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Society. Personality. Technologies:
Social Paradoxes of Industry 4.0

Abstract
The Fourth Industrial Revolution (Industry 4.0) and a «new» economy formed on its basis are some of the global phenomena of modern times. It is connected with the development of a global information and technology platform for industrial communications. In order to be able to integrate into such an environment, a person has to master operational skills of the user. Such communication is provided by the created interfaces and protocols. The assumption that the so-called McDonaldisation in society and protocol forms of its actors' social activity reflect their technological essence is substantiated in the article.
The methodological foundations of the study are the interdisciplinary theses of universalism, synergetic effects and the complexity theory adapted to sociological issues. In this regard, the method of theoretical modelling is the basic one.
It has been revealed that instrumental values which involve the skills of an actor as an operator become important. The main paradox of the situation is that the growing technological complexity in the context of Industry 4.0 technocratic capitalism is in inverse proportionality to the spiritual sphere which is simplified in the postmodern tradition of misconceptions of consumer society and a mass actor-consumer's false sense of involvement in the innovative development of techno-environment and knowledge economy.
Keywords: Industry 4.0; Industrial Revolution; Cyber-Physical Technologies; Social Agency; Consumer Society
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Анотація
Одним із глобальних феноменів сучасності є Четверта промислова революція (Індустрія 4.0), а також «нова» економіка, що формується на її основі. Це пов'язують з розвитком інформаційно-технологічної платформи організації промислових комунікацій. Для того, щоб мати можливість інтеграції в такі середовища людина опановує операційні уміння користувача. Таку комунікацію забезпечують створювані інтерфейси і протоколи. Обґрунтовано припущення про те, що їх технологічну суть в суспільстві відображає так звана макдональдизація та протокольні форми активності її суб'єктів.
Методологічними засадами цього дослідження є міждисциплінарні положення універсалізму, синергетики й теорії складності з урахуванням їх адаптованості до соціологічної проблематики. Базовим є метод теоретичного моделювання. Виявлено, що актуальними стають інструментальні цінності, які розвивають навички суб'єкта як оператора. Основним парадоксом ситуації є те, що зростаюча технологічна складність у контексті технократичного капіталізму Індустрії 4.0 передбачає зворотну пропорційність відносно духовної сфери, яка спрощується у помилковому розумінні постмодерністського суспільства споживання та хибного відчуття причетності масового суб'єкта споживача до інноваційного розвитку техносередовища та економіки знань.
Ключові слова: Індустрія 4.0; промислова революція; кіберфізичні технології; соціальна суб'єктність, суспільство споживання.

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Аннотация
Одним из глобальных феноменов современности является Четвертая промышленная революция (Индустрия 4.0) и формируемая на ее основе «новая» экономика. Это связывают с развитием глобальной информационно-технологической платформы организации промышленных коммуникаций. Для того, чтобы иметь возможность интеграции в такие среды, человек овладевает операционными умениями пользователя. Такую коммуникацию обеспечивают создаваемые интерфейсы и протоколы. Обосновывается предположение о том, что их технологическую суть в обществе отражает так называемая макдональдизация и протокольные формы социальной активности ее субъектов.
Методологическими основаниями исследования служат междисциплинарные положения универсализма, синергетики и теории сложности в их адаптированном к социологической проблематике состоянии. Базовым выступает метод теоретического моделирования.
Выявлено, что актуальными становятся инструментальные ценности, сводящиеся к навыкам субъекта как оператора. Основным парадоксом ситуации является то, что возрастающая технологическая сложность в контексте технократического капитализма Индустрии 4.0 находится в отношениях обратной пропорциональности к духовной сфере, упрощающейся в постмодернистской традиции заблуждений общества потребления и ложного чувства причастности массового субъекта-потребителя к инновационному развитию техносреды и экономике знаний.
Ключевые слова: Индустрия 4.0; промышленная революция; киберфизические технологии; социальная субъектность; общество потребления.

