presumably perceive the term “digitalization” precisely from these positions, since they deal with mechanisms, devices, codes — anything you can “touch with your hands”. Such devices and codes do not carry additional semantic load, since these are just tools that perform functions. The consequences of creating these tools can be expressed only abstractly, in the form of possible moral dilemmas on a planetary scale, as happened with the inventors of trotilo and atomic weapons. This perception is rational from the point of view of representatives of technical areas, since they do not seek to change society and act out of need to fulfill the task given to them. A similar rationality can be assumed for the legal, economic and political spheres. From the point of view of a lawyer, the transition to a “digital” is a social change that adds a number of aspects to existing relationships, like a need to redefine the concept of subjectivity, as well as to clarify the liability policy in the field of personal data. In the economy, production acquires new characteristics, mostly an increase in capacities and a change in the flow of information, which require the understanding of new solutions and the order of actions. In politics, digitalization is an object of decision making. In Russia, it is associated primarily with the president and federal laws. Thus, the digitalization of society means the perception of digital technology as a resource that must be regulated, distributed, produced and used.

Another term, “digitalization” was probably first introduced into the Oxford English Dictionary in the mid-1950s and was borrowed from information technology terminology. Initially, digitalization was understood as the process of converting data into a digital format. Gradually, it began to be extrapolated to social sciences with the significance of a social problem. In this sense, digitalization first appears in the scientific discourse in the article “Humanity and Computers” by the scientist R. Wachal, published in the American journal *North American Review* in 1971. By this term the author understood the process of introducing computerized principles of social development [8]. In those years, R. Wachal used this concept only to indicate trends in the mass introduction of digital technologies in everyday life. Ubiquitous digitalization has led to the emergence of a new discourse in the social sciences — the problem of the impact of new virtual technologies on the social life of society. Of course, the digitalization process has been studied to a greater extent in the framework of technical and natural sciences. And they are of undeniable importance for technical digitalization, however theories of digital sound, digital television, digital Internet are not suitable for studying the social consequences of digitalization. Perhaps, ahead of all the social sciences economists have advanced more successfully in the field of studying digitalization, using the term “digital economy” quite steadily. Scientific economic research is underway, the concepts of the digital economy are being developed, theoretical foundations are being laid for such components as the theory of the digital economy, industry, production, studies and theoretical studies of digital power and digital education have appeared.

3. Findings and Discussion

We conducted five expert interviews. Participants are a junior researcher at the Research Institute of the Russian Academy of Sciences, an engineer at a large technology company, a researcher-professor at a university, an information security designer, a specialist in data visualization and an analyst in a private company for the development and implementation of information security systems. Differences in the degree of familiarity with the technological sphere between us and the participants did not become an obstacle, since respondents talked more about digitalization from an institutional point of view than from a directly technological point of view.

Digitalization is perceived by experts as a formal initiative, a ‘campaign promise’ or another buzzword that replaced ‘innovation’. However, despite the formality of this term in the minds of experts, issues of implementing digitalization measures do arise in the organizations to which they belong. Often this is a separate scientific interest in applied

aspects, but there were also indications of the units that were entrusted, for example, with the implementation of the government program “Digital Economy of the Russian Federation”.

The term “digitalization” was well known to experts, however during the interview it was not discussed as an independent term. Experts went on to discuss its specific manifestations — data security, programming, neural networks, provision of production capacities, financing, organizational features of implementation, interaction with foreign colleagues. Experts did not notice any purely scientific research on digitalization, since the technological sphere is more characterized by practical “post-service” — support of implemented technologies, problem solving, consultations.

One of the expert’s job functions includes ‘the use of digital technologies in the collection, transmission, analysis and correlation of various data’. The main task is to protect the client from self-analysis and data analysis”. That is why the analytical efforts in organizations related to the technological sphere are aimed at solving assigned tasks through technology, and then solving emerging problems after introducing the created technology. There is a significant difference in approaches between sociology and the technological sphere: while sociology systematizes a new digital reality, conceptualizes and contributes to predictive pictures, technology experts do not go into the field of assumptions, linking forecasting and generalization exclusively with actual results. Moreover, during the interview we noted the lack of emotional, affective terms in connection with digitalization, we were not talking about function / dysfunction; experts reasoned exclusively in terms of specific work tasks, without adding additional meaning in technology, without endowing it with socially significant consequences, limiting it to a functional approach.

