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TECHNOLOGY AND SUSTAINABLE DEVELOPMENT: TOWARDS THE FUTURE?

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Abstract. Sustainable development, care for the common good, debates on the challenges of civilization connected with the transformations of society and economies taking place under the influence of the technological factor belong to the issues most commonly covered by social researchers. The advent of the civilization of the future is becoming the much looked forward to conceptual revolution. Technology, technical innovations, technological principles are listed among the range of factors supposed to affect the future condition of the collectivity termed society today. Modern technologies are defined in categories of factors designed to genuinely affect the processes of the social construction of certain narrations of sustainable development. Authors endeavour to shed a light on the controversial role of technology in the process of the social construction of the premises of the conception of sustainable development. Technology alters the way we define the approach to valuating the issue of development in an increasingly complex world, in which it is becoming a difficult task to indicate the universal foundations of the emerging civilization of the future. Will the idea of the common good prevail over the ideological vision of a technological society based on strictly rational values of maximization?

Keywords: sustainable development; technology; technological society; values, risk; common good; social networks

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1. Introduction

Over the recent years there has been a visible change in the way of thinking about socio-economic development connected with the return to the idea of the common good. A symbol of this semantic transformation is popularizing the slogans referring to the care for the natural environment and humanistic values (Beck 1995; 1997a). Development trends, whose direct implication has become excessive exploitation of nature, maximization of world consumption, are being questioned today by experts pointing out the social costs of these processes. The

care for the future, for the common good of future generations is beginning to be defined by social researchers in terms of civilizational challenges. Ecological problems treated as direct implications of unchecked technological advancement, devoid of any reflection on the condition of civilization, are tackled by representatives of all science disciplines (Jucker, Mathar 2015; Ul Haque 2019; Tkachenko et al. 2019; Polozova et al. 2019; Smaliukienė, Monni 2019).

The first debates from the 1960s and 70s concerned the form and scope of the degradation of the natural environment (Carson 1962). The 1980s saw the emergence of world ecologism, combining the issues of nature conservation and social development (Slovic et al. 1980, pp. 181-213). In the 1990s scientists began to raise the issues of the greenhouse effect and the ozone hole (Luhmann 1990). This period witnessed a significant change of environmental and economic policy of the most developed countries of the world. The conception of sustainable development is currently acquiring an axiological status on a global scale. A change of the development paradigm is occurring alongside the creation of new social conceptions connected with the evaluation of the new technologies and development trends. Technology development is defined in social sciences in the terms of a key factor affecting the qualitative changes taking place in the crucial spheres of life. The process of technicization of a social world is accompanied by a theoretical debate on its social costs (Betlej 2017, pp. 117-128).

Technological progressivism and the vision of the technological self-destruction of the known social order belong to the mainstream research into sustainable development. The theoretical contextualization of the relationship between the development of technology, knowledge and the social construction of specific narrations of a sustainable future is an extremely difficult task (Zacher 2013, pp. 182-198). The evaluation of technology, development risks, civilization threats, safety in an individual, social, cultural dimension requires a transdisciplinary approach (Menshikov et al. 2017, pp. 585-604). One discerns a need for a new way of thinking of the future of society defined as technological, digital or network one (Douglas 1966). It seems justifiable to pose questions about the social costs of the development of complex technological systems in the process of reproduction of social order, especially of political and economic systems (Carson 1962). Technological advancement is not assessed unambiguously. Many authors call attention to the negative effects of the development and popularization of technological innovations in the world (Coca et al. 2018, pp. 185-194). Knowing the essence of the relationship between technology and the idea of a sustainable future will enable researchers to unmask the crucial relationships of the invisible technological power bound up with the negative implications of technological advancement. The analysis of these multifaceted relationships will also indicate the directions of search for the network anti-power and the civilizational capabilities of technology which may become a tool for creating a sustainable future.

