SCIENTIFIC-TECHNICAL DEVELOPMENT – TOOL FOR DEVELOPMENT OR CONFRONTATION OF HUMANITY?

Štefan VOLNER[1]

[1]*Štefan Volner, Department of Political Science, Alexander Dubček University of Trenčín, Študentská 2, 911 50 Trenčín*
Corresponding author E-mail address: stefan.volner@tnuni.sk

Abstract
Scientific-technical development and its importance for dynamic social development. The main directions of application of scientific-technical development: information; substance; energy and work. The key information, which form the basics and content of development of nature and society are: cosmic information, genetic information, social information and scientific-technical information. The scientific-technical system changes and will change especially all types of information radically, their application on creation of new substance, new energy, new tools and methods of work. It will change the structure of society and activities of humanity radically (from cosmos to nanoworld). This process will not be connected only with "advantages" for humanity, but will also be accompanied by various risks and threats for humanity, states and individuals.

Keywords: scientific-technical development, information, cosmic information, genetic information, social information, scientific-technical information, substance, energy.

One of the most dynamically developing area of human activity and also a subsystem of human society is the scientific-technical system. Fundamentally, it steps in the natural and social processes, makes the diversified humanity more dynamic, and changes the methods and conditions of our future development and behavior. It is an important factor of development as well as the end of humanity. Which aspects (constructive or destructive) and which process (development or confrontation) will prevail? Will be the scientific-technical development mostly a tool for development and survive of humanity or a tool for increasing confrontation and downfall of humanity (its own destruction)? The answer is very complicated and it would need thousands of pages. Therefore I will point out only few key moments of scientific-technical development, which are important to give "correct" answers to the given questions.

One of the *key and basic conditions, initial factors* of *development process* and *organization* of systems is *information.* The development of system and its new organization is not possible without information. The information is all the changes, processes, things, relations, elements, attributes, standards, knowledge etc., which forms the *starting point and basis of the organization and development of a system*. Each (natural and social) system develops (arises, functions and ceases to exist) thanks to this information. It is very important factor for ensuring the order (decrease of entropy) of systems.

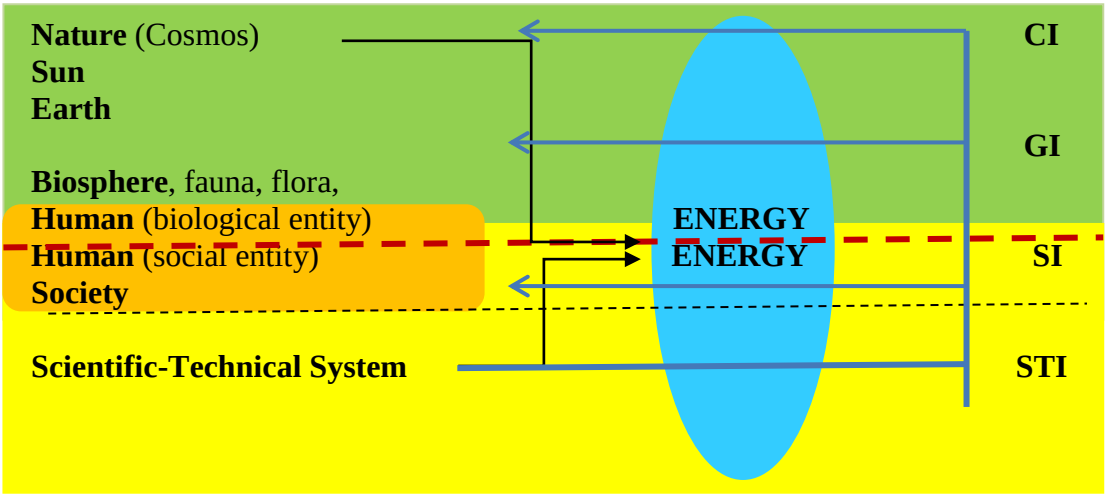
It is important to become conscious of the fact that all information has to have its *carrier and processor* (for DNA it is a living system, a book for scientific information, a computer and a floppy disc for technical information etc.), otherwise it does not survive or it becomes non-functional.

