TECHNOLOGY-DRIVEN GENERATIONAL AND DEMOGRAPHIC INCOMPATIBILITIES (The Future Perspective)

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In the advanced countries the present demographic trends (low or negative population growth, life prolongation) generate a new social stratification based on age criteria. A new generational composition of societies is emerging. This new age stratification has several indicators, e.g., consumption structure, income disparities, differentiation of interests and values, level of dependence on others, etc. Some differences become incompatibilities. The reason for these incompatibilities is not really age per se but factors related to age: technological competences, proportions of new and old knowledge, and also aspirations of people. The decisive role of new technologies (especially of information and communication technologies (ICTs)) seems rather evident. To a great extent many new problems nowadays are technology-driven. So cultural ability to adapt to this situation and positive applications of the new technologies is necessary to cope with the incompatibilities. However, some tensions, lack of communication, and misunderstandings may occur. Some technology-driven incompatibilities between so-called digital natives and digital immigrants, and also digitally excluded people can be a problem not only domestically but globally as well. The future perspective of aging societies may be a kind of technologically-aided gerontocracy. Transhumanistic and posthumanistic perspectives become not only a matter of s-f. The rapid advances in science and technology make these perspectives more and more real; they determine a framework of further development of civilization and man's relations with technology.

Keywords: ageing society, technology-driven incompatibilities, cultural ability

A new age stratification of society is emerging. It is connected also with other indicators such as the structure of consumption and income, not to mention specific interests, values, and expectations. Let us show schematically this situation-- its description and its consequences.

- Factors of structural demographic change in the advanced countries
 - Low or negative population growth

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Not many children   ⟶   Additional factor

Not many youth   - migration
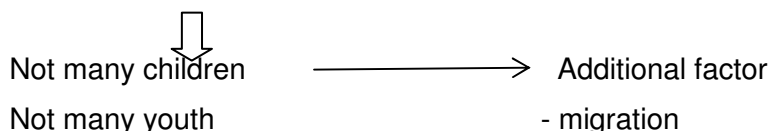
  - Prolongation of human life

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A lot of old and very old people

- Effect: reverse of the traditional ("natural") demographic pyramid (Fig. 1) , i.e., a change in the age structure of society

Fig. 1. Demographic pyramid or structure of aging process of the advanced societies (reverse of proportion)
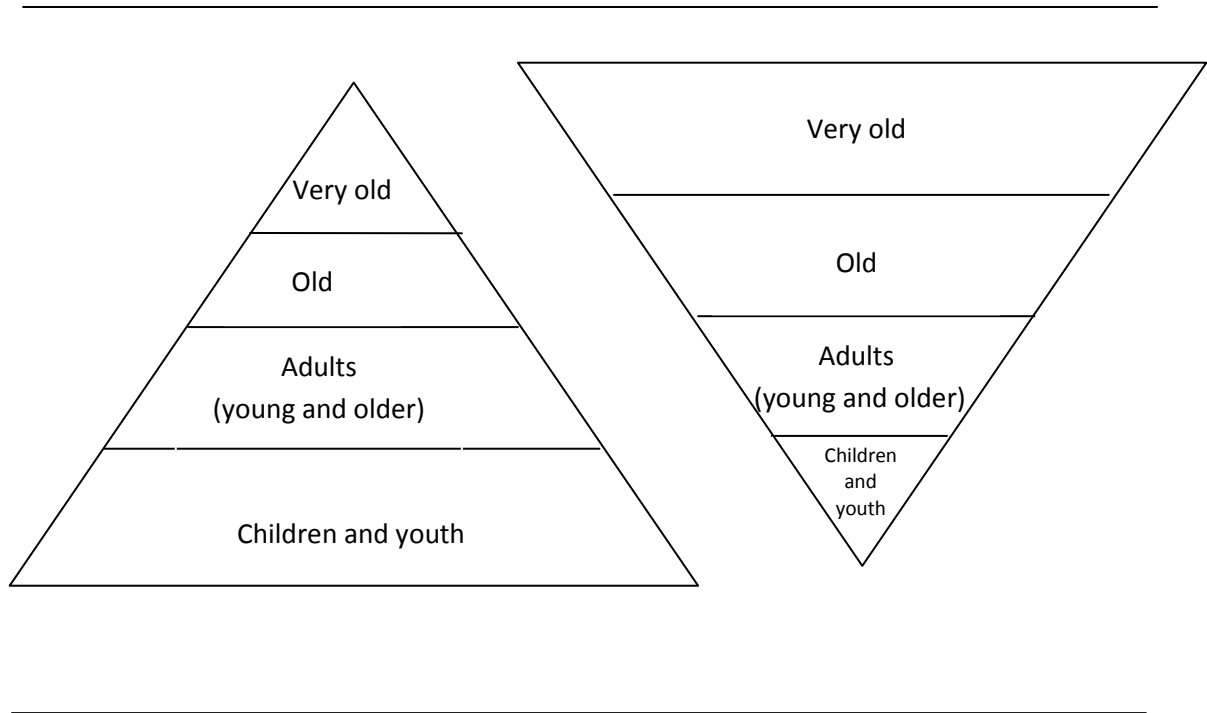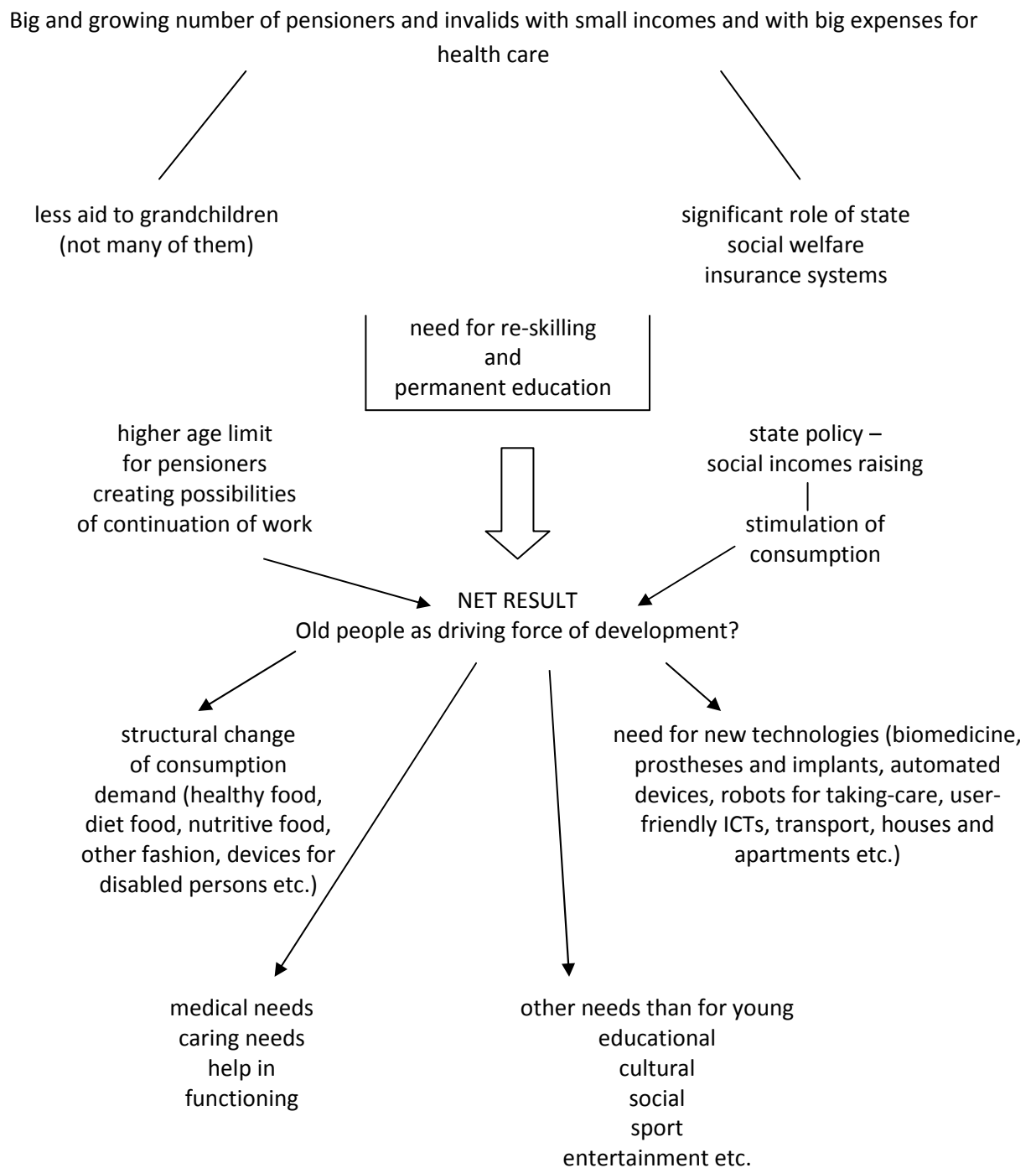

