

EMPLOYMENT AND THE UNITY OF SOCIAL SCIENCES

ZAPOŠLJAVANJE I JEDINSTVO DRUŠTVENIH ZNANOSTI

*Ivo Šlaus**The World Academy of Art and Science, Dag Hammarskjöld University College for International Relations and Diplomacy
Zagreb, Croatia**Svjetska akademija umjetnosti i znanosti, Visoka škola međunarodnih odnosa i diplomacije Dag Hammarskjöld, Zagreb,
Hrvatska**Abstract*

Employment and the Unity of Social Sciences are discussed. We argue that employment is the simplest and best indicator of human-centered sustainable and secure development.

Sažetak

U radu se raspravlja o zapošljavanju i jedinstvu društvenih znanosti. Tvrdi se da je zapošljavanje najjednostavniji i najbolji pokazatelj ljudima okrenutog održivog i sigurnog razvoja.

1. Introduction

The 20th century is referred as the measuring century /1/. Indeed, Gross Domestic Product (GDP) concept and its operational definition have been introduced in the 30ties by Simon Kuznets. Later various improvements of GDP such as Human Development Index (HDI), but also Environmental Performance Index (EPI), Happy Planet Index (HPI), Globalization Index (GI), Competitiveness Index (CI), etc have been formulated /2/. It is instructive to compare this flood of measurements with the development of the Standard Units in physical sciences. It took millennia before measures: meter, kilogram and second have been precisely defined and internationally accepted, and the system how to improve their precision defined and implemented. It is also important to stress that when Kuznets introduced GDP he emphasized its shortcomings. The inadequacy of the GDP have been pointed out also by Jan Tinbergen, the first Nobel laureate in economics, and also by R.F. Kennedy in one of his last speeches /3/: "GDP counts air pollution and cigarette advertising, and ambulances to clear our highways of carnage. It counts special locks for our doors and the jails for the people who break them. It counts the destruction of the redwood and the

loss of our natural wonder in chaotic sprawl. It counts napalm and counts nuclear warheads and armored cars for the police to fight the riots in our cities. ... Yet the GDP does not allow for the health of our children, the quality of their education or the joy of their play. It does not include the beauty of our poetry or the strength of our marriages, the intelligence of our public debate or the integrity of our public officials. It measures neither our wit nor our courage, neither our wisdom nor our learning, neither our compassion nor our devotion to our country, it measures everything in short, except that which makes life worthwhile". Information is very important and ICT has indeed introduced another age by allowing the present wealth of information to be developed and to be used, but nevertheless information is not knowledge, and knowledge is not truth, and truth is not wisdom, and wisdom is not beauty - to repeat Frank Zappa. Let us not overlook that the first metal to be used 11,000 years ago was gold and was used only for decoration - for beauty. Lord Kelvin emphasized the importance of measurement and stressed that unless we can measure (and define), discussion is pointless. If it is correct that measurements relevant for social sciences are rather ill-defined, is it possible to develop social sciences, notably economics. Again comparison

with physical sciences is useful: pyramids have been built and Newtonian laws formulated before meter, kilogram and second have been precisely defined. We have to address important issues with whatever we have at our disposal. One of the most serious problems facing humankind today is low and inadequate employment. We argue that employment data are now the best socio-economic-political indicator to assess development – much better than GDP. It looks exaggerating in a world faced by catastrophe that could be

caused by wars using weapons of mass destruction (WMD) and by enormous destruction of natural capital. Ecological Footprint /4/ is over 50% larger than the Earth capacity, and in two decades we will need two Earths to take care of our pollution and of consumption of natural resources). Fig.1. displays Human development index vs. Ecological footprint (expressed in global hectares per capita) for numerous countries. Vertical red line indicates Earth’s biocapacity, which is equal to 2.1 hectares per persons.