1. Introduction

Ideologically, the Fourth Industrial Revolution (Industry 4.0) is a contextual environment for innovatisation of the world economy. Its formation and development is determined by historically unique in terms of speed technical and technological progress tending to the state of technological singularity on the scale of world and local societies. This phenomenon is within the limits of the global vector of economic development based on cyber-physical systems, in which Industry 4.0, as an information and technological concept, has currently acquired the status of a sociocultural paradigm. Being technogenic in nature, it successfully competes with all kinds of ecological and other non-technogenic approaches in the ideological space.

On the one hand, the sociocultural macrocontext of society is viewed as consumer society. On the other hand, we are witnessing the development of unprecedented fascinating technologies which still have a poorly realised potential for the transformation or even reconstruction of not only the social order, but also all living things. We believe that it is necessary to consider these phenomena in their interrelationship with the problem of institutional competition, social mythmaking, transformation of social agency and the like. For example, the statement that the Fourth Industrial Revolution is only a new stage of past in their essence tendencies and cyberspace is the third great form of the global expansion of capitalism (Buhl, 1997) [1] leads to problems while conceptualising all these aspects for sociology and political economy.

It is necessary to understand which forms of interaction with the cyber-physical social reality a person should master, since it is interfaces and protocols that provide such communication, based on which the entire information technological cyber-physical system of Industry 4.0 is built. The McDonaldisation reflects this technological, mechanistic and algorithmic essence, i.e. calculability, efficiency, predictability and control (Ritzer, 2000) [2]. In this case, man and society are only a resource of capitalist ideology, which requires a pre-emptive theoretical modelling of the consequences of the development of a high-tech platform of a new social paradigm of Industry 4.0.

2. Brief Literature Review

The limited character, as well as fragmentary and controversial nature of the scientific and social reflection of sociocultural aspects of the modern stage of technical and technological development of society, defined by the so-called complex society, are the main humanitarian problem of the technocratic world (Kravchenko, 2012) [3]. This phenomenon in its paradigm-ideological boundaries is reflected in the concept of the global Industry 4.0 information technology project. The difficulties of such reflections are to a large extent objective and related to the methodology of constructing initial priori models that are adequately coherent to the complexity of modern society. In scientific theory, they are described as «a wicked problem» (Rittel & Webber, 1973) [4].

More and more works devoted to the problems of the development of society in the context of the Industry 4.0 paradigm are being written. Issues, such as virtual reality in context of Industry 4.0 (Kovar, Mouralova, Ksica, Kroupa, Andrs & Hadas, 2016) [5], moral and ethical aspects of behaviour in virtual networks (Kinnunen, Lindeman, & Verkasalo, 2016) [6], dangers of social networking with an emphasis on gender aspects (Brooks & Longstreet, 2015) [7], effect analysis of Industry 4.0 to higher education (Baygin, Yetis, Karakose & Akin, 2016) [8], standardisation of communication of industrial networks in Industry 4.0 (Halenar, Juhasova & Juhas, 2016) [9], technoethics (Grebenshchikova, 2016) and humanitarian expert assessment of technosciences (Aseeva, 2016) [10, 11], new values of the society (Kamensky, 2016) [12], the new digital Industry 4.0 technological order in the context of the complexity paradigm (Roblek, Meško & Krapež, 2016) [13], are being researched by foreign scholars.

Despite the research interest in the problem, the challenges of constructing representative instrumental models of axiological worlds and the typologies of social agency in cyber reality remain largely unsolved.

3. The purpose

of the study is to consider the transformation processes within society under the influence of cyber-physical technologies and model social consequences of the emergence of new forms of the hybrid neuro-digital reality, reflected in technological communications and interactions for mass actors.

4. Research methodology

Synergism of cognition seems to be productive for the research tasks (Budanov, 2007) [14]. For example, the successful use of the concept of order parameters relevant to the socio-humanitarian aspect is found in H. Haken's work (Haken, 1996) [15]. Such a methodology is actively developing and represented by synergetics (Haken, 2012) [16], memetics (Dawkins, 1976) [17] and the like, which are often related to complexity theories (Arshinov, 2011) [18].

