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
JEL Classification: C45; O33; P17; Z13

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1. Introduction
Ideologically, the Fourth Industrial Revolution (Industry 4.0) is a contextual environment for innovativeness 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 fascinat-}

ing 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 will have an impact on society? Which place will a social actor have in it? By whom can this social actor be typologically represented?

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 paradigmatic 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 Industry 4.0 are being written. Issues, such as virtual reality in context of Industry 4.0 (Kovar, Mouralova, Ksica, Kroupa, Andrš & Hadas, 2016) [5], moral and ethical aspects of behaviour in virtual networks (Kinnunen, Lindeman, & Verkasalo, 2016) [6], design of learning and working with new smart objects (Brooks & Longstreet, 2015) [7], effect analysis of Industry 4.0 to higher education (Baygin, Yetis, Karakoč and Akin, 2016) [8], standardisation of communication of industrial networks in Industry 4.0 (Halenar, Juhasova & Juhas, 2016) [9], technoeconomics (Grebenschchikova, 2016) and humanitarian explanation of technosciences (Aseeva, 2016) [10, 11], new values of the society (Kaminsky, 2016) [12], the idea of 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 society and the typologies of social agency in cyber-reality remain largely unevaluated.
skills of a meta-actor as an operator interacting with the sophisti cated environment (including its social aspect) within the framework of communication 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 mega-economy 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 by data integration. In addition, Industry 4.0 new strategies, which involve the formation of global economic systems and the 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 ideologue for a mass actor. Being a cross-cultural trend, it emerges from uniform protocols, 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 networked entities of Industry 4.0, such 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 of organisations 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 the present day. At the 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].

2.2. 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 live, they cannot exist, this is the case for 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 cyber-physical 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 socio-cultural 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 the trans-scientific paradigm.

The ideology of postmodernity is still filling the basic spiritual contexts of the contemporary general social thought and, 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 pre-
dominantly based on the M. Castells’s work (1996) [36] in
which he suggests that network structures, for example, vi-
tural social networks, create a kind of «timeless-time» that re-
lieves from contexts. The elegance of these structures is un-
doubted and obvious. However, for the personality of an ac-
tor, any presence in reality, whether it is virtual or has some
other form of the today’s existence, presupposes a kind of ac-
tivity which is possible only in contexts. In this case, the con-
textual structure, the actual coherence and the type of struc-
turing 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 so-
cial practices. He/she acts in it being localised precisely in
contexts. Unlike 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 pre-
sence of interfaces for the actor’s entry into these environ-
ments and performance in them. This problem is not only of
a technological nature and acute instrumentally in the pro-
cess 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, infor-
mation globalisation, are not equivalent. Then, what kind of
process do WE 2.0, WEB 3.0 and higher construct? How
different will their values, life principles, behavioural charac-
teristics 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 mecha-
nistic 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 technog-
ogenic neuro-worlds resembling a real world, it is necessary
to construct their value matrix; however, it is probably im-
possible 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 exis-
tence built both on the basis of social convergence and di-
vergence.

If, this is a challenge to build «Morality 2.0», «Morality
3.0», etc. When a normative component is taken into ac-
count as the leading one, most likely an extremely rational
morality will be constructed because artificial intelligence is
intelligence without consciousness, and, hence, without mo-
rality. Is not this confirmation of the «protocol» thinking and
the organisation of social life reducing social agency as re-
ponsibility 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 sub-
ject-actual contexts which used to be of a relatively autono-
mous, ontologically independent meaning for a person; to-
gather they form a certain socio-cultural palette. If we con-
sider this issue, even through the topological theory of fields
involving a person in various semiotic communication spa-
ces, or, in the phenomenological language, the domains of
meanings, in any case, we will see the formation of an es-
esentially unified hybrid topological field. It is formed definite-
ly by field and structure interfaces that in turn account the task of integrating an acting person into glo-
bal interactions of the anthroposociotechnosphere, the glo-
bal 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
the increasing complexity of environment, making the pos-
cible to the way of their integration into the field of unified
information of artificial neural networks. Such communica-
tion as a culture of meanings generated from the goal of
promoting the search for and coordination of communica-
tion «interfaces». First of all, it was precisely the axiological
sense that integrated professional subcultures in the gene-
ral sociocultural outline. Today, the development of commu-
nication networks and single standards of control of even
relatively «simple» technogenics generates techno-
logical 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 sys-
tem itself. Such an actor formally controls a complex tech-
nological system, however the actor does not intrude direct-
ly into this communication. That is, despite the fact that con-
trol 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 substi-
tution of the social actor-person in the sphere of technolo-
gised 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 repre-
sented 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 ex-
pert is a somewhat different, too simplified and enlarged ty-
pology, although this typology is of fundamental methodo-
nological 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 produ-
cer through the control of complex machines and technolo-
gies 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 con-
tent 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 antagonsis-
tic response to them, are much more circulating and, there-
fore, socially in much demand by globalist and anti-globalist
ideologemnes 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-organisa-
tion that are beyond the competence of managing techno-
logical 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 so-
cial actor unintentionally establishes a matrix interface
with subject value matrices unifying them in accordance with
communication and interaction standards that corre-
spond to the standards of Industry 4.0 cyber-physical reali-
ty protocols.

Thus, contrary to postmodernists’ expectations, a pa-
радox of the effect of an inversely-proportional relationship
between the processes of techno-society complexity and

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personality simplifying due to this relationship is formed. Consumer values are most fully consistent with the technogenic capitalism society. The communicating ideology of consumer society, which in the modern world has the form of technogenic ex-

pansive capitalism is the mechanism for the identification reference values and strategies. This ideology offers simple and understandable linear patterns of biography and crea-
tes a value deficit, emasculating the morphology of social agency, legitimising the instrumental status of innovation as high-tech consumerism in technogenetic institutional myths. A short biographical project that removes the psychologi-
cal costs of an unpredictable future and the social dicho-
tomy of tradition and innovation becomes the main strate-
gy of a person.

References


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