- So the change of proportions of generations emerges

Number of	children	–	diminishes
	youth	–	diminishes
	adults	–	simple or reduced reproduction
	adults (advanced age)	–	growing
	very old	–	growing

These two last social groups were economically, politically, and socially marginalized and treated as a burden for society (in many not-rich countries, not to mention less developed countries (LDCs)).

- Economic consequences (see Fig. 2)

Fig. 2. Possible growing role of old people

Big and growing number of pensioners and invalids with small incomes and with big expenses for health care

less aid to grandchildren
(not many of them)

significant role of state
social welfare
insurance systems

need for re-skilling
and
permanent education

higher age limit
for pensioners
creating possibilities
of continuation of work

state policy –
social incomes raising

stimulation of
consumption

NET RESULT
Old people as driving force of development?

structural change
of consumption
demand (healthy food,
diet food, nutritive food,
other fashion, devices for
disabled persons etc.)

need for new technologies (biomedicine,
prostheses and implants, automated
devices, robots for taking-care, user-
friendly ICTs, transport, houses and
apartments etc.)

medical needs
caring needs
help in
functioning

other needs than for young
educational
cultural
social
sport
entertainment etc.

- demand potential – consumption and stimulating technology and modifying its directions (also R&D directions and expenditures)
- asset potential (savings, cumulated goods)
- carrier of continuity, traditions, heritage, social memory

To sum up: The old people – living longer and longer, with better health and various technological "helpers" can be productive and active in many sectors. Their potential (skills, experience, savings, market demand) may be of growing importance to the economy. In the scarcity of young people they should work longer and have decent incomes stimulating consumption demand. Their different – as compared to young people – needs may stimulate research, technologies, production, services, etc.

- Other effects and impacts:

Reconfigurations of forces of political influence (the old people as electorate and local social activists).

The main domains and types of influence:

- innovation policy (biomedicine, genetic engineering, life prolongation technologies and pharmaceuticals, automation and robotization, friendly-user technologies),

- in the field of work and skills (no age limits for working life, more telework, reskilling and lifelong education, possibilities for part time jobs and work for the disabled),