Technology is an example of space and a process that has undergone rapid transformations over the course of history. It should not be defined solely as an instance of an abstract category. In modern times, technology is assuming the form of a structuralized multilevel system (Zacher 2006). Technological rationality is different from social one. Technological systems ought to be considered in the context of the analysis of modern social transformations of a global significance as entities distinct from the well-known social systems (Zacher 2006, p. 156). The development of the new technologies is also connected with civilization development, advancement. It concerns implications of the development of technologies defined as network ones, which have brought about one of the greatest modern social transformations – the advent of the digital age and the economic dominance of the digital social formation (Castells 2009; 2012). The issue of the implications of these processes is an element of the research devoted to sustainable development. The properties of the new technologies establish the framework for the emergent social order, in which there is a clash between two axiological planes connected with the civilizational assessment of social sustainable development (Betlej 2015, pp. 2-17). A sustainable future is becoming the universal common good and ideology of the inhabitants of a digital world.

What is the role of the new technologies in the process of the social constructions of axiological narrations of sustainable development in a technological society? In what vision of the imagined future of society and

technology are we moving about nowadays? Fears of technological threats are ever more serious and it is technology that plays the role of the leading actor, an animated and fettered superstructure, finally, a real driving force in the process of social transformations (Zacher 2011). Can technology become an instrument of sustainable development, the application of which will provide the axionormative foundations for a safe, stable and predictable future? While talking about technological advancement, do we have in mind a real future or rather the present manifestations of the technological social order which may undergo self-destruction under the influence of seemingly rational social actions?

2. The future uncertain

A technologically mediated future of the human civilization seems to be increasingly uncertain. The sustainable development of societies and economies building their success on the technological substrate of incomprehensible technological tools is endangered. Attention needs to be drawn to the fact of a close axiological link between technological and economic systems, a symbol of which is the global idea of maximizing development, profits, benefits, effects, goods, consumption, etc. Moral values, the common good, universal axionormative systems cease to be the aim of thus conceived progress. The technological mediation of social systems brings about axiological transformations of normative systems in many dimensions (Tvaronavičienė 2018). An example of this may be transformations of techno-social relations. Universal values, moral standards undergo the process of social redefinition. The propagated idea of being free to choose a set of moral values and principles stands in contradiction to the premises of the conception of sustainable development.

The future regarded as an example of a symbol of belief in the purposefulness of human actions is becoming epistemologically uncertain. The content that could give meaning to this conceptual notion-tool is beginning to be missing. The idea of maximizing and multiplying success which is possible to be achieved by virtue of the use of technological innovations appears to have negative consequences for the future society. The dominance of the technological imperative in a social world may result in permanent social changes, the greatest of which will be a loss of a sense of social agency and of subjectivity in a society dominated by machines. A contemporary manifestation of future problems are new areas of social technology-driven risk (Wichaisri, Sopadang 2017). An increasing degree of computerization of social life also affects the process of the technologization of social space and technicizing human activities.

The 2017 Digital Economy and Society Index (DESI) shows that the European Union is making progress in the process of technological- driven development. There is still seen a need for less digitalized countries, as it is seen on the figure 1, to do more investments in technological innovations. Future is uncertain in the context of digital divides of contemporary societies. The technological development is a very abstract notion. The Digital Single Market for sustainable development still needs more efforts to be done by the main market's institutions. There is no "one" sustainable future for the whole world. New technologies brings different implications in countries on various stages of technological development.