In the conditions of complex behaviour of social objects, predictive scenarios are based on K. Mainzer's standpoint (2011), according to which nonlinear dynamics can generate unpredictable complex states for a distant horizon, hence their computability is limited [19].

The works by Toffler (1971, 1984) [20; 21] and U. Beck (1987, 1992) [22; 23] also play an important role in understanding the context of the contemporary sociocultural environment. They propose explanatory constructs for risk society, future shock and the third wave. A structural and functional approach is used in the construction of hierarchical models (Parsons, 1968) [24]. The description of the transition of society to the postindustrial stage as a crisis stage of humanitarian development (Boev & Kamensky, 2015) [25] and its social risks (Kamensky, 2016) [26] is contextually taken into account.

In particular, the problem of complexity, which is topical for the present, is considered in social sciences. S. A. Kravchenko's work (2012) [27] concerning complexity in society is a vivid example of the above said.

A cognitive model for the solution of the formulated task is the system of scientific ideas of «State-Risks-Forecasting» regarding the sociocultural aspects of mass introduction of the latest cyber-physical technologies. Such a system has not been developed at an appropriate level yet.

5. Results

5.1. Industry 4.0 and the cyber-physical culture

Currently, there is a transition to a new technological order that catalyses the trend of industrial and economic development of society to its sixth cycle (or sixth technological mode) in the chronotope of N. Kondratiev's wave model (1922) [28]. The principles and protocols of the organisation of neural network cyber systems of communication of machines, things and people, as previously heterogeneous ontological phenomena (living - non-living, natural and artificial, social and machine, etc.) and their hybridisation are the fundamental ones within the framework of the new socio-economic paradigm. The concepts of the Internet of things, Smart environments and the like, not to mention the conventional virtual social networks reflect this idea. The philosophy of transhumanism, the scientific interest to which has been somewhat weakened against a surge of interest to the topic of «Industry 4.0», also has an instrumentally close (but not valuable) content.

The creation and development of the components organisation of such an industry involves the creation of complex adaptive multitasking protocols and interfaces, without which the idea cannot be implemented. These interfaces and protocols should be sufficiently universal for the entire system of this scale, and have a high degree of unification. But what impact will it have on society? Which place will a social actor have in it? By whom can this social actor be typologically represented?

It is obvious that in order to be able to communicate and interact with emerging smart environments, a person should master operational skills of the user. This type of communication is provided by interfaces and protocols. Their socio-technological, mechanistic and algorithmic essence is reflected in the so-called McDonaldisation. It is precisely the instrumental values which are of great importance here. They are limited to

skills of a meta-actor as an operator interacting with the sophisticated environment (including its social aspect) within the framework of uniform protocols.

At the current stage of industrial revolution, marked as Industry 4.0, the coordination of communication protocols in the heterogeneous cultural environment can be implemented precisely by means of such interfaces. The very content of the new categories, such as «Innovative Society», «Information Society» and the like, shows the unprecedented growth of the socio-cultural significance of technical and technological instruments of social and economic development. Here the problem of «the semiotic seam» (Marks-Tarlow, Robertson & Combs, 2002, 2004) [29, 30] of cultural contexts in megaeconomy can be limited to the problem of constructing an artificial communication protocol based on the meta-language of high-tech machines interaction.

For example, it has been noted that approximately 90% automation of equipment was upgraded during the Third Industrial Revolution. However, Industry 4.0 will require replacement of only 40%-50% of equipment (the United States - 53%, Germany - 44%, Japan - 47%). First of all, it is related to the modernisation of the existing equipment with new sensors, transducers and interfaces in accordance with the requirements of new technologies in the industry. The disruptive Industry 4.0 technologies, such as IT-enabled manufacturing and increased computing capacity, hold the promise of smart factories that are highly efficient and increasingly data integrated. Data is the core driver: leaders across industries are leveraging data to achieve a step in value creation. A big data or an advanced analytical approach can result in a 20%-25% increase in production volume and up to a 45% reduction in downtime (Bauer, H., Baur, C., Camplone, G. et al., 2015) [31].