- in the economic sphere (pressure on systematic growth of pensions, social welfare, etc., no legal age limits for work, tax reductions, lower insurance, pensions systems supported by state and also businesses),
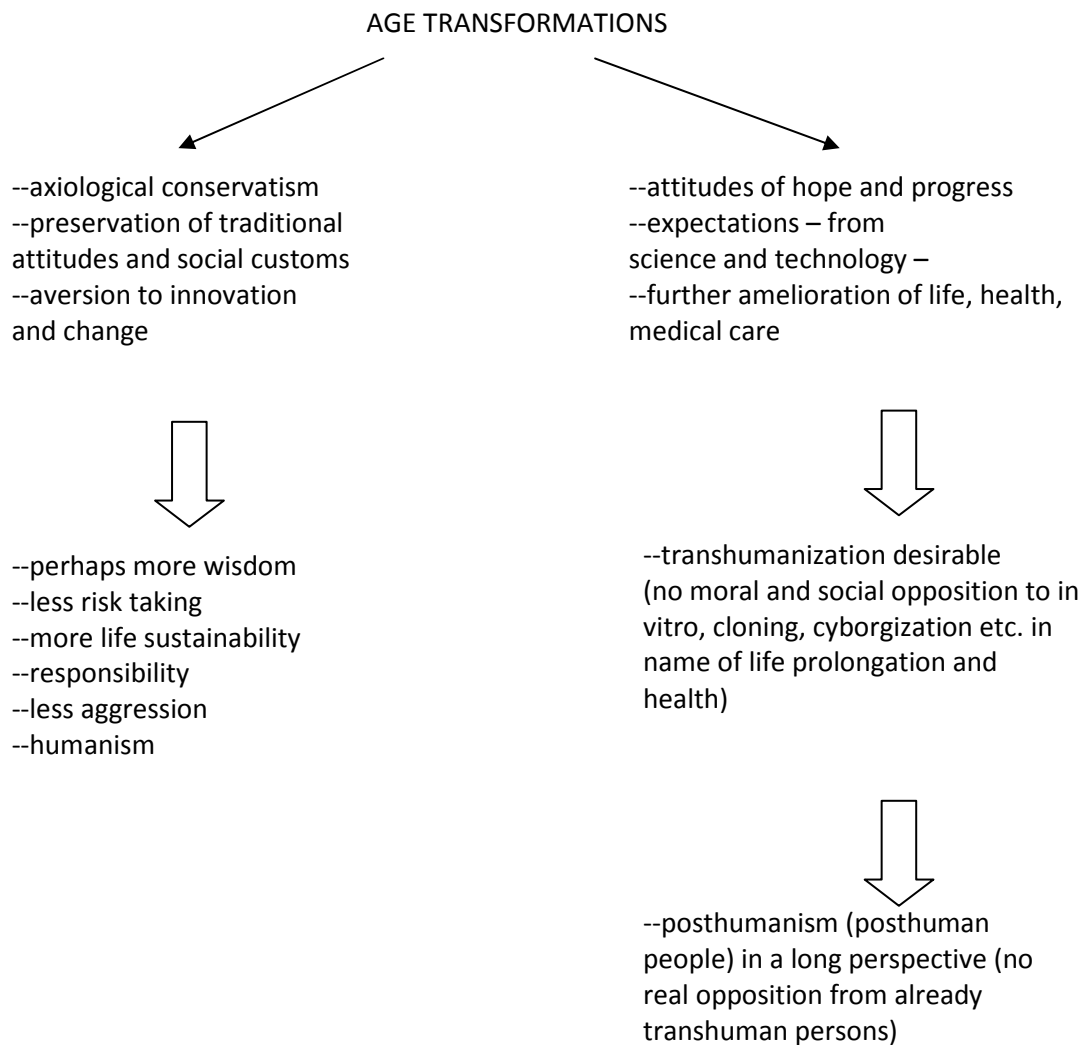
- in the military sphere (because of lack of young men – more stress on robotization and automation of army, diminishing of scale of armies, their increasing professionalization, diminishing of political and social significance of armies, i.e., an increase in civilian societies, reconfiguration of pressure groups and power institutions. Moreover, the life-prolongation and comfortable living may generate attitudes for anti-conflict and anti-war policy),

- in the sphere of human aspirations (a possibility of gerontocracy – as necessity in face of lack of young people and of the old powerful electorate; preserving traditions and values; social competences (within the old population in particular); influence on social policy and health care policy; diminishing prospectiveness (time horizon) of thinking, decision-making and acting; conservatism, possible psychological opposition to innovation and change).

The most important perspective (prognostic) question is the following: What will be the result of the aforementioned transformations: a new development potential or regress?

There are two main possibilities (illustrated in Fig. 3).

Fig. 3. Age transformations and their possible impacts for human development

AGE TRANSFORMATIONS

--axiological conservatism
--preservation of traditional
attitudes and social customs
--aversion to innovation
and change

--attitudes of hope and progress
--expectations – from
science and technology –
--further amelioration of life, health,
medical care

--perhaps more wisdom
--less risk taking
--more life sustainability
--responsibility
--less aggression
--humanism

--transhumanization desirable
(no moral and social opposition to in
vitro, cloning, cyborgization etc. in
name of life prolongation and
health)

--posthumanism (posthuman
people) in a long perspective (no
real opposition from already
transhuman persons)

This is of course one possible scenario of development of human populations in the aging societies. It is assumed (predicted) that in a long perspective (20-50 years) a growing number (and growing significance) of elements of so-called transhumanism will emerge as results of increasing artificialization of people (prostheses, implants, artificial body parts, etc.) which will end as radical cyborgization (as an effect also of progress in artificial intelligence (AI), further development of automation and robotization, biomedicine, brain sciences, genetic engineering, biotechnologies, cloning, etc.). These processes will be significantly stimulated – in the psycho-cultural sphere – by the converging media with their artificially created world (simplified and often censored – see e.g. Zylinska 2002, Lovink 2003, Cohen

2005). A major role will be played by the Internet (see e.g. Flichy 2007) and virtual reality (VR) technology (see writings of H. Rheingold). Scenarios of technoscience of the future are easier to imagine than the scenarios of cyberculture (e.g. Aronowitz 1996, Spiller 2002, Senge 2004). Anyway, probably the distant future will be technologized and sociotechnical (see e.g. Johnson, Wetmore 2009) and posthuman technologies (and creatures) are difficult even to imagine (except for s-f, see Dinello 2005).

Of course, all the future scenarios should – as all analysis or empirical research – be limited or in other words linked with time and space and related to diversities of societies, religions, cultures, stages of development, etc.