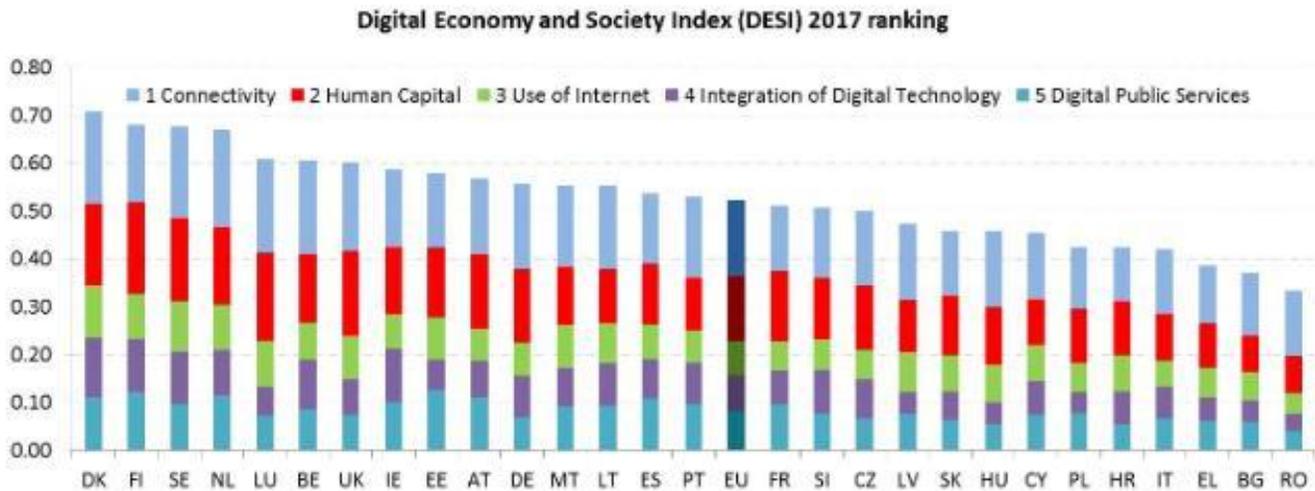


Fig. 1. Digital Economy and Society Index (DESI) 2017 ranking

Source: http://europa.eu/rapid/press-release_IP-17-347_en.htm

Technological rationality is ceasing to be contrasted with social rationality. Technological values significantly differ from social ones. Technology has a contextual, performative, progressive, totalizing character. Social values are universalizing (Zacher 2017, pp. 154-171). A technological way of thinking, connected with the development of specific technical devices (the mobile phone, laptop, tablet) is beginning to be prevalent in a society whose development is dependent on the new technologies. The stability of thus defined social order has a relative character. Social transformations in the dimension of man's biology, the way of life, of work, of running a business, science development, artificialization of the natural environment, controlling man's spirituality, constraining privacy stand in contradiction to the idea of enduring development (Raş 2017, pp.172-186). The future of a technological society appears to be a technical construct created for the needs of promoting specific technological innovations (Lavrinenko et. al. 2016, pp.155-166). Ethical considerations encompassing the issues of transformations of human consciousness and a dominance of technological values in modern societies seem to be ingored by political decision makers (Vilčinskas et. al 2018, pp. 285-297).

There can be identified two specific kinds of technologies for sustainable development. The figure 2 point the attention at the problem of co-interactions between supporting technologies and applications of a new technologies. Ethical considerations usually encompass the problem of the nature of technologies. The same technologies could be used in a different way in contemporary societies. Technology for sustainable development can be transformed into the tool of uncertainty, war, and destabilization. Technologies are enhanced by the power potencial which no neutral in the context of social technology assessment.