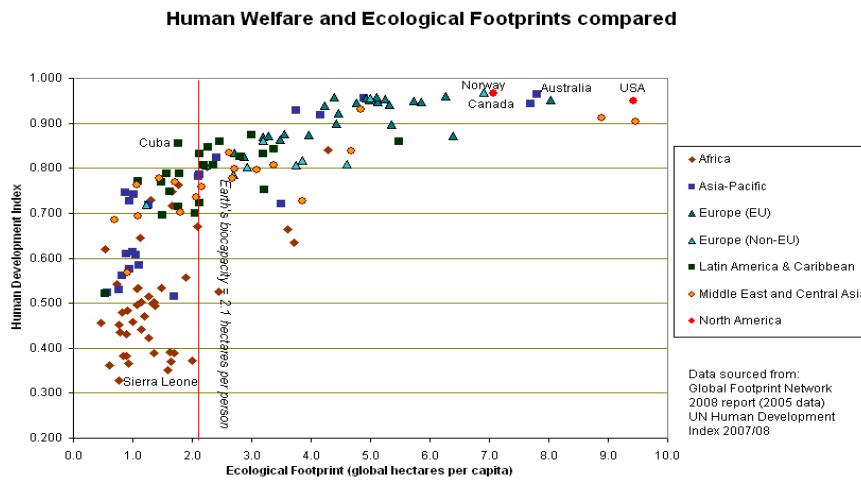


Fig. 1.

Data clearly show that many countries have huge ecological footprint which is up to five times larger than Earth’s biocapacity and their human development index is essentially constant. Consequently, enormous damage to

Earth and huge destruction of natural capital is done without any improvement of human development /5/. Comparison of Subjective well-being and happiness with GDP /6/ also show

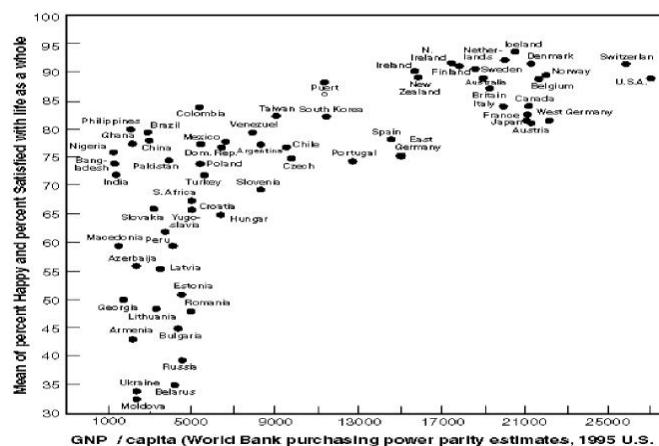


Figure 2. Subjective well-being by level of economic development. Source: World Values Surveys; GNP/capita purchasing power estimates from World Bank, World Development Report, 1997. R = .70 N = 65 p < .0000

that at GDP of \$9,000/capita subjective wellbeing reaches a plateau. Higher GDP/capita does not increase happiness. Bulletin of the Atomic

Scientists put in 1947 on its front page a Doomsday clock at 7 minutes to Midnight. When the USA and the USSR tested their H-

bomb Bulletin moved the clock to 2 minutes to Midnight, and at the end of the Cold War it was at 17 minutes to Midnight. Terrorism as well as the destruction of natural, human and social capitals forced the Bulletin to put on January 14, 2014 the clock at 5 minutes to Midnight. Compounded by East-West tensions and ISIL aggressiveness it is likely that the next clock will be set even closer to Midnight.

Nevertheless, emphasizing low employment as one of the most serious failure of our current econo-political system is not an exaggeration! Employment rate in many European countries is below 75% (actually 75% is the EU goal), and many countries have employment rates not much larger than 50%. In addition to low employment there is also under-employment and miss-employment, mal-employment compounded by unnecessary retirement making a large and constantly larger percentage of population doomed not to work. Apparently, social structure is wasting more than 30-40% of its human capital, and it seems that we are not even concerned about it. Throughout human history human capital has played a very important role even when mainly physical aspects of the human capital were used.

Before proceeding we have to answer two questions. First, how important is human capital? Is it just a minor fraction in the total sum of all capitals: natural capital: resources, biodiversity, agriculture, water, etc, and human-built capital: roads, buildings, money, etc. A recent study by Sir Partha Dasgupta and collaborators has shown that human capital is dominant /7/. Table I summarizes results presented in The Economist in 2012:

Table I
Real wealth of nations (2012): human, natural and human-made capital

| | | | |
|--------------|---|-------------------|--|
| USA (2008) | = | \$ 117.8 trillion | |
| (HC | = | 75%) | |
| UK | = | \$ 13.4 | |
| (HC | = | 88%) | |
| Saudi Arabia | = | \$ 4.9 | |
| (HC | = | 35%) | |
| Brazil | = | \$ 7.4 | |
| (HC | = | 62%) | |

| | | | |
|-----------------|---|----|------|
| Russian Federat | = | \$ | 10.3 |
| (HC = 21%) | | | |