Probably some clear techno-cultural transformations will appear in advanced and rich e-societies (with some margins of excluded people). In the less developed world (which is a majority of humankind), this kind of development may not be common but marginal or enclave type, however, the globalization and global networking connected with technology transfer, transnational corporations (TNCs), global media, migrations, and cultural imitation will have an influence. But in the LDCs the demographic situation is different, so they may be delayed in the developmental stages. The question is how these two worlds of technology, of demography and of culture will function depending on how technology is produced and used. Conflicts regarding technological interests will be possible.

In the distant transhuman and posthuman future (if it develops) the difference between level of technologization and artificialization of humans may lead to a degree of technological stratification not known before (technology-rich *vs* technology-poor). The relations and cooperation among people will be facilitated by technological interfaces. The open question is, which groups will be dominant in the postpolitical, postnational, postsocial, sense, but also which groups will be more network-driven and technological? What will be the significance of info-masses and excluded groups? The interesting question is whether a change in age structure will have a significant effect on these dimensions. Anyway, what is important from the point of view of technology and society (people) relations is the

growing dependence of people on technology, especially in the developed world, not only in the fields of communication, production, and services, but also in health care, longevity, duration of functioning, and performing power.

- The changing role of women will mark a new era in the future as well.

In the aging rich societies there will be fewer and fewer marriages, children, and grandchildren, and more informal or temporary relations. Reproduction technologies will probably be changing; technologies of rejuvenation will become very common, also life prolongation; feminization of society (women live longer); more activism by women, more education, work, careers in politics, business; growth of feminism, eco-feminism; emerging "feministic mindset;" significant influence on politics, law, and R&D; orientation toward needs

of women – medical services, beauty surgeries, life and youth prolongation; more *in vitro;* more single mothers; less time devoted to children, who will be raised by TV, Internet; and in the very long run, more cloning and robots to raise children; women become "bionic"; resulting in declining populations, less pressure on the planet resources, and feminization (the end of patriarchal relations).

• Intergenerational relations will change sharply. Relations will be increasingly technologically-driven and technology-mediated. The digital generation (or so called *digital natives* – Small 2008) will function in entirely different "life spaces" than older people (*digital immigrants*). This "two cultures" situation is already emerging. Still, there are vivid traditional postulates of mutual understanding and intergenerational solidarity, heritage, and continuity. For new generations the more appropriate generational relations may be based on *game* thinking. Adolescence of the present "digital kids" may mean a kind of *cultural discontinuity*. Perhaps the older generations (still living and being in majority) will create and use some "interfaces" so as not to lose contact with entirely info (digital) generations (e.g., in research and education it could be a sort of information and knowledge brokering – Zacher 2009c). If not, incompatibilities may grow and endanger the cohesion of social groups including families and local communities.

The situation described above will have some stages. At present what we know is that the role of new info-communication competences is radically increasing, because they are necessary for purposeful and effective use of new technologies, including computer use, networking, and media. Traditional industrial societies are transforming themselves into information societies, especially in the developed world. As new technical and organizational competences are created and multiplied, they should be assimilated and massively used in all fields of human activities. This, however, requires certain *cultural ability* to be smoothly implemented. It is proved empirically that such ability – on the level of mental openness and technical skills – varies with age. Children learn quickly how to use new technological devices such as TV sets, DVD players, mobile phones, mp3, computers, and so on. They do not have – generally – psychological problems with new technologies, and they may treat using them as joy and entertainment. So the age differentiation of such abilities may lead to some *generational incompatibilities*, now and in the future.

In the present emerging info-societies (not digital societies yet) there is *technology-driven stratification*. There are the digital natives (still children, raised from birth in the digital environment), digital immigrants (adults and older people having some technical competences to use new ICTs. but not without problems), and the people digitally excluded (even in advanced societies these may be a considerable margin – uneducated, poor, homeless, disabled, very old, sick). In fact, the technical competences (theoretically access

is guaranteed for all by the overall infrastructure) are decisive. So the *competence pyramids* can be put on the age pyramids (see Fig. 4).

*Fig. 4* Pyramid of info-communication competences in the emerging info-societies (IS)
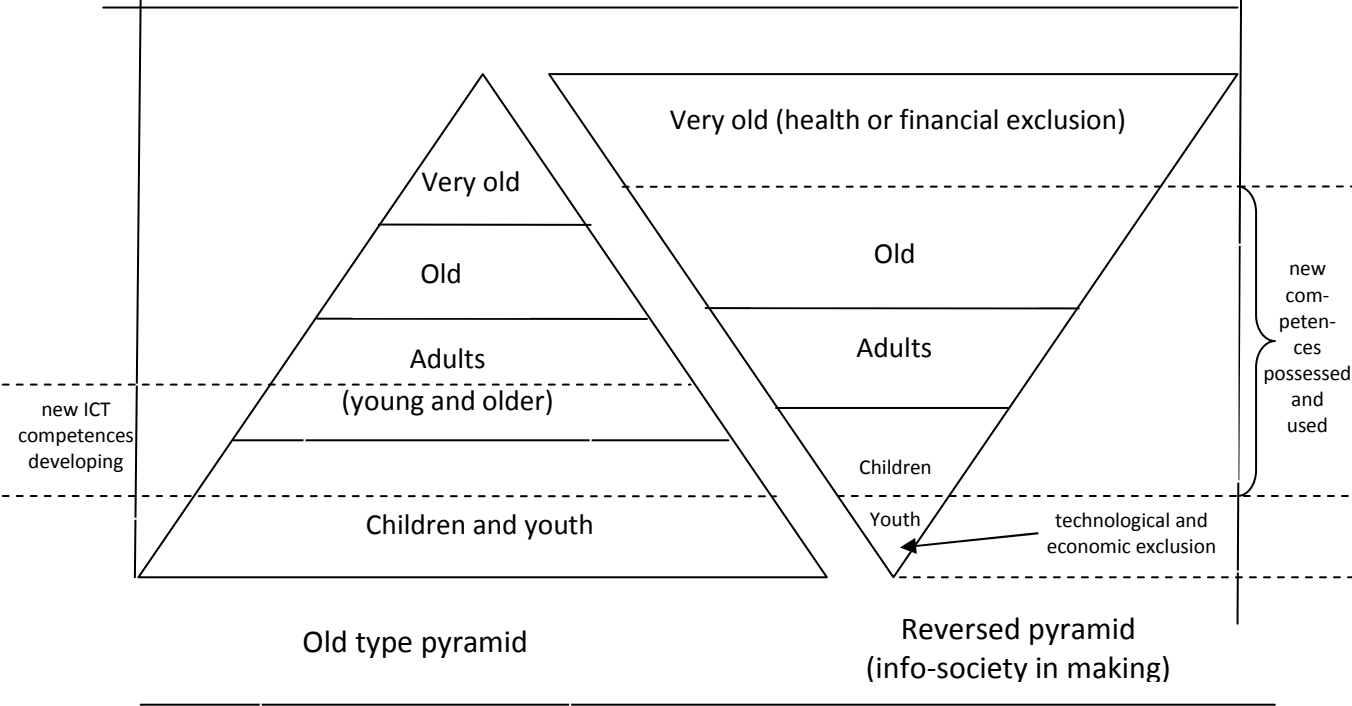
In the old type demographic pyramid the new ICT competencies are created by adults (e.g. inventors, scientists), and youth are more and more interested in using them (e.g. students). This pyramid also reflects the growing institutional use of ICTs (e.g. in banks, railways, travel bureaus). In many countries, children are introduced to computers in schools. Excluded are old and very old people, and also some adults.