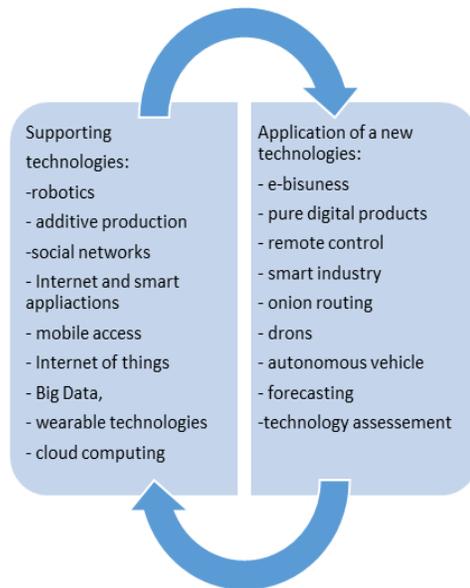


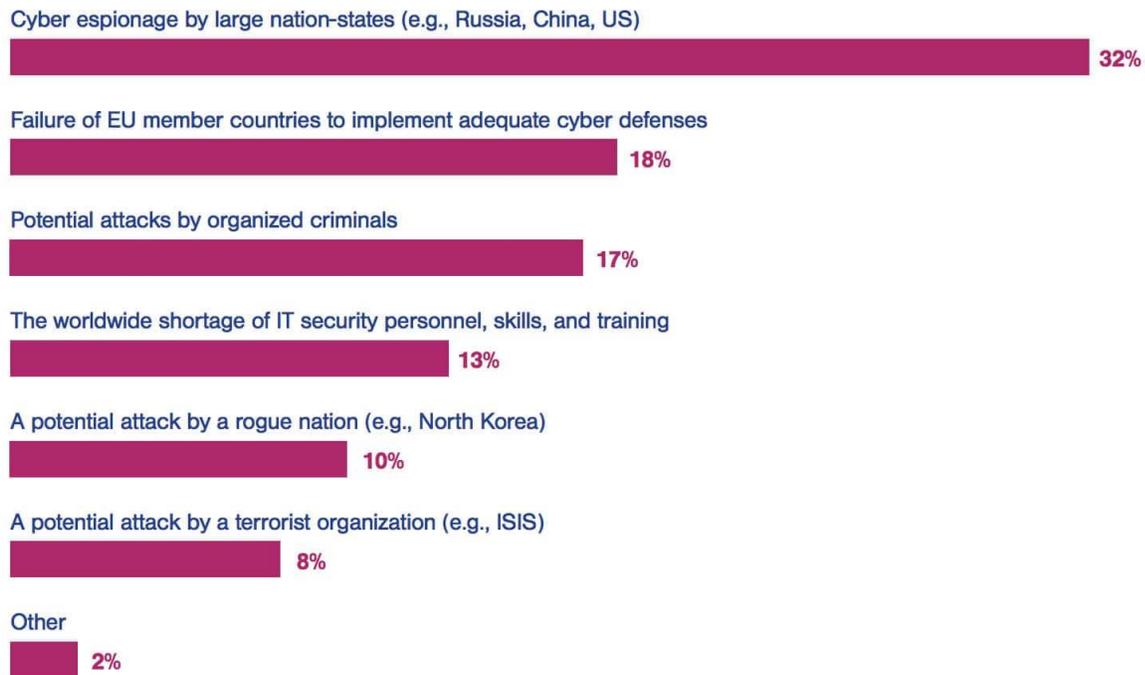
Fig. 2. Technological interactions

Source: Authors

The greatest threats of the unchecked development of the new technologies market for the idea of a sustainable future should be sought in a loss of control over the structures responsible for sustaining the social order (Davidavičienė et al. 2019). Radical transformations of social order may cause a disintegration of long duration structures, further increase of the significance of technological principles, atrophy of classical social relations in favour of the development of relational techno-systems as well as the development of new areas of technological risks. The global narration of a sustainable future seems to lose in the dispute with the technological idea of maximization. The right to privacy, anonymity and a freedom of communication, present in modern social debates, may be significantly redefined in the future. The freedom technologies are already today becoming an instrument of total control of a society dependent on technological solutions. A sustainable future is endangered also owing to the development of alternative social spaces in a digital world, such as Deep Web. Classical institutional structures, and in particular their social effectiveness, are more and more frequently questioned in the context of the emergence of new areas of threats.

Greatest Cybersecurity Threat to EU Infrastructure

What is the greatest threat to the cybersecurity of EU critical infrastructure?



Data: UBM survey of 127 European IT and security professionals, September 2017

Fig. 3. Greatest Cybersecurity Threat to EU Infrastructure

Source: Cyberx (blog) <https://cyberx-labs.com/blog/black-hat-europe-attendees-speak-critical-infrastructure-attacks-imminent/>

Cybersecurity is one of the problems which are basically connected with the technology-driven sustainability issues. As it is mentioned on the figure 3, the general abstract of security is under deconstruction in theoretical analysis. The greatest threats for future social orders are connected with technological development in all aspects. Cybersecurity, what should be underlined, is not just a technological issue in contemporary societies. A prognosis could be made that in near future this problem will be one of the great importance in the context of sustainable development strategies.