In the nature as well as in the society exists four types of information, which are, at the same time, the basics and also the starting point of construction, arrangement and motion of four *main subsystems of nature and society:*

1. *Cosmic Information (CI),* probably the first – pre-information of cosmos, nature by extension. The result is the origin and contemporary structure of *cosmos* (the equivalent of universe), including our Earth;
2. *Genetic Information (GI),* the result is the origin and existence of living systems, the whole biosphere, including humans;
3. *Social Information (SI),* the result is the origin and structure of contemporary human society (homo sapiens sapiens);
4. *Scientific-Technical Information (STI),* the result is the origin and structure of contemporary scientific-technical system of humankind (network science, technique, technology). (Figure 1)

If we divide the world into natural and social, the starting point, and the basis of origins and formation of nature will be cosmic and genetic information, summarizing term natural information. The starting point, and the basis of origins and formation of human society will be socio-information and scientific-technical information, summarizing term social information or socio-scientific-technical information (ŠMAJS, J., 2006), which is a distinctive starting point and the basis of formation and motion of scientific-technical system.
By the origins of thinking humans and human society also came into existence *asymmetry and conflict* among the development of nature and development of human society (human, humanity), among the development of

natural and social information. Since this moment, the development of social information, development of humans, diversification of humanity have happened at the expense of nature, biosphere and at the expense of natural information. Here we can see the information, genetic and system basis and the cause of *conflict among nature and society* or more precisely the diversification of nature and diversification of human society, humans. The decisive unifying basis and the cause is the *diversification of humanity*, which permanently meet with the diversification and existing order of nature, planet. (VOLNER, Š., (c) 2012, pp. 167-170). The most dynamic system (process) of exponential diversification of humanity is the scientific-technical system (scientific-technical development).



Own graphical processing

Fig. 1 **Fundamental areas, levels of nature and society**

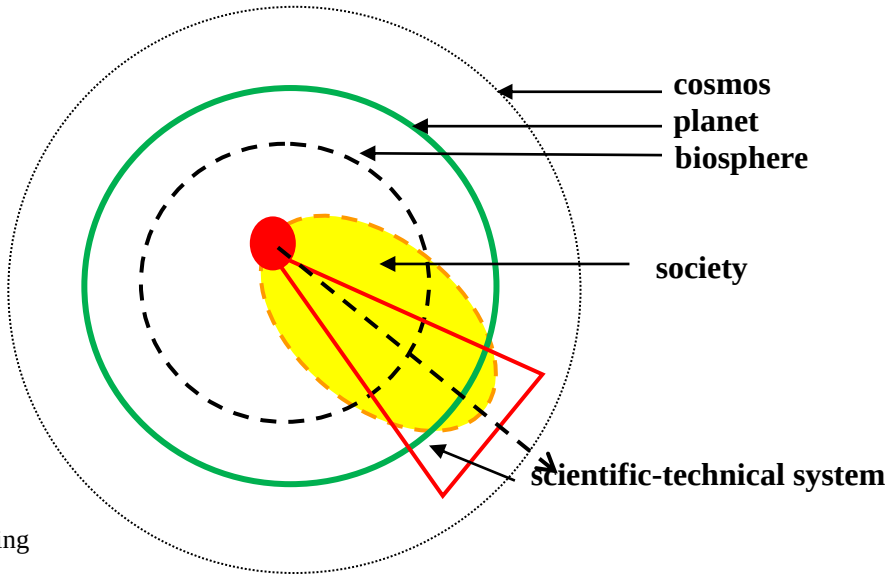
In the development (more opposing) of relationship *between the nature and society* (as well as natural and social information) is important to point out some key security moments:

- It is about one of the biggest and deepest *global conflicts*, in which the humanity set to,
- Even though the winner is known: humans will never be able to defeat the nature, they can exterminate the human society, may be, the most of biosphere or deform our planet (total nuclear or cognitive war), but they will not rule and "determine the rules" for nature; probably will know and "control" the most of fundamental natural information, but will not manage themselves,
- Human being and its social-scientific-technical information will never be able to be determining and founding information of nature, although the nature and its information can be and will be influence, change and complete largely (genetic manipulation, genetic modification of food, "artificial" life, cleavages and fusion of atoms, nanorobots etc.,
- By the intensification of conflict among nature (natural information) and society (social information), the humanity will be familiar with and meet its *limits.* If it exceed the critical borders, it will start the way of self-destruction,
- From the point of view of genetic approach, there is the following order of the origins and functioning of information and systems: cosmic information and cosmos, planetary system (Earth) and planetary information, biosphere and genetic information, social sphere and social-scientific-technical information. Ageing of systems and their information will go from the end: it means that at first, the conditions for human life and human society will get worse, then the conditions of biosphere, planet, Sun, solar system; in the development of living systems (in biosphere), the humans came as the last, but will leave our planet and nature as the first,
- It becomes a *contradictory* development (direction) of nature and society, cosmic, genetic and social-scientific-technical information; the socio-information interferes in natural information "violently", limits its motion, thanks to what it "interferes" in the creation of natural structures, development of nature violently,
- Different *pace* of development of society (exponential) and nature (organic) cause *asymmetry, imbalance and their conflict;* diversification of humanity has a higher pace as the diversification of our planet and biosphere,

- In the case of further diversification of humanity comes a noticeable increase of *energy consumption.* This is the way how humanity is getting closer to the critical limits of energy sources, which has our planet at its disposal without disrupting its balance,
- It becomes an imbalanced development if humanity and *disrupting of overall "balance"* between nature, biosphere, and among nature and society,
- It becomes the increase of planet's entropy as well as human society as the result of exponential diversification, and exponential increase of consumption and chaotic development of humanity,
- The origins of *new global conflicts,* more precisely conflicts with global range for humanity,
- The origins of new social systems (integrations, energetic, scientific-technical etc.), as the result of increase of entropy and *new organization* of humanity (New world order? Or total anarchy?). (VOLNER, Š., (c) 2012, pp. 172-174)

The basic *tool* of diversification of humanity, thanks to which it differs and separates from nature, mainly from animal world, thanks to which it intervenes constantly and "conquers" the nature, thanks to which it penetrates new spaces, makes new structures and looks for new energy for its development, is the *scientific-technical system* (including scientific-technical information) (Figure 2).

The major spaces, levels of its penetration and discovering new types of energy are especially *cosmos and nanoworld.* The main tools of diversification and penetration of humanity to the future are *science, technique and technology* (together in one new unit and quality – scientific-technical system), thanks to which it creates new (alternative) energy, new robots and intelligent machines, new information systems, virtual world, thanks to which it penetrates nanoworld, genetic structures of living systems including humans. The result of diversification of humanity is its further development, penetration cosmos and nanoworld, affection of natural processes, other types of information and systems.



Own graphical processing

Fig. 2 **Cosmos – planet - society - scientific-technical system**

The distinctiveness of scientific-technical system is also that thanks to it the humans, the humanity "exceed" the border of original biosphere, our planet; it creates artificial abiotic world and systems; thanks to it, they are able to extend their influence and social activities. It penetrates its future, cosmic space and nanowrold, it "presses" them its system, which becomes "the part" of mega- and nanoworld. At the same time, this kind of system is "subordinate" to its interests and aims, "brings the cosmos, biosphere and nanoworld under its control", makes them "the parts" of its own human system. Both of these connected processes of relationship among humans and technology will bring (except of positives) huge amounts of risks for nature and human society as well as for human itself.