In the aging societies the access to ICTs is rather common. However, the very old people (e.g., disabled, poor) and some children (from social margins or from underdeveloped countryside schools) may be excluded. The access to new ICTs will grow as schools and public institutions achieve full computerization and internet access and more services of e-government are offered (see Zacher 2007a). Use of ICTs in business is essential to gaining a comparative advantage domestically and being competitive beyond home markets. Of course, the level and effectiveness of ICT use in different sectors and countries will vary (e.g. there were many cases of the underuse or misuse, such as using computers for games in the workplace or solely for entertainment or pornography at home). Needless to say, the common access to new ICTs does not solve all socio-economic problems, such as inequality and poverty (see Wyatt et al. 2000). By the way, nothing – any technology, any policies –

could solve these problems (even in the welfare state countries). But what is really important is an emerging and growing new *epistemic culture* in societies, connected with shaping of a *new mindset* (mostly among the digital natives) and a *new Weltanschauung* connected with global networking, global information and news, global patterns of technology and consumption, and civil society activities (e.g., alter-globalism).

The longer perspective of societal development is not easy to forecast. However, it can be taken for granted that new generations of info-society will come into existence. This development would mean more *digitally competent* people – not necessary equal, just, and happy, but with some important potential to be competitive, better informed, and open to networking. Fig. 5 illustrates schematically the societal transformations toward the *higher-order info-societies* (in its generational dimension). In the future scenarios it is not possible to eliminate a possibility of the emerging new gaps, also generationally conditioned. Radical technological changes have – usually with some delay – been reflected in education and practical knowledge (also tacit knowledge).

Fig. 5 The future generations of ISs – Changing proportions of IC skills and competencies (reversed pyramids)
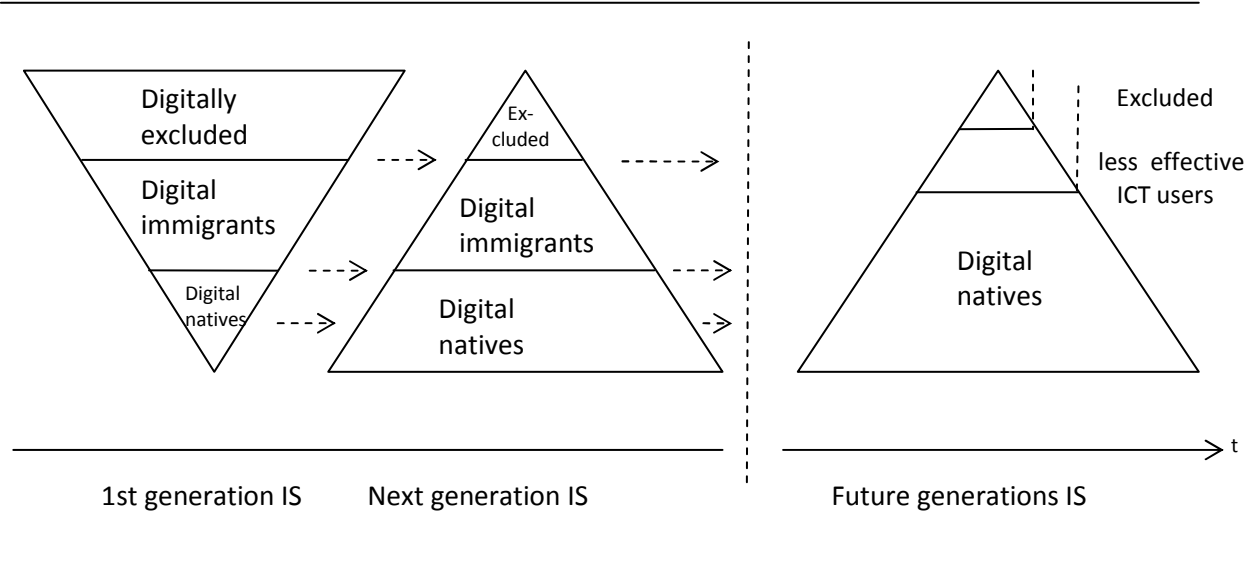
These changes will take place over an extended period of time. The speed of social learning – for many reasons (including but not limited to age) is not the same for all. So some competence gaps – intellectual, technical, organizational -- may appear and create a new social stratification (of course a higher general level of knowledge and skills). This process is schematically illustrated on Fig. 6.