(1 T\$ = \$ 10¹², values in parentheses list the percentage of the total wealth of each nation that belongs to human capital)

Obviously, human capital is very important. The second question is how reliable are measurements of human capital? Can human capital (and natural capital) be expressed in dollars even if corrected by inflation and corrected by purchasing power parity (PPP), and what PPP means in a global world? The value of the human capital can be qualitatively assessed by evaluating historical progress. The very fact that contemporary world witnesses numerous improvements in all domains of human activities: science, technology, life expectancy, better international and national laws, higher GDP/capita and better quality of life indicates (though it does not convincingly prove) that human capital is increasing. We argued that human capital is self-augmenting by a kind of bootstrapping process /8/.

2. Two Cultures and Three Cultures

On May 7, 1959 in his now famous Rede lecture entitled "The Two Cultures and The Scientific Revolution" /9/ C.P. Snow emphasized that science and art were becoming two different cultures. It seems that it is getting worse nowadays: split into three cultures /10/, i.e. natural sciences, social sciences, and art and humanities. However, the separation of scholarly/scientific disciplines is barely 200 years old and the term "scientist" was coined in 1833. In 1882 another Rede lecturer M. Arnold discussed whether classical education is still relevant in an age of scientific discoveries. This was the time of a debate on theory of evolution and physics just accomplished a fraction of its revolutions. Nobel laureate Sir Andrew Huxley recalls that when he was a student and wanted to switch from classics to physics the headmaster of the Westminster College accused him for "forsaking virtue for pleasure" /11/. The view that higher education overcomes these "cultural" splits was outlined in a keynote address at the International Association of Universities meeting in Zagreb in 1982 /12/. Recently World Academy of Art and Sci-

ence established World University Consortium with the aim of contributing to the fulfillment of higher education as formulated by WAAS fellow and Academia Europaea former president S. Strömholm: "University has a mission and a responsibility which goes far beyond the task of providing industry with efficient employees, marketable ideas or science-based solutions.... The mission is the production of mature, independent, critical, responsible personalities, who are not tools in the service of Church, State, party, business or trade unions. The scholars are treated with respect if they maintain their dignity and uphold their own standards against those of the world at large, in those cases where the conflict emerges, and with contempt, and soon enough as simple goods, if they accept the rules of the outside world." /13/

Natural sciences proceed through unifications. Newton unified heaven and Earth – circular motions along "perfect" circles and along straight-lines, Faraday and Maxwell unified electricity and magnetism and as a bonus got the speed of light and consequently optics. Quantum physics united physics and chemistry, and it seems biology as Jacques Monod describes in his 1970 book "Chance and Necessity: Essay on the Natural Philosophy of Modern Biology" /14/. Unification in physics proceeds on and on toward a possible Theory of Everything, but as soon as we think we have accomplished describing (not necessarily understanding) "everything", that "everything" reduces to a small fraction, i.e. less than 5% of our universe /15/, possibly just one of an infinite number of universes /16/. The fact that our universe is fine-tuned to the existence of humans led to the idea of infinitely many universes where just one has laws and basic constants fine-tuned to our existence]. On the other hand methodology and pattern of thought of physics and mathematics infiltrates into many scientific/scholarly activities. Several new disciplines are emerging such as astro-archaeology, bio-archaeology, and anthropology is for quite some time separated into physical and cultural anthropology. Most Nobel prizes in economics were given for econometrics and actually the first one was given to a former physicist Jan Tinbergen. This tendency