The development of human depends on the nature (natural conditions of human development), and also the society, its scientific-technological subsystem. It is for sure that humans and humanity cannot exist as well as its scientific-technological system. It is dependent on nature as well as the cognitive and creative activities of humans. However, there is a risk: most likely, in a given stage of development, the technology will not "need"

humans (may be, only a highly specialized ones) and probably the nature will "get rid of them", because they will become limited and dangerous. We will have to become reconciled to the fact that the nature, in the meantime, does not need humans and their culture, science or technology necessarily for its existence. But we cannot exclude the possibility that the intelligent technology, if it is low energetic, will be able to make a "useful symbiosis" with the nature. As it was mentioned, the nature itself will "suffer from pains", which will be a danger for humans and humanities. In this process, the humans can provide help and support with its scientific-technological system. However, here is again something what will make some risks: the aggressive and egoistic nature of humans. We do not know, whether this genetically programmed biological attributes along with greediness, egoism and eagerness for power, we will be able to change positively. If this change is not a catastrophe for humanity, it will be from biological point of view (biological selection and regulation of human development) as well as from social point of view (social, political and power selection of humans, social revolutions of new generation etc.).

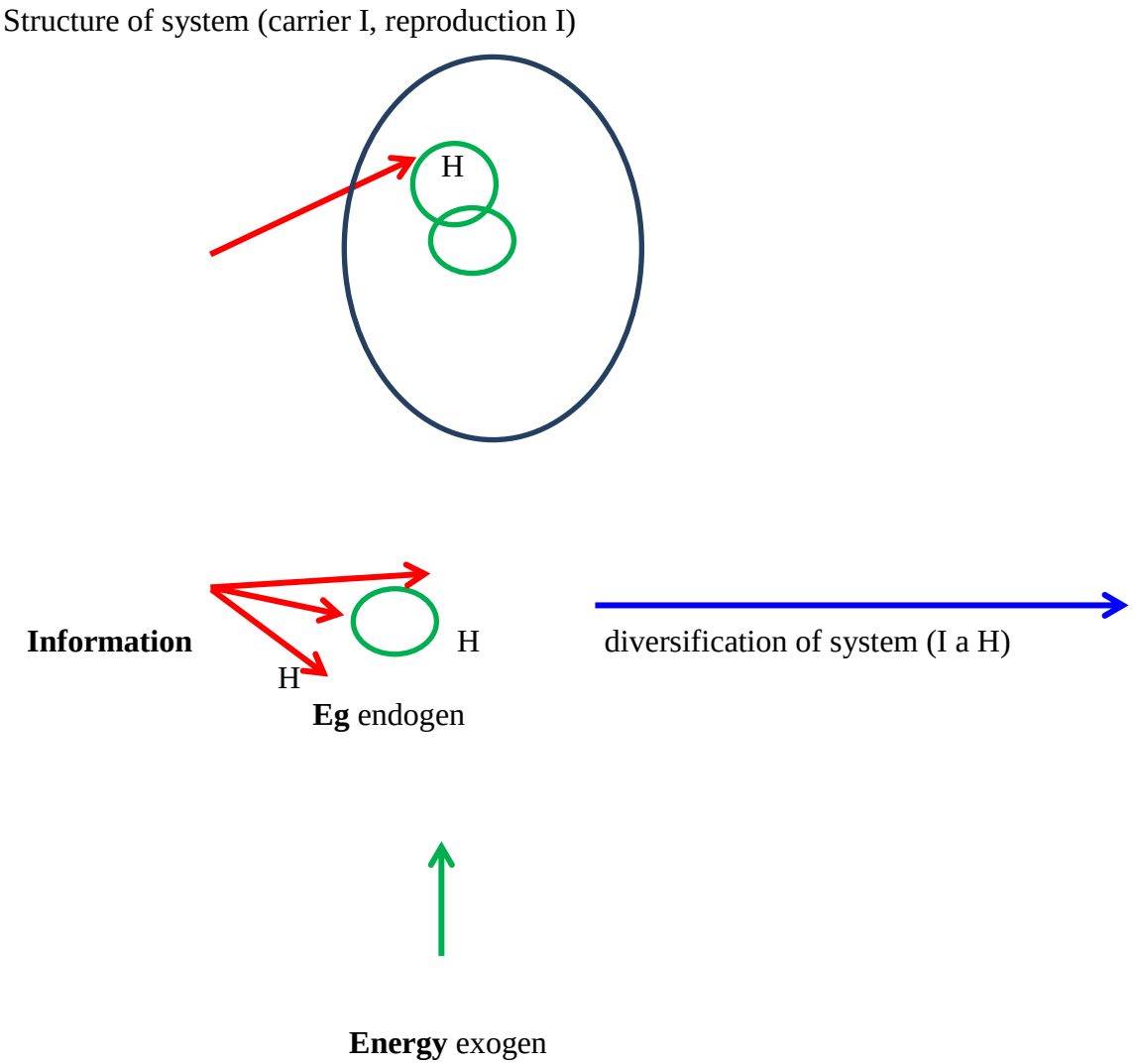
The dynamics of development of science technology, informatics, genetics etc. will be so huge that its application and applicability will be limited mainly by financial, economical sources; the ability of its mass production and readiness, and the ability of humans to adopt it and manage it.