Fig. 6 The future competence gap as related to radical technological changes
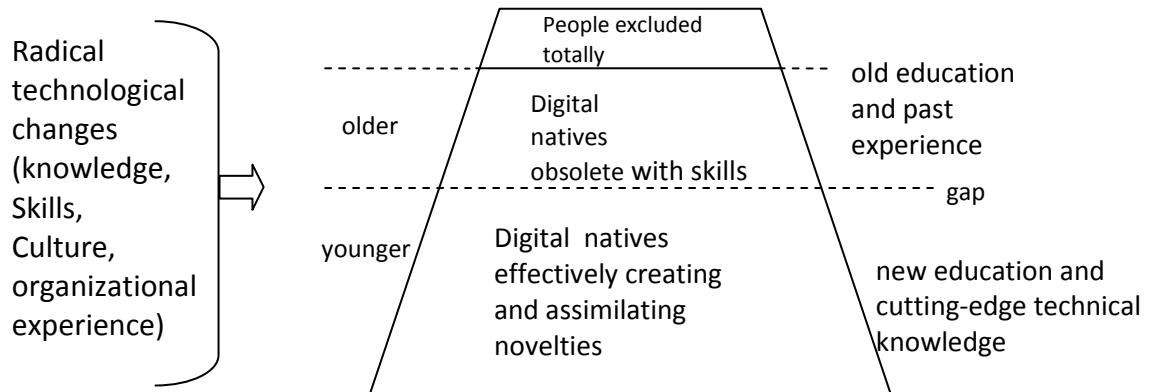
This case shows the possibility of a new gap within the digital natives (when digital immigrants have already died out) connected with the radical ("paradigmatic") technological changes (e.g., nanotechnology, bioelectronics, neuroscience) and emerging new "sets" of knowledge to be transmitted to the educational system, the media, and the public. So the new waves of technological knowledge (and their new practical applications) are at stake. The privilege of gaining this knowledge is mostly available to younger people ("late-comers") coming in the educational systems later than their older colleagues (though those colleagues may be perhaps only a few years older). The late-comers who enter an advanced post-graduate education may sometimes be the same age as their colleagues who are not taking such courses. So the differentiating criterion for these groups will be the most immediate access to the cutting-edge knowledge.

The aforementioned incompatibilities generated mostly by or with the help of technology (this is not technological determinism but a cold description of the hard facts) are not intentional or politically stimulated. The users of new technologies create – with their use – new *life spaces*. And these technologies are not "directed" against other generations or groups. Simply, the internauts function and live in this life space. Having permanent access to the global Net, they become its individualized members, its inhabitants. In cyberspace which is *de facto* their additional social and life space, they have a possibility to develop their *network individualism* (until they reach the monadic stage) and take part in various groupings, forums, Internet communities, (e.g. Twitter, LinkedIn, YouTube, Facebook, MySpace), in network tribes, and also in virtual "worlds" such as The Second Life. The network extreme individualism or even monadization (analogy to Leibniz monads) can

produce a new type of incompatibilities (e.g., psychological). However, some authors claim that this transition reflects the new (not only technologically-driven) trend – a passage from *sociality* to *humanity*.

Anyway, the more distant future of various human forms of the organization or structure may surprise us. In the meantime, for the medium-term horizon, there are also predictions of the emerging *global civil society* promoted by ICTs and stimulated by international nongovernmental organizations (NGOs). On the other side, a "natural" cosmopolitanism – especially for borderless cyberspace – may lead to a "society of strangers" (interestingly, that technological dimension has not been considered at all – e.g. Rumford 2001).

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It is a well documented tendency that the changes in the aging structure of societies is the result of longer life and diminishing population growth rate; both these factors appear in the successfully developed countries where there is a high level of hygiene and health care, mass good education, women's emancipation, etc. Global spreading of these advantageous conditions will make this tendency even stronger and extended. It is not necessary to prove that those conditions are strongly linked with technology and its applications. Technological gaps between technologically leading countries and the rest may be – potentially – overcome through technology transfer, technical co-operation, networking, foreign aid, and so on. Are there chances to liquidate or at least diminish these gaps? Some authors show that the world differentiation is growing, especially with regard to the higher level of accessible knowledge and technology, and some others point out that the new emerging powers (such as China and India which together have 2.5 billion people) are making unprecedented economic and technological progress. But still their development seems to be dualistic, because apart from this modern technology there is a lot of traditional technology and primitive societal characteristics, and also many people still in poverty. So the technology-driven changes together with demographic ones may cause in these countries even more serious incompatibilities between generations. The young, educated, dynamic people will be really technology-driven in their professional careers and private life (resembling American yuppies). The same incompatibilities apply to migrants.

Independently on the part of the globalizing world, the generationally and technologically-driven incompatibilities – cognitive, competence, axiological, in mindsets and in Weltanschauung – will constitute a practical framework of the *intergenerational interplay*. Of course, the "postmodern conditions" (described and visioned by Lyotard, Baudrillard, Bauman) in the "liquid times" make the traditional postulates of *intergenerational solidarity* (in distribution of incomes and social costs, shared interests, values and convictions) rather

unrealistic, because of the generational discrepancies ("two cultures" syndrome). Still, in social sciences and politics there are optimistic hopes and calls for consensus, a social contract, a new order, etc. This is, however, a problem not of intentional striving for conflict but something like "parallel worlds" that are indifferent and mutually strange. Yet interactions and unintentional clashes will regulate their relations. So the approach and terminology of the theory of games may be proper and helpful. It is worthwhile to note that the intergenerational games will not be necessarily zero-sum type, but also various transfers, flows, diffusions, also co-operative type games and possibilities of synergy can appear. For example, some "deficits" and "redundancies" of various generations can be mutually complementary. Perhaps the advanced societies, more and more based on knowledge and expertise, led by an elitist cognitariat, can be more reflexive in their further development (to recall Giddens' and Beck's idea of reflexivity).