is quite old and as early as Spinoza's Ethics, attempts were made to use axiomatic geometrical approach to formulate social sciences. Pattern of thought of physics and mathematics is at least to some extent based on the fact that basic components of the physical universe ("elementary particles", basic constants and laws) did not change for almost 13.7 billion years (proposal by Dirac to explain a huge ratio of strengths of the electromagnetic to gravitational forces by assuming that they change with time is experimentally proven to be incorrect). On the other hand within physics and mathematics scientific disciplines develop which have significant implication for social sciences. Examples are: complexity theory (the property of a real world that is manifest in an inability of any formalism being adequate to capture all of its properties. It requires that we find distinctly different ways of interacting with system. "Distinctly different" in a sense that when we make successful models, the formal systems needed to describe each distinct aspect are not derivable from each other, B. Rosen, D. Mikulecky, Meryll Flood, S. Kaufmann and Murray Gell Mann "The Quark and the Jaguar"), fractals, game theory (John von Neumann and Oskar Morgenstern 1944) and Catastrophe theory /17/ are developing. Einstein stressed that the most incomprehensible thing about the world is that it is comprehensible, but M. Rees at the Academia Europaea Annual Conference in Liverpool in 2008 questioned "Are we capable of understanding the physical universe?" Eugene Wigner in his article published in 1960 stressed the unreasonable effectiveness of mathematics in natural sciences: /18/ "enormous usefulness of mathematics in natural sciences borders on the mysterious and there is no rational explanation for it." It is not surprising that physicists were led to introduce fuzzy logic (i.e. certain to some extent), that arguing with a friend N. Bohr said "You are not thinking, you are just being logical!", that K. Gödel showed that there are truths beyond proof and R. Penrose wrote that "reason destroys itself." /19/, that Einstein claimed that "common sense is the collection of prejudices acquired by the age of 18", that Pascal claimed "We know the truth not only by reason, but also by our heart. It is through

the latter that we know the first principle, and reason – which has nothing to do with it – tries in vain to refute it.” /20/ Is common sense that segment of our thought that is generated by evolution, and can we ask unthinkable – as e.g. in the third generation warfare, where plans are prepared for unthinkable attacks. Of course, art knew it much earlier. Dostoyevsky wrote in “Notes from Underground” that the blind faith in reason is dangerous. “The most destructive and dangerous of all religions is the newfound faith in the power of reason and perfectibility of man.” Humans cannot live by rational thoughts alone /21/.

3. Social sciences

Social sciences are focused on human beings. Contrary to unchangeable “elementary particles” and physical laws, humans undergo biological and cultural evolutions. Humans change and they change the world they live in, so that the current geological epoch could be appropriately called Anthropocene Epoch /22/. Our biological evolution accelerated 100-fold in the last 5-10,000 years. Driving forces are growth of the world’s population and changes due to agriculture and all other scientific-technological developments (Success of mutation causing to digest lactose over the last 3,000 years due to genes controlling the glucose metabolism in the brain is possibly essential for the human brain growth to the size twice that of our nearest cousin - chimpanzee, and possibly suggesting why humans do and chimpanzees do not have diabetes). Ongoing and future developments are much more pronounced starting with a pacemaker, implants and transplantations to stem cells, cerebral organoids and regenerative medicine: flat (skin), tubes (blood vessels), hollow organs (bladders made from implanted patients’ own cells), solid (kidney, heart) /23/, and synthetic biology (design and construction of new biological devices and systems that do not exist in the natural world and adapting and improving those that exist in natural world, e.g. sensitivity of sharks to magnetic fields) to be followed so that by 2020 nanomachines will be routinely used in medicine - entering the bloodstream to feed cells and extract waste, and by 2030 mind uploading will be possible and by 2040 human

body 3.0 could alter its shape and organs can be replaced by superior cyber implants. Converging technologies: nanotechnology (manipulation with atoms), biotechnology (manipulation of genes), information technology (manipulation of bits) and cognitive neuroscience (of neurons) will be integrated. It is doubtful that social sciences developed 100 to 200 years ago are adequate for our times. A brief outline of some social sciences follows: Linguistics: language is one of the most important “innovations”, but grammar and linguistics developed much latter. It was Panini in 5th century BC, India and Sibawayh in the Arab world in 760 AD, that developed grammar, though the first to use the word „grammar“ was the school of the Library of Alexandria. Modern linguistics was developed by W. von Humboldt and notably by Noam Chomsky. Mercantilism (16-18c) and Physiocrats (18c) are among the first schools in economics, though economic problems were addresses earlier by Aristotle, Xenophon, Kautilya, Th. Aquinas and Ibn Khaldun. A moral philosopher Adam Smith (his Wealth of Nations was published in 1776) is credited as a first economist and notably first political economist, followed by T. R. Malthus (1798 – year indicates publication of their most important work, respectively), David Ricardo (1817), John Stuart Mills (1848), Karl Marx (1867), Alfred Marshal (1890), J. M. Keynes (1936), the Chicago school M. Friedman (1970), Jan Tinbergen (first Nobel laureate in economics in 1969), Simon Kuznets (1971 NP), J. Schumpeter, J. Stiglitz (2001), P. Krugman (2008), A. Sen (1999) and N.N. Taleb who introduced black swan (for studies of uncertainties D. Kahneman got the Nobel prize in 2002). Sociology was studied by Confucius, Plato and Ibn Khaldun, and it is quoted in the Doomsday Book of AD 1086. Modern sociology starts with A. Comte (1798-1857), K. Marx (1818-1883), Herbert Spencer (1820-1903), Max Weber (1864-1920) and most notably Emile Durkheim (1858-1917) who set up the first department of sociology at the University of Bordeaux in 1895.