What does this mean in terms of the value-normative aspect of socio-economic exchange? This means introducing a unified normative framework into the established links of any national economic system. This normative framework will integrate this local system by establishing new norms and values of the global economic system on a new technological platform. In this case, the expansion of Industry 4.0 is implemented due the integration of formalised norms which are new orders of functioning unlike the natural process of ordering social and economic life, where locally born social values further form norms that serve as their protective mechanism and are initialised by an actor in the process of socialisation.

These trends are important not as such, but as an illustration of integration of national sociocultural environments into the space of communications that are peculiar to highly developed industrial countries suggesting complex systems of communication exchange and information circulation. Then, being commercial projects, such systems acquire a status which is beyond this framework. It involves the formation of international meta-communication platforms based on unified standards of participation in such information and economic exchange, possession of the protocols for this participation. Such a result fits perfectly into the content of the concept of the McDonaldisation.

In such an environment, an innovation gets a status of an ideologeme for a mass actor. Being a cross-cultural trend, it emerges from the process, rather than from the content of communication, which has the status of a targeted rational exchange of information in Industry 4.0. Being the next stage of the industrial revolution, this system quite adequately has a need for the formation of impersonal high-tech information and communication products, primarily in the form of networks. Like the current Industry 3.0 and in general like any highly organised transnational or even a national industrial system, it operates on information and functions in interactions that are identifies with the depersonalised types of socio-economic actors that produce it. These actors are represented by network operators that do not have actor-personal identification and are more and more often artificial subsystems organised according to the principle of «machine-machine» communication.

Even at the very beginning of the 21st century, sociologists noted that computer communication networks entail consequences for actors of theorising. At present, while managing the system of the modern world multinational economy, a person does not have an adequate apparatus of perception, cognition and internalisation of hyperspaces (Romanovskiy, 2000) [32]. This can be exemplified by systems of complex logistics of transnational corporations and similar dynamic mega-structures. It has been noted that the relevant situations occur now when it is impossible to control the interaction of powerful supercomputers. For example, when two corporations merge and two super-systems of document circulation combine, a person does not practically understand the meaning of what is happening, hence the world of machines emerges (Budanov, 2015) [33].

5.2. The problem of cyber-physical society

Let us try to consider the problem not from the standpoint of philosophical and scientific reflection but from its social representation.

The inability of an actor to determine his/her environment in terms of objective categories generates the need for a new type of observer - an observer of complexity (Zolo, 1992). This circumstance is especially important for a social actor of a modern complex society; on a mass scale, it not only generates the problem of reflexive complexity but also complexity of reflection. And if D. Zolo (1992) states that actors who realise the high level of complexity of the environment in which they exist reach the state of cognitive circularity [34], we believe that this is relevant purely epistemologically. The real mass social actor is rather in a chronic state of cognitive dissonance and ambivalence of thinking. In the socio-cultural aspect, for example, this is evident as the effect of the value tightness of the consumption society described by V. G. Budanov (Budanov, 2015) [35]. And if D. Zolo thinks that such actors are aware of the complexity with which they will have to face when trying to explain and predict external phenomena occurring in the environment, we believe that they are not aware of it unless they are involved in local communities of professional scientists and philosophers, which are often still marginal in the environment of the orthodox linear positivism.

The mass social actor does not realise the necessity of applying value-reduced atmosphere of the consumer society, the mechanistic normative environment of the protocols and interfaces of Industry 4.0 new technologies and cyberphysical reality in his/her worldview. The choice of life strategies in the objective complexity of the new society is also difficult, since the movement of those strategies toward the following phases of complexity (Society 2.0, Nature 2.0, and further) is stimulated, for example, by NBICS convergence. Nevertheless, the actor existentially coheres into society and feels such a need perceiving the impulses of the sociocultural environment, being unable to objectify it. Today, there is no social institution other than producing consumer ideologemes of political structures and formations providing the performance of the task of legitimising a new industrial revolution and economic expansion which would develop and implement a normative and orientation function in the socialisation of generations. Despite various policy statements and slogans about problem-oriented learning, modern education, based on competency-based and agency-oriented approaches, does not perform a function of forming a holistic world view, which is extremely destructive in the conditions of objectifying of the trans-scientific paradigm.