It is important to consider the influence of the above mentioned changes in the generational proportions on the general demographic and eco-resource situations. The growing percentage of old people in societies (both in affluent and developing societies) may cause a decline in population growth and as result a diminishing of whole populations (of countries, regions, and the globe.) This shift may have a "saving effect" in the planet's resources and also decrease the so-called anthropopressure, the pressure of huge human masses on the "one, small and limited planet." This pressure is caused by the growing density of population (e.g. in mega-cities or highly industrialized regions), with overexploitation of resources (e.g. energy), with deficits of drinking water (for about 1 billion people), with pollution of the atmosphere, and a huge production of waste (more and more electronic). Probably – optimistically looking forward – the further effects could include the amelioration of the quality of the environment and the quality of life, better health, and many other important indicators of sustainable development. So in this scenario the smaller populations could have new advantages and new savings, which might diminish risks of various crises, conflicts, "clashes of civilizations" (to recall Huntington), wars on resources (e.g. oil, water), and make possible a more effective struggle with poverty and exclusion (not only the digital divide). It is not known, however, whether such a vision is at all possible to be implemented practically in the face of quite common pro-growth and pro-natalistic policies and their supporting convictions, ideologies, and religions (e.g. Catholicism). There are noisy appeals and calls for unlimited population growth, also warnings against "depopulation of the Earth" and against the demographic "Islamization of the world", the "end of white Christian civilization." The modern civilization – because of its transformations – was even named a "civilization of death." It seems, however, that aging societies – having rather limited physiological and health possibilities, and also limited financial and psychological resources (such as women's liberation) – could hardly listen and obey such slogans and

recommendations. It does not mean, however, that future worlds will be free of such conflicts and clashes.

It is important to recollect that the future, the changes of demographic and generational structures and proportions, their multifaceted and multidimensional – less or more distant – effects and impacts will be evaluated – not arrogantly by us – but by the next, subsequent generations which will be their "producers." It is even difficult to imagine what will be their evaluations of the past, of themselves and of the future (already being the present for them). Certainly these evaluations will be far different than ours. Can they be kept on the ideological or religious leash from the past?

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For systematic thinking on a long perspective two elements are needed: a well trained imagination and knowledge about the present breakthroughs in science, directions of future research, and experiments which are already conducted and are well financed. Having both these, one can sketch the scenarios of the long-term future (say 30-90 years). One of such scenarios could be entitled "the planet of old people" (which would be dominated by old women). Such visions have been developed on the assumption of the radical prolongation of human life thanks to achievements in nanotechnology and artificial intelligence. This scenario is professed not only by futurists but also by scientists (e.g. R. Kurzweil and M. Zey).

The role of technology is strongly underlined, because *evolution of technology* stimulates – still unfinished – *evolution of man* (this is often overlooked in social sciences). The evolutionary process of prolonging human life is still progressing. In the past there were also many advantageous circumstances and incentives for this process, e.g., advances of hygiene, boiling food, drinking clean water, progress in medicine and health care, keeping food in refrigerators, tinned food, better diet, and the like. In the 20th century this trend was radically increased by scientific and technological advances. The average life length increased by about 30 years, thanks also to massive vaccinations, and antibiotics, and technologically advanced surgeries (in cardiology, transplantology, and neurology). The second stage of this *de facto* revolution (not really evolution) will be continued in the 21st century and can prolong human life much more due to the achievements in genetic engineering and the use of stem cells and bionics. It is predicted that people will not only live much longer but will be "improved" – healthier, more efficient, even more intelligent. There are forecasts predicting the length of human life up to 300-400 years by the end of this century. If the natural population growth continues at its present rate in many regions, the planet could be rather overcrowded. Moreover, at present we cannot imagine the psyches, personalities, and identities of such old people.

The development of nanotechnologies and their massive use will probably take place in the 22nd century and will mean for people practically immortality. In other terms it can be stated that this means a passage to a transhuman era, and then to a posthuman one (whatever that would mean). Already known technologies or new technologies – in the fields of ICTs, electronics, biotechnology, genomics, medical technologies, robotics, nanotechnologies, not to mention chemistry and pharmacology – will create opportunities for a future full of people who will live longer and at the same time be healthier and and more efficient. This tendency supports our prediction concerning the possibility of gerontocracy.

It goes without saying that the struggle of medicine with sicknesses that reduce our health and finally lead to death is continuing all the time. Technology is making revolutionary advances here. The future direction of technology useful for health care will be oriented toward construction of various monitoring and measuring devices. There is research on a mobile lab, based on using a mobile phone with proper sensors and registering devices. Telemedicine has already made physical distance between a doctor and a patient meaningless; diagnoses, consultations, and even surgeries can be conducted with use of ICTs. The biggest hopes are located in medical nano-robots which – circulating in the human organism – could hit directly and destroy viruses, bacterias, and cancer cells. Moreover, they can also repair damages to the DNA code which are the basic cause of aging. Medical mini-robots facilitate the correct diagnosing, monitoring of sickness and providing pharmaceuticals directly to proper tissues. Intensive research has already been conducted, and their prototypes have been created (e.g. in the U.S., Israel, and Germany). The production of "spare parts" for the human body is not a fantasy anymore; biological parts (such as organs from stem cells) and artificial parts (various implants, egzo-skeletons, "artificial eyes") have been tested and used.

The only problem left to be solved in this struggle with aging and death is the effective rejuvenation of the brain and its partial or entire replacement. The question is posed whether it will be possible to transmit human personalities and memories to an artificial brain. In virtual space there is no aging. Creation of artificial intelligence will certainly require a long research on the human brain and on finding a way of recording of our humanity. Research on the brain mechanisms and on processes of thinking as well as on the possibility of digital notation of human personality are already advanced (The Human Cognome Project in the U.S.). Of course, nobody knows whether in the next decades the technologies, presently designed and elaborated, will be able to generate a new – from the point of view of the evolution – human species. And if so, will it be a kind of transhuman man and posthuman, or ultra-man or a cyborg? And finally, what will be the scale, i.e. the percentage share in societies and in the mankind as a whole, of this species? Moreover, what will be the

relationship of such creatures to the rest of the world that is still human? Will this species be leaders and rulers or just human-like machines serving their human creators?