Humans are not even able to understand the principles of functioning of contemporary science and technologies; manage and use its all possibilities and functions, and they already have a new discovery, new information, new technology, and new way of communication. Due to this given situation, there is a "danger" for humans that they will have to relinquish this ability to computers, robots and machines. What happens, if a human adopts this method of world "control" and stops to "sharpen" his/her brain? What happens, if the abyss between the ability of understanding and practice among humans and computer is so big that they become the computer's "slave" and become completely dependent on it? This would not even be a big tragedy, but what happens, when some predictions will be accomplished and the machines will be more intelligent than humans? What happens if they take over the management of society and nature from humans? What happens if the greatest powers will be the connection of computers, the Internet and robots? Nowadays, humans are already connected and communicate via communication and connection systems. One day, if we pulled the computers, the Internet, satellites, GPS, robots and communication systems apart from humans, they would panic and it would cause a chaos. Then the humans would realize how powerless they are. Of course, the humans must continue in this and due to their own safety, they should realize that the relationship among humans and machines – relationship of superiority and inferiority, the relationship, in which the humans control the computers and machines could be changed and the humans will be under the control of computers, they will be only "human" complement, so-called appendage. This is (will be) a security problem, if the humans continue in their technological development egoistic and recklessly. If this development should be irreversible, then it will be only question of time. Therefore, the humans would make some "safety measures".

The further key conditions of development of every natural and social systems (excluding the mentioned information) are: *substance, energy and work.* Thanks to their mutual efficacy, every system is formed. The importance of scientific-technical system lies in the fact that fundamentally, it influences the structure, quality and development of these elements (systems, substances, energy) and processes (work by extension). (Figure 3).
The main directions of application of results of scientific-technological development and their security aspects:

- **Nature (from mega to nanoworld)**:
  - cosmos, research and "control" of cosmos, cosmic systems, militarization of cosmos
  - atmosphere, composition (greenhouse gases)
  - climatic system (warming and cooling down)
  - magnetism and electrical system of Earth
  - movement of magnetic poles
  - lithosphere, volcanic activities
  - oceans, ocean streaming, glacier recession, hydrologic system of Earth
  - biosphere (genetic modification):
    - plants,
    - animals
    - **human, DNA !**
- **Society**:
  - Political system, sovereign states or „New world order"?
  - Social structure, demographic development, asymmetry and conflicts
  - economic system, system crisis of contemporary economic system, virtualization of financial system
  - Globalization of humanity, polarization of states, nations, humanity, global and social chaos
  - Scientific-technological development, 4. technological revolution, impact on education, social structure and employment

- energy (natural sources, renewable and alternative forms of energy)
- militarization of states and new forms of destruction
- change and replacement of humans:
  - genetic manipulation, number (reduction) „required quality“ and ability, consumption,
  - brain intervention, change of thinking and behavior, invisible control of humans,
  - development of intelligent machines (from mega-machines (cosmic systems) to nanorobots) and communication systems.