Thales, Hippocrates as well as many scholars of ancient China, Persia and India studied what we now call psychology. Modern psychology started with W. Wundt in 1897 in

Leipzig, with W. James, psychoanalysis with Sigmund Freud and Carl Jung. Then followed E. Fromm, E. Erikson, B.F. Skinner, A. Maslow and Gestalt psychology with Ch. von Ehrenfeld and later Kurt Koffka and Wolfgang Köhler. Anthropology is a study of humans and therefore a very wide area. It has developed in many branches particularly after the work of Franz Boas and B. Malinowski at the turn of 19th into 20th century. And then it comes to politics referred by Aristotle as master science. Politics – a mixture of art and science, intuition, emotion, facts and visions, leadership and collective endeavor. It seems to me that the most appropriate quote to open and to conclude the discussion of politics is from F. Schiller written in 1796 “Our century has given birth to a great epoch, but the great moment finds a stunned generation and even more stunned politicians” /24/. “It is absurd to believe that everything is going to change, but politics will and can remain the same.”/25/ Each technological development survives only when accepted and used by humans, therefore, engineering and technologies have their matching counterpart in social sciences. Since - as Julian Huxley stressed - humans are now in charge of evolution, understanding contemporary evolution implies understanding human behavior, i.e. “contemporary” evolution becomes part of social science: “Evolution on this planet is a history of the realization of ever new possibilities... through the new knowledge. It has defined man’s destiny and responsibility to be an agent for the rest of the world in the job of realizing its inherent potentialities as fully as possible. It is as if man had been suddenly appointed managing director of the biggest business of all, the business of evolution. What is more, he can’t refuse the job.” /26/ and Aurelio Peccei “Humankind became the basic factor of change in this corner of the universe.” /27/ And similarly, developing robots, ICT and, artificial intelligence are merged

with psychology, sociology, economy and politics.

4. Paradigm Change

The concept of paradigm (*Παραδειγμα*) was used by Plato in his book *Timaeus* to mean a pattern used by God to create the universe. It was again used more than two millennia later by Th. Kuhn in his *The Structure of Scientific Revolutions* /28/ to describe “universally accepted scientific achievements, that – for a time – provide model problems and solutions for a community of practitioners.” Paradigm means pattern of activity and an accepted worldview. Mattei Dogan argued in 2001 /29/ that there is no paradigm in social sciences since concepts are polysemic (having a number of meanings and understandings). On the contrary Larry Laudan (1977) and M.L. Handa (1986) introduces social paradigms /30/.

5. Employment

Full employment is desirable and possible /31/. Employment increases human capital and decreases income inequalities. Inequalities are negatively correlated with most socio-economic-health indicators: life expectancy, infant mortality and crime rate, and decrease human development index (HDI) (see Fig 3 /32/ and Table 2) Taking into account inequality HDI decreases 27% for Arab States, 33% for Sub-Saharan Africa and 30% for South Asia. Loss is largest in education (57%, 32% and 50%, respectively) and in health (24%, 45%, 34%, respectively). In addition inequality freezes human-made capital. Obviously, having several hundred shirts and ten cars freezes all those unused and unnecessarily consumes material resources and increases pollution. Gandhi stated that there is enough for human needs, but not for human greed. Adding to greed are unnecessary “needs” /33/, needs enforced upon us through advertizing agencies.