Analysing the negative aspects of technological development for the natural environment, one cannot ignore the problem of recycling no longer needed technological devices. Excessive consumption in the sphere of technological gadgets, a total technicization of all aspects of human life result in the artificialization of the natural environment and production of techno-trash.

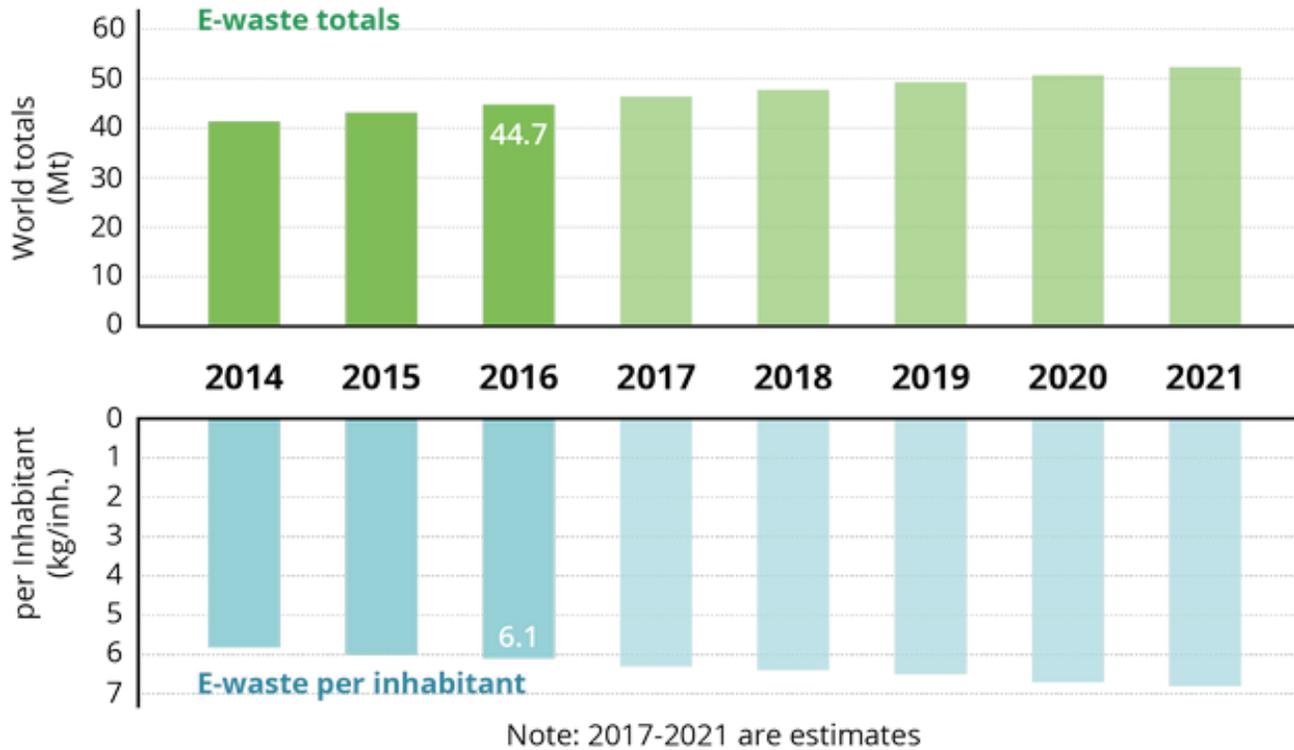


Fig. 4. Global E-waste Monitor 2017

Source: Global E-waste Monitor 2017

<https://www.itu.int/en/ITU-D/Climate-Change/Pages/Global-E-waste-Monitor-2017.aspx>

The growing amounts of electronic equipment consequently leads to greater amounts of e-waste as is it seen on the figure 4. “The Global E-waste Monitor 2017” provides the most comprehensive overview of global e-waste statistics. The magnitude of the e-waste problem in different regions will be in the next future the main problem to be solved in the policy of sustainable development. E-waste should be treated adequately to other types of “traditional” waste. It poses the same serious health issues since it contains hazardous components, including contaminating air, water, and soil, which seems not to be remembered by technological optimists claiming the digital era as the most fitted environment for humans in future. The new technologies are the factors of risk for people’s health.