Own graphical processing

Fig. 3 **Mutual relationship among information, substance, energy and work.**

Few additional notes to the problematic of change and replacement of humans:

In connection with Contemporary (biological) human, it is important to realize three directions of application of scientific-technological development:

1. *Genetic manipulation* (modification) with human DNA. It is about the “improvement” of human genes with the aim of creation of “desired” human. At first, took place a long and uncompromising evolution of human genes. Millions of years, the genes have been developing and have stored new and new information on entire development of universe, nature, living creatures and humans. If we make progress in encoding of DNA, if we know precisely the set of genes of concrete individual, his/her instincts, talent, if we know his/her live experience, then we will know what, when and how to do. We will know earlier what he/she wants to do, if this situation comes. (WARWICK, K., 1999, p. 35). The behavior of individual human will be “free” outwardly, but in a fact it will be

already planned and directed. This human will not protest, he/she will do exactly what it is expected from him/her.

2. The creation of *mutants from mutant or artificial genes.* The contemporary humans gained some abilities: thanks to their organs to keep the contact with the outside world and to ensure the survival of their organism; and thanks to work to react to changes actively. To survive and react actively to changes meant that the humans had to acquire the ability to learn and remember the experiences, find solutions and get them into the brain as well as into the genes as a new information. This was the way how the genes, during the humans' lives, were not only reproduced, but also mutated, improved and enriched by new information, which later got to new generations by reproduction, delivering genes and reproduction of humans (WARWICK, K., 1999, p. 30). The humans "got" the function of genes carrier, adopting, reproduction and enrichment. Nowadays, we have to ask a question: what happens, if the humans develop an artificial carrier of genes and information? What happens, if several other functions, which nowadays are done by humans, are done by a kind of "half-human" or artificially created creature?
3. The creation of *intelligent machine.* If artificial cells are created, then the threat of elimination of humans from information and communication system will be higher. It is very important for the safety and development of humanity, whether humans will *hand over weapons* to machines, whether humans will start to teach machines to fight and destroy humans, whether humans will develop machines to destroy humans; machines, which, without the control of humans, independently will track, search, evaluate, make decisions and destroy. If military robots gain intelligence, independence, if they act independently, if they are connected, then it will be a threat that they will be able to active themselves and cause, for example, a thermonuclear destruction, or they will be able to turn against the humans. If nowadays a guided missile destroys an airplane, an intelligent munition destroys human habitation, an intercontinental intelligent missile destroys cities, we cannot count with the rule of Isaac Asimov anymore that a robot is not allowed to attack a human-being. (WARWICK, K., 1999, p. 183). In the near future, the humanity will be not threatened directly by intelligent machines. However, what happens in about 100 or 200 years? The activities of politicians, statesmen, corporations, universities, research departments, armies as well as a financial pressure and donations directed to this end of human beings. Humans cannot design and build machines as good as the machines. Humans are impatient, they want to be the first, to have power, profits, control and direct, and they want it by hook or by crook! Therefore they develop machines and teach them act independently and fast. This is also one of the reasons why the machines will "replace" humans in the future. (WARWICK, K., 1999, p. 200). A society, where the basic driving mechanism is a profit, competition, consumption, wealth and violence, where the humanism and morality do not work, will give everything up very soon in favor of machines and one day it realizes that there is a new species in the world, a new ruler – the machines. The machines will take control of humans from energy and ecological reasons, in the name of protection of planet. Then we will be able to pronounce for sure that the real end of history of human society will come. When the machines will take over the power, there will not be human history anymore (in classical meaning). If yes, then only as a subordinate species, which is getting closer to its end. Will it be a history of machines or other creatures? Many people satisfy with an imagination that the machines will not take over the power, because they are under the humans' control and in the case of threat the humans turn them off. Just an inconspicuous question: How do you turn off a guided intelligent missile, which is headed for humans and which was launched accidently, by failure or by virus and which continues in destruction? Who instructs somebody to stop the research and development of quantum computers, holograms, 3D printers, nanochips, biochips, new military robots and mechanical intelligence? Who prevents the computers not to collect the data on humans and on humanity into its "brain" memory? It will not be humans, because they do it intentionally with self-seeking aim. It is (will be) much more frightening in the case of military technologies, military machines and invisible nanorobots, poles (e.g. electromagnetic field) and information flow.