In general there were identified discrepancies in understanding and evaluating the impact of digitalization between sociological and technological approaches:

1. Digitalization, in the experts’ opinion, is a certain inevitable reality of the evolutionary type. However, for them this stage of evolution is not filled with abstract content, it is as definite as possible: specific technologies are produced, certain areas of work are developed, some professions are replaced by others and new skills are in demand. For them, the introduction of digital technology is a process that does not differ from the invention of cars or the discovery of electricity.
2. The consequences of work of specialists in the field of technology are not under the control of the specialists themselves, and such a state of affairs is perceived by them as natural. Experts demonstrates control over their own site of work,

however, the further path of technologies, their social consequences are unknown to them. It can be assumed that the tendency to linear logic in perception leads to a similarly linear interpretation of the possible consequences at the level of the law of conservation of matter in physics: nothing appears from nowhere and does not disappear to nowhere.

3. Experts describes three scenarios for the implementation of digitalization in Russia: 'state', 'business model' and 'market':
 - (a) 'state' scenario means that the main actor is the state. The model for implementing digitalization measures is a pyramid. Methods of implementation are as follows: state initiative in the form of laws, ordinances, directions and distribution of tasks among state institutions;
 - (b) 'business model' scenario means that the main actor is the digitalization business players. The model for implementing digitalization measures is functional, staff, regional. Method of implementation is international cooperation for profit.
 - (c) 'market' scenario means that the main actor is the market relations of supply and demand, producers and consumers. The model for implementing digitalization measures is the product and design. Methods of implementations are market research and response to its requests.
4. Experts are not inclined to characterize the changes caused by digitalization as radical. However, they nevertheless note a certain degree of uncertainty of everyday life, which technology allows to cope with. According to experts, the source of any changes is the person himself.

Based on the results of the in-depth interviews with experts in the field of technology, we propose the following adjusted conceptual definition of social digitalization: *social digitalization* is a global evolutionary process of converting information into digital form and the discourse of this transformation, which progressively change the nature of intergroup and interpersonal relationships; digitalization is implemented at the level of states, economics, technology and society in their interconnection; the conditions for the existence of society become dependent on digital technologies, controlled at the stage of practical implementation, but after implementation leading to unintentional and uncontrolled consequences for society on a global scale.

Indicators of social digitalization include the following ones:

1. introduction of digital technologies in areas affecting public relations;

2. an active role of society in implementation issues;
3. the occurrence of unintended consequences due to the complexity, inaccessibility of technology to non-specialists, as well as due to the withdrawal of the consequences of creating a technology from the scope of producer control;
4. relations of power and control include digital technology;
5. there is a digitalization discourse in society.

The research allows us suggesting the following areas for further investigation:

1. the interconnection and mutual influence of the four digitalization dimensions: the state program, business project, the actual penetration of digital technologies into everyday life and the paradigm shift of social thinking;
2. discourse and implementation of digitalization;
3. strategies for avoiding digitalization and the practice of overcoming its “inevitability”;
4. transformation of the linear logic of the creation and implementation of technologies into the non-linear logic of public relations;
5. scenarios for the implementation of digitalization projects in Russia in connection with the transformation of public relations;
6. empirical research based on a conceptualized definition of social digitalization and its attributes.

4. Conclusions

This work is significant from the point of view of its theoretical and applied contribution to a deeper and more complete understanding of the problem of society digitalization. Identifying some unique aspects, unprecedented consequences and risks of digital progress allows us to expand the disciplinary field of research on social and other types of risk, as well as update the tools for implementing preventive measures to reduce the risks of digital society.

The results of the work can be used as a methodological basis for further empirical research on digitalization of society. At the macro level, the results of the study will be useful in developing practical recommendations for the implementation of the state social policy in the field of the prevention of digital mediation risks, as well as the

adoption of the Concept of the Cyber Security Strategy of the Russian Federation and the addition of the Digital Economy Program.

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