The ideology of postmodernity is still filling the basic spiritual contexts of the formation of agency and its realisation by social myths and trends of technocracy. In the same vein, sacralisation of science and engineering creativity is going on for mass actors with the simultaneous fall of their social status. In such an environment innovations are of value only as a technology of mass consumption. In this case, the typology of agency is extremely simplified and includes only two types: the innovation producer and the consumer and technology as a product.

Moreover, today there is a widespread standpoint predominantly based on the M. Castells's work (1996) [36] in which he suggests that network structures, for example, virtual social networks, create a kind of «timeless time» that relieves from contexts. The elegance of these structures is undoubted and obvious. However, for the personality of an actor, any presence in reality, whether it is virtual or has some other form of the today's existence, presupposes a kind of activity which is possible only in contexts. In this case, the contextual structure, the actual coherence and the type of structuring contextual connection play a much greater role than it seems. Assuming systemic integrity, an emergent network as a complex environment is unthinkable by the actor in real social practices. He/she acts in it being localised precisely in contexts. Uunlike the «past» technologies, the modern ones, and primarily the so-called virtual networks, allow us to be present in many contexts simultaneously, taking us beyond the physical presence.

Involvement in the cyber-physical reality implies the presence of interfaces for the actor's entry into these environments and performance in them. This problem is not only of a technological nature and acute instrumentally in the process of the formation of Industry 4.0, the Internet of Things, and Smart Media. The so-called cyber-umwelts that have a hybrid nature are formed.

However, cultural globalisation and, for example, information globalisation, are not equivalent. Then, what kind of people do WEB 2.0, WEB 3.0 and higher construct? How different will their values, life principles, behavioural characteristics be [37]?

Unlike sociocultural matrices, the protocols of network cyber-physical systems do not contain any value component as their basis or it is secondary at best. Consequently, the normative component anticipates the value, forming mechanistic patterns of social interactions in such environments. However, the whole history of the socio-cultural evolution of mankind is based on the reverse process. Only those things are normalised which are important, i.e. values. In this case, when constructing cyber-physical systems and new technogenic neuro-worlds resembling a real world, it is necessary to construct their value matrix; however, it is probably impossible to apply the principles of such similarity because of their technogenic ontology. It is the algorithmised origin and the existence of cyber-physical reality which is built on the given protocols, excluding the non-linearity of human existence built both on the basis of social convergence and divergence.

In fact, this is a challenge to build «Morality 2.0», «Morality 3.0», etc. When a normative component is taken into account as the leading one, most likely an extremely rational morality will be constructed because artificial intelligence is intelligence without consciousness, and, hence, without morality. Is not this confirmation of the «protocol» thinking and the organisation of social life reducing social agency as responsibility and self-responsibility with regard to protocols, norms and algorithms.

Communication protocols of the cyber-physical reality can become (and are becoming) a semiotic seam of subject-actual contexts which used to be of a relatively autonomous, ontologically independent meaning for a person; together they form a certain socio-cultural palette. If we consider this issue, even through the topological theory of fields involving a person in various semiotic communication spaces, or, in the phenomenological language, the domains of meanings, in any case, we will see the formation of an essentially unified hybrid topological field. It is formed definitely by the content and structure of interfaces that take into account the task of integrating an acting person into global interactions of the anthroposociotechnosphere, the global area of signs and values - «Nature 2.0», «Society 2.0», etc. This is the development of information system support, of «Information Society» as a sociocultural paradigm. It is the preservation of differences in communication protocols of cultures in such an environment that is a serious obstacle to the way of their integration into the field of unified

information of artificial neural networks. Such communication as a culture of meanings generated from the goal of constructing its very process rather than from a semantic content will become semiotically homogeneous due to the social unification of these meanings born by the very language of cyber-physical reality.