References:

[1] BARTÁK, P.: Vojenskopolitické súvislosti vedecko-technickej revolúcie. Naše vojsko, Praha 1986
[2] BAUER, A. – RAUFER, X.: Válka teprve začíná. Scénáře pro 21. století. Themis, Praha 2004
[3] BAUMAN, Z.: Globalizace. Důsledky pro člověka. Mladá fronta, Praha

2000
[4] BEDNÁR, R.: Za prahom 3. tisícročia. EUGENIKA, Bratislava 1998
[5] BROCKMAN, J. (ed.): Příštích padesát let. Dokořán a Argo. Praha 2004
[6] CAPRA, F.: Bod obratu. Věda, společnost a nová kultura. MataDharmaGaia, Praha 2002
[7] DAHLKE, R: Čím onemocněl svět? Moderní mýty ohrožují naši budoucnost. Ikar, Praha 2004
[8] DUNNIGAN, J. F.: Bojiště zítřka. Tváří v tvář globální hrozbě kybernetického terorismu. Baronet, Praha 2004
[9] GREENE, B. Struktura vesmíru. Čas, prostor a povaha reality, Paseka, Praha – Litomyšl 2006
[10] GRIBBIN, J.: Pátrání po dvojité šroubovici. Kvantová fyzika a život. COLUMBUS, Praha 2007
[11] JOY, B.: Why the Future Doesn´t Need Us. Wired, April 2000, In: HOWARD, S.: Nanotechnology and Mass Destruction: The Need for an Inner Treaty. Disarmament Diplomacy, Issue No. 65, July–August 2002
[12] KAKU, M.: Hyperprostor. Edecká odysea paralelními vesmíry, zakřiveným prostorem a desátým rozměrem, Agro a Dokořán, Praha 2008
[13] KAKU, M.: Fyzika nemožného, Agro a Dokořán, Praha 2010
[14] KAKU, M.: Fyzika budoucnosti. Jak bude věda do roku 2100 utvářet lidský osud a náš každodenní život, Agro a Dokořán, Praha 2013
[15] NIŽŇANSKÝ, J. a kol.: Informačná vojna v ozbrojených silách. Ministerstvo obrany SR, Bratislava 2003
[16] STONIER, T.: Informace a vnitřní struktura vesmíru. Průzkum v informační fyzice. BEN, Praha 2002
[17] ŠMAJS, J.: Ohrozená kultúra. Od evolučnej ontológie k ekologickej politike, PRO B. Bystrica 2006
[18] ŠRÁMEK, O.: Jsme zajatci budoucnosti? EKON, Jihlava 2008
[19] TOFFLER, A. – TOFFLEROVÁ, A.: Válka a antiválka. Jak porozumět dnešnímu globálnímu chaosu. Dokořán a Argo, Praha 2002
[20] VOLNER, Š.: (b) Bezpečnosť ľudstva. Planéta, Vedecko-technický systém, Vesmír, Mikrosvet, Bratislava, IRIS, 2012
[21] VOLNER, Š: (c) Bezpečnosť v 21. storočí. Bratislava, IRIS, 2012
[22] VOLNER, Š.: (d) Príroda, klíma, ľudstvo. Je vývoj našej planéty pre ľudstvo bezpečný? Bratislava, IRIS, 2014
[23] WARD, P. – BROWNLEE, D.: Život a smrt planety Země. Dokořán a Argo, Praha 2004
[24] WARWICK, K.: Úsvit robotů. Soumrak lidstva. Vesmír, Praha 1999
[25] WHITEHEAD, A. N.: Věda a moderný svet. Pravda, Bratislava 1989