More e-waste is thrashed then recycled which should bring us to make statements about the need of a new e-waste policy in European Union. A statistical analysis of the scale of the phenomenon directs our attention to traditional problems of sustainable development. A conscious use of consumer goods and promotion of humanistic values still seem to be of essential significance for potential future social micro-revolutions, the aim of which will be to restore the significance of the conception of sustainable development. The concept of sustainability needs a new policy on digitalization of natural environments and the emergence of a new problems for the future civilization.

3. Social potential of the new technologies

The development of the new technologies is also bound up with great civilization hopes. The future is to be sustainable, intelligent and safe for society which will solve most of its existential problems thanks to technology. The belief in the technological power to overcome the ills of civilization such as poverty, hunger, hard labour, a too fast pace of life, diseases, social divisions is made very clearly in texts of social techno-progressivists. They highlight the self-organizational potential of the new technologies facilitating the maximization of the social capital of humanity in the future (Zacher 2007; 2012). For years, an unabated interest in this concept category has been connected with a growing need to make use of the resources (such as, among other things, trust, social and citizen activity) which individuals and local communities have at their disposal. At this juncture, the issue of particular interest is to find, first, the determinants of the occurrence of social capital resources in various age groups of the new technologies users, second, the relationship which holds between age and the socio-economic status and the disposition to generate one of the three types of social capital: bonding, bridging and linking (Adamczyk 2016, pp. 5-13). In particular, the development of information and communication technologies is to facilitate the formation of decentralized structures without a control centre (Menshikov et al. 2017, pp.585-604).

Technology may be treated as an instrument to create a moral order in the technologically mediated civilization on condition that humanistic values prevail in an epistemological confrontation with technological rules (Beck et al. 1994). The main constituents of a social order are ethical values, norms and patterns of actions as well as institutions creating the normative and institutional moral order (Adamczyk 2017, pp.66-77). The “epidemic of cooperation” raises great hopes of a stable development of a society of the future, which will enable the materialization of the idea of socially active entities shaping social reality in a conscious way. Can, however, the human capital be treated as a resource participating in shaping a new social and moral order in the society of the future? Social order is the manner in which a society is organized and functions based on principles and rules, which are enduring and consistent with one another. These rules must be respected for it is them that safeguard social cohesion and ensure the coordination of individual and collective activities. Society defined as technological also functions based on a certain form of potential order, which ensures the coordination of fulfilling individual and collective needs. The new technologies may assist in the process of a specific stabilization of social life undergoing relational atrophy (Gondek 2017, pp.87-97).

Europeans are told to be more digitalized in all aspects of their activities. Digital technologies are interpreted as the tools for collective actions and economic development. There is no way back from the ICT revolution. The question is if the digital technologies could be environmental. The emergence of the digital era could bring a solution for environment polity. New technologies will be applied in generating vast amounts of data which could help in better understanding the models of social and economic interactions in the process of building sustainable future. The Analytics’ applications and techniques of visualization can improve the process of conceptual framing the patterns for more sustainable behavior. The experts says, the digital revolution is the first step for:” [...] improving forecasts of natural events or disasters, optimizing global agricultural production and food supply, anticipating traffic congestion and managing low emission zones, limiting energy production up to the precise needs of consumers, discovering defects in, or imminent failure of specific product components, allowing preventative maintenance that avoids failure and more costly repair / replacement” (Tardieu 2014).

An important potential of technology is the possibility of using technical devices, machines, gadgets as tools counteracting social exclusion in the society of the future. The aging of societies is currently a process considered to be the universal trend in Western European countries. Population changes termed even as social ones bring qualitative changes in the manner of defining social exclusion. The consequences of the aging of societies raise numerous concerns about the future of European countries. Contemporary reality is undergoing rapid transformations in numerous areas. The ability to adjust to the ongoing changes is acquiring a civilizational significance. Full participation in the technologized socio-economic environment is possible only for individuals

having specific technical, social and psychological competences. The ability to use the new technologies is becoming a historical necessity. A consequence of the progressive technological development is, on the one hand, the emergence of new areas of social exclusion, however, the potential of technology is also noteworthy. An example of this may be the social exclusion of elderly people, which is tackled by the conception of sustainable development. Technology has never before been so friendly to man as it is nowadays.