In the recent past, for example, different professional belonging to the actor generated differences in meanings and provoked the search for and coordination of communication «interfaces». First of all, it was precisely the *axiological sense* that integrated professional subcultures in the general sociocultural outline. Today, the development of communication networks and single standards of control of even relatively «simple» technogenic objects generates technological unification of the professions, the functions of which are reduced to the functions of operators in all the branches of economic management. A communication culture of the *actor-user* and the *actor-operator* was being created. At the same time in the Industry 4.0 economy even the very set of operator's functions is already assigned to the technical system itself. Such an actor formally controls a complex technological system, however the actor does not intrude directly into this communication. That is, despite the fact that control is carried out, it is done according to specified protocols, i.e. mechanistically.

Therefore, it is necessary to consider the problem on a larger scale of social consequences (Aseeva & Budanov, 2015) [38] with regard to forthcoming unemployment due to the increasing complexity of techno-society and the substitution of the social actor-person in the sphere of technologised professional practices filling the disappearing niches of traditional industrial professional occupations.

In the sociological analysis, the agency problem, at least its professional component, can be considered through the content of the status-role pattern, which is currently represented in such types of agency as a person-operator and a person-user. In this case, the main criterion is the type of integration of the person-actor into complex socio-techno worlds. The producer, the consumer and the innovation expert is a somewhat different, too simplified and enlarged typology, although this typology is of fundamental methodological nature and is the basis for any other typologies in the aspect under study. After all, the type of the operator and the user can be represented both in the concept of the producer through the control of complex machines and technologies that produce other technologies and in the concept of the consumer who satisfies cognitive, hedonistic and other needs in cyber-physical and other types of the techno-reality. And this issue has a direct link with the problem of the content and state of the value-normative matrix in which such a status-role pattern is formed and is implemented.

Tolerance, multiculturalism and political correctness, as well as patriotism and national chauvinism as an antagonistic response to them, are much more circulating and, therefore, socially in much demand by globalist and anti-globalist ideologemes rather than intelligence, creativity and the like close to them and aimed at revealing human potential. This is the case of the trends of modern cyber-physical society of the near future.

6. Conclusions

We believe that the described processes are objective to a large extent and are part of the fields of self-organisation that are beyond the competence of managing technological progress. By destroying the value matrix, which has both existential and cultural-integrative significance for the social actor, techno-society replaces it with a regulatory and normative one similarly to machine protocols. Thus, the social actor unintentionally establishes a negative feedback with subject value matrices unifying them in accordance with communication and interaction standards that correspond to the standards of Industry 4.0 cyber-physic reality protocols.

Thus, contrary to postmodernists» expectations, a paradox of the effect of an inversely-proportional relationship between the processes of techno-society complicating and

personality simplifying due to this relationship is formed. Consumer values are most fully consistent with the techno-society norms and, therefore, have special stability in a supportive environment. They are a replicator competing with other replicators for the resources of the environment. These values are quite mechanistic and determined for a person only from the outside. Consequently, the formation of organic foundations of social interaction in techno-society, as opposed to mechanistic ones, is one of the most important challenges of the technological platform and the basic element of its social and humanitarian aspects. It is the correlation with social value that is presupposed by man-measurability of scientific and technological progress in its sociocultural dimension.

Currently, we see a real transition from institutional to technological determination of cultural matrices value content. Its meaning is in its other vector and replacement of causality poles. Machine interaction norms form values of a new culture. Theoretically, this is a kind of technogenic «Morality 2.0» designed to fill the value-reduced content of the mechanistic norms of the technogenic capitalism society. We believe that in the spirit of existentialism, this process can be called rationalisation. Making attempts to identify and self-identify, the actor becomes more intelligent and rational. This means that the person-actor excludes biographically non-referential domains of meanings in complex society. The communicating ideology of consumer society, which in the modern world has the form of technogenic expansive capitalism is the mechanism for the identification reference values and strategies. This ideology offers simple and understandable linear patterns of biography and creates a value deficit, emasculating the morphology of social agency, legitimising the instrumental status of innovation as high-tech consumerism in technogenic institutional myths. A short biographical project that removes the psychological costs of an unpredictable future and the social dichotomy of tradition and innovation becomes the main strategy of a person.

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