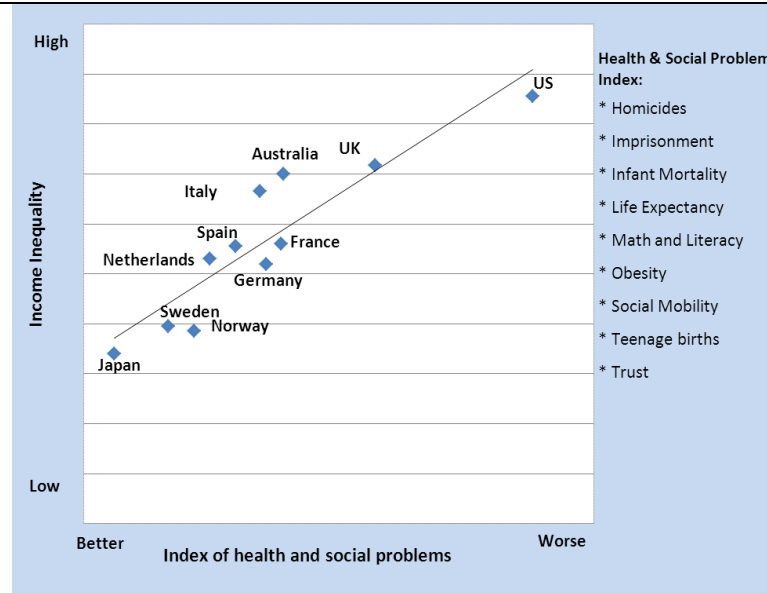


Fig 3.

Human needs include spiritual, emotional, artistic, intellectual, physical and material needs, and fulfillment of many of them require work – often jobs by other people. If there are more needed jobs than people, then full employment is possible, even demanded. Of course, it requires that people have skills and knowledge, and that again increases the need for employment – procedure to provide skills and knowledge, i.e. process we call education. Science and technology have introduced a competitor to humans – robots and various other “agents” that do human work. We already witnessed that the percentage of people involved in agriculture dropped from over 60-70% to just few percents during less than 100 years, and we witness that many other jobs are disappearing. Actually, during their lifetime our children and grandchildren will have to change their “professions” several times. Several developments are characterized by very different time scales. Our life expectancy is about 70-80 years (life expectancy doubled in about 100 years and is still increasing), knowledge doubles each 5-10 years and new technologies are introduced at the same rate (e.g. Moore’s law), demography has superimposed the demographic transition (i.e. decreasing fertility rate in many countries below 2.1) on until 2060 increasing global population reaching close to ten billions producing migration and cultural problems. These clashing time scales add to already alarming destruc-

tion of natural, human and social capitals and to highly vulnerable political structures. Where does the world go from now? Theoretically possible future scenarios are: 1) static, 2) business-as-usual, 3) incrementally and 4) paradigmatically changing world. Static world is impossible since the rate of change is increasing and drivers of change are imbedded in our society. Business-as-usual is not sustainable and leads to disaster. The question is whether incremental changes are sufficient or a paradigmatic change is needed, or most likely combination of both – incremental and paradigmatic - producing essentially a paradigmatic change (Notwithstanding quantum physics and theory of relativity, classical physics remained valid in a narrowly specified domain). Insight into human needs suggest that the “jobs” will undergo major paradigmatic change. We need and will need less and less production of material goods (they are destroying natural capital anyway, polluting the environment by enormous waste and add little to our quality of life) and we will need more and more of knowledge (just to be a citizen of a democratic country an enormous knowledge is required unless we plan to surrender to manipulation, dictatorship and self-destruction led by stupidity), more research to understand the world we live and more and more creative, revolutionary and out-of-the-box ideas to change the world to achieve sustainable, human-centered secure world. As Don Giovanni

says "To drift is to be in hell - to steer is to be in heaven." (G. B. Shaw).

Table 2.

| Country | HDI _r | (GNI-HDI) _r | IHDI _{los} | GINI | LS _(0-10h) |
|------------|--|------------------------|---------------------|------|-----------------------|
| r-ranking, | IHDI _{los} decrease due to inequality | | | | |
| Germany | 5 | 10 | 6.9% | 28.3 | 6.7 |
| Austria | 18 | - 5 | 6.6 | 29.2 | 7.5 |
| Slovenia | 21 | 12 | 5.8 | 31.2 | 6.0 |
| Croatia | 47 | 4 | 15.1 | 33.7 | 5.6 |
| RusFed | 55 | 0 | | 40.1 | 5.4 |
| MontN | 52 | 24 | 8.0 | 45.3 | 5.5 |
| Serbia | 64 | 16 | 8.0 | 27.8 | 4.5 |