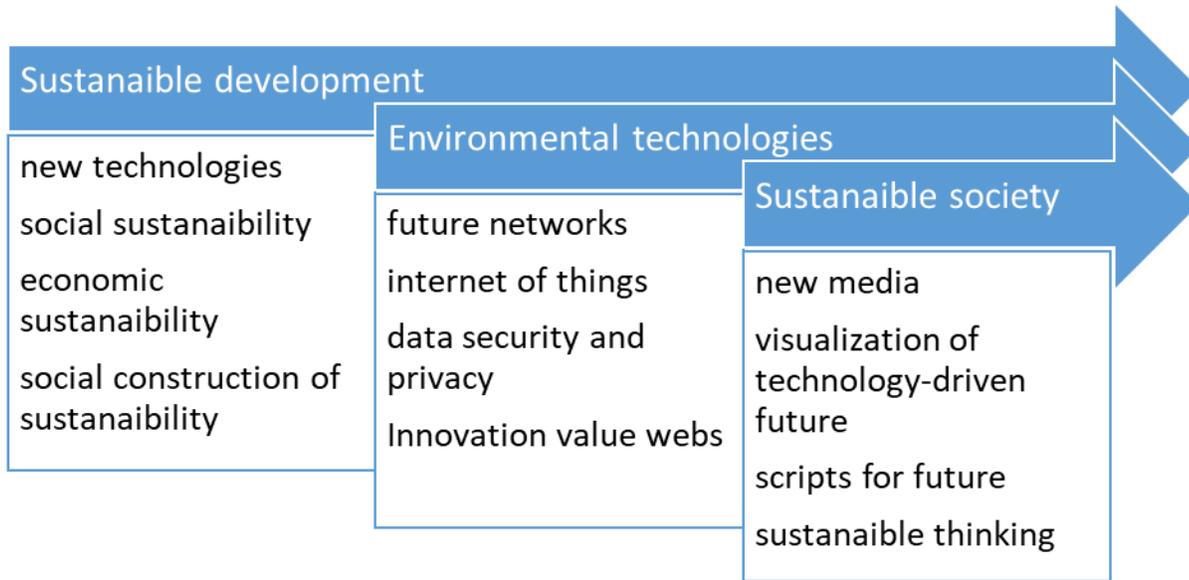


Fig. 5. Directions for sustainable based and technology-driven future.

Source: Authors

As it is seen at figure, 5 the directions for sustainable based and technology driven future are commonly accepted in the global debat. New technologies “are expected” to be smart, as well as natural environment and societies. The question is are we on the last mile to the smart civilization? Technologies are more environmental. What about the human factor? In the future, the new technologies may enable people to effectively prevent conflicts, terrorist attacks or other actions which are aimed at destabilizing social order in a global dimension. Technological products hold an essential potential for social control (Betlej 2018, pp. 38-47). Its ethical assessment also raises numerous controversies. Total control implies a loss of certain areas of freedom of activity of social actors. It is necessary to undertake multidimensional studies into mechanisms of creating new types of technologically mediated social control (Levidow 1998, pp. 211-226).

An ever increasing degree of complexity of the social world in technological civilization calls attention to the emergence of certain techno-social realities which may, to a certain extent, constitute the materialization of the idea of sustainable development. The processes of the formation and accumulation of social resources within the framework of technological systems require in-depth studies. The benefits resulting from technological development are significant in the context of creating scenarios for the future. However, each potential of the new technologies becomes a factor of social exclusion in other areas of human activity. Sustainable development, a crucial element of which, to an even greater extent, will be the new technologies, requires new management strategies (Beck 1997b).