Anyway, the new demographic and generational incompatibilities driven by science and technology will certainly (or rather probably) appear. The trend of the demographic and generational transformations is already quite clear. A significant prolongation of the lifespan of people seems to be not a very far future. This change will cause significant changes in generational proportions; and the bigger share of old people will result in a further limitation of reproductive capabilities, i.e. with a diminishing proportion of the young people in human communities. However, it should be noted that there are many issues to be solved before this situation occurs. For example, a serious question is whether there will be a proper (sufficiently generous) financing of the research, experiments, and technologies mentioned above, not to mention a costly and risky process of applications of results. Determining the scale, necessary expenses, and a sequence of human groups, countries, and regions that could benefit from such research seems to be rather controversial; the interests of governments and other authorities, of business and of citizens will not be the same. It may be assumed that the old generations – which will begin to play a bigger role in structures of power, science, and business – will try to stimulate such research directions. Perhaps also the young people will support such research, seeing better chances for later aging and later death. Some serious opposition may be raised by certain ideologies and religions, appealing to "respecting natural law." Also other counter-cultural groups may appear. But is it really possible to hamper such research and experiments which are tempted by a possibility of emergence of immortal species of man (while immortality is the main promise of many religions)?

The next important issue is what kind of competences will be required from the "seniors" living longer and longer, competences needed for effective use of technologies for prolonging health and life (medical techno-service only will not be sufficient). Needless to say, if the tendencies and practical solutions achieve a large scale success, some other changes will follow. For example, the structure of R&D (and their costs), education (especially technical and continuing), industry of human "spare parts" and facilitating life devices and services (techno-medical), and finally the technological culture will all have to be changed. All this may be a subject of political controversy, which can be solved democratically or by other means.

Another problem worthy of investigation is linked with the axiology (values systems) of aging human populations – both the oldest generations and the youngest ones. Will these types of incompatibilities – past, present and future – be growing or diminishing or disappearing? Perhaps in "senior societies" values will head towards uniformity because the chances of all generations – thanks to technology – will be similar. Old people, probably, will

not be apt to bio-cyber rejuvenation of their personalities. Perhaps generationality as an age status will disappear step by step (the old people will rejuvenate, the young will be getting older and will live longer and longer). Then a monogenerationality can dominate in societies or other human aggregates which will be – as a result of their evolution – emerging.

The context of the evolution of society seems to be important since it constitutes a general *framework* for the mentioned tendencies of the generational changes, their reasons, courses, and consequences. So finally the problems of multi-generationality and inter-generational relations, the incompatibilities and conflicts included, may disappear, though in various ways according to diversified socio-political, institutional, organizational frameworks. The directions of the evolution of the new organizational forms of human populations are already reflected in such fashionable "etiquettes" as *cybersociety*, *e-society*, *network society*, *virtual society*, *digital society*, and in the much longer perspective – *e-herd*, *e-swarm*, *intelligent mobs*, *monadic networked human aggregates*, *techno-human aggregates*, *transhuman* and *posthuman populations* (aggregates, groups, hordes) (see e.g. Zacher 2007b, 2009b). It is not known in what political frames these techno-social transformations will take place (be it e-democracy, e-authoritarian rules, e-totalitarianism, e-anarchy, e-ochlocracy) and what will be their impacts on the both sides of the evolution – technology and society (men, people). It is not known which elements will be dominant or how these demographic changes will influence the transformations and implementation of values, people's behavior, or inter-human (or trans- and post-human) relations. It is not known whether human relations as we know them nowadays will be replaced – in the totally marketed and macdonaldized (to recall Ritzer's term) human populations that can be also called "societies of sensations" – by the loose ties of generations living in their own artificial (virtual) worlds and being shaped by mass pop-cultural computer and network games (e.g. The Sims). Such games function in the global net as simulators of interactions of cyberspace nomads (or perhaps more precisely – monads). It is important to remember that an evaluation of this situation will be conducted (if at all) not even by the present digital natives who are the forefront of the "first digital generation" (in the CNN debate on January 1, 2010 the term "the first all-digital generation" was used) but by their further successors about whom we do not know anything.

And the last important issue is the generational dimension of globalization, its processes, causes, risks, effects, and impacts. Breakthrough innovations – in spite of intense use of global networking of knowledge and research – will appear mostly in centers dominated by the world leaders (because of their potential and capital). Diffusion of these innovations will certainly not be free (the limited amount of charity money or expenditures to protect us from global epidemics, conflicts, and crises can be neglected here). The massive application of these innovations will be the most expensive and necessary commonly

available technoservice, and the training and even research needed for their assimilation will not be free either. Probably some popular technologies will be broadly accessible, but the most sophisticated and expensive will be at first for the rich – and properly "technologized"– people, countries, and markets. New technologies for the poor (or poorer) may be – as it is now – scarce and not easily accessed. For the time being the poor are the bigger part of humankind, so probably they will not have an *ability* (scientific, technological, economic, organizational and cultural) to adapt to new solutions, technologies and devices for prolonging life, improving health and organisms, transforming bodies, and – in perspective – also personalities and identities. So the poor part of the human population may not be an object of the *law of co-evolution of technology and man* (society), but rather it will obey a kind of Malthusian self-regulation, promoting reproduction but not allowing its offspring to live too long. So there is a possibility of two, not only generationally, different ("parallel") *worlds of people*. What will be the relations between such incompatible worlds? We may hope optimistically that perhaps the global net, the global cyber-space as a new (additional *de facto*) social and human space will ease various clashes, conflicts, tensions. However, it is also possible (with the same probabiliity) that there may even be "crusades" or wars between civilizations (to name properly "clashes") – initiated and won – subsequently – by the both sides. Of course, the future is as a rule – open ended. So at present all visions of the future can be only a subject of our imagination and rather fuzzy object of debates and scenario-building. It is sad that not we but the future generations and individuals will check their accuracy.

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