Conclusions

Theoretical deliberations on the essence of the new technologies in terms of creating potential scenarios of the development of a sustainable civilization of the future direct one's attention to several essential issues (compare with figure 6). In the first place, it is necessary to develop efficient solutions in the domain of predictive analytics. There is a discernible need to create tools facilitating the assessment of civilization risks, identification of social and economic problems, as well as the institutionalization, on new conditions, of the processes of solving the identified problems. Technological advancement is progressing at an ever greater rate; in his surroundings man creates too many innovations, information, data, the analysis of which is not possible without utilizing technological tools in analytical processes. A miscomprehension of the new technological solutions, despite the fact of using them in everyday life, results in man's increasing alienation in relation to the technologized reality, and consequently, in a loss of social agency. A sustainable technological future requires undertaking institutionalized actions facilitating an increase of the social awareness of the new technologies users. Long-term and sustainable development will be feasible only by virtue of restoring to social actors their natural subjectivity in relation to a hybrid techno-social world.

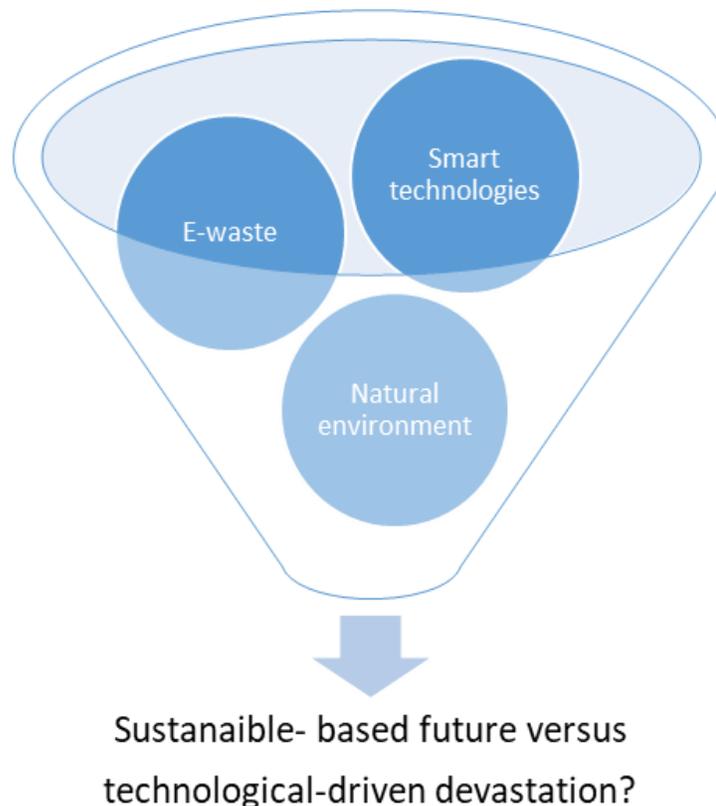


Fig. 6. Sustainable- based future versus technological-driven devastation.

Source: Authors

The challenge that sustainable future faces is solving the issues of the safety, freedom and privacy of the participants of a technologized world. The analysed issues of the dominance of technological principles over social ones require a special approach. The problem, often ignored in social debates, is of civilizational significance for the manners of overcoming these social dilemmas will condition future trends of development of a total or a responsible society.

Another technology pivotal for the future is the Internet. This solution will bring the greatest changes for the world economy and for the society of the future over the timespan of the next decades. Projects which use the potential of the Internet, things may be instrumental in accomplishing the Objectives of Sustainable Development established by the UN. This technology gives a promise of a qualitative increase based on the idea of sustainable development to less developed countries with a lower standard of living of the inhabitants.

There remains an unsolved issue of technological waste, rubbish, products unattractive to requiring customers. Are we, as a civilization, heading for the future? Does our development encompass an essential social objective, different from economic growth? The questions still remain open. Sustainable future is the goal promoted today, however, technology itself will not solve the problems resulting from a low awareness of the civilization threats connected with a broadly conceived devastation of the natural environment among the contemporary creators of the civilization of the future.

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