Socio-economic and political world changes now quite rapidly and social sciences describing specific aspects are not adequately explaining that world. If one appreciates that social sciences deal with society composed of humans, then a human-centered approach could lead to unity of all social sciences. Achievements of social sciences during last century are enormous (just as physics achieved a lot during the 19th century but still two minor clouds led to quantum physics and theory of relativity), there is an increasing amount of observation, data and analyses, but we still lack a reasonable basic theory (and as Boltzmann stated „Nothing is as useful as a good theory“). Physical theories are guided by experimental data and the imperative of beauty since we strongly believe and have evidence that Nature is beautiful. Social human-centered theories can be guided by essential characteristics of humans, also expressed in all major cultures and religions:

- 1) *Humans have rights and responsibilities, and our basic right and responsibility are to LIVE and assure that future generations live! Raison d'humanite. [25]*
- 2) *Humans are curious – Sapere aude – as stressed by Aristotle in opening words of his Metaphysics. We should never succumb to vanity and believe that we know all – our knowledge and understanding are very small and inadequate.*
- 3) *Humans are social beings living on Earth and preservation of natural capital is our duty.*
- 4) *Humans are social being and Golden Rule is imperative: even more strongly formulated: Love thy neighbor!*
- 5) *Humans have to be active and wisely decide when and how to be active.*

Recent progress in sciences indicated Nature - Nurture Interaction (Life sciences - Socio-political-economic sciences) /34/ Comparison of identical and fraternal twins show the heritability of politically related behavior. Gene DRD4 is implicated in the development of political affiliation. Those with a variant of DRD4 called 7R and also a large network of friends acquired during adolescence tended to be more left wing (in the USA). However, there is no particular gene for left-wing, but inclinations. Political action is the collective expression of some primal biological motives: survival and procreation. Genes - seem - to assist in deciding which opinions an individual will find most attractive to cleave to. It seems that there is a sort of granularity, the need to accept partial rather than universal explanations for biological phenomena. Person's gene can propel him/her more easily in one direction than another. Her/his free will be a little freer to turn right than left, or vice versa. It is not US vs. THEM, but rather WE and THEY /35/. This is the only and the best way to overcome crises, to eliminate threats and to assure prosperous, sustainable and secure development /36/ "Difference is our greatest opportunity" wrote B. Clinton echoing Hungarian King Stephen I. „People are the real wealth of nations. The basic aim of development is to enlarge human freedom and choices so that people live full and creative lives. This must benefit everybody equitably.“ /37/

Notes

- /1/ T. Caplow, I. Hicks, B.J. Wittenberg, *The First Measured Century*, The AEI Press, Washington DC 2001
- /2/ A. Sen, Mahbub ul Haq, Human Development Report 2013: The Rise of the South; Garry Jacobs and Ivo Šlaus, *Cadmus*, Vol 1, Issue 1 (Oct 2010) pp 53-113; Stiglitz, Sen, Fitoussi Report www.stiglitz-sen-fitoussi.fr/documents/overview-eng.pdf (2008); Kh. Malik; D.C. Esty, M. Levy, T. Srebotnjak and A. de Sherbinin, 2005 Environmental Sustainability Index, 2005, www.yale.edu/esi; 2002 Environmental Sustainability Index, World Economic Forum, in collaboration with Yale Centre for Environmental Law and Policy and Centre for International Earth Science Information Network, Columbia University, <http://www.ciesin.org/indicators/ESI/ESI2002>; Overall competitiveness ranking, from <http://www.konkurentnost.hr/nvk>; Globalisation index 2003, A.T. Kearney and Foreign Policy Magazine, Washington, D.C. 2003; Foreign Policy and A. T. Kearney, *Measuring Globalization*, May/June 2005 <http://www.foreignpolicy.com>; R.Veenhoven, Happy Life Years in 90 nations 1990-2000, World data base of happiness, [ww2.eur.nl/fsw/research/happiness](http://www2.eur.nl/fsw/research/happiness); R. Inglehart, H.D. Kligemann, Genes, Culture, Democracy and Happiness, pp. 165-182 in E. Diener and E.M. Suh, Eds., *Culture and Subjective Well-Being Across Cultures*, Cambridge, Mass, MIT Press, 2000, and R. Veenhoven, Database of Happiness, http://esp.eur.nl/documents/fsw2/database_of_happiness
- /3/ R.F. Kennedy, Remarks at University of Kansas, March 18, 1968
- /4/ Ecological Footprint: Rees, William E. (October 1992). "Ecological footprints and appropriated carrying capacity: what urban economics leaves out". *Environment and Urbanisation* 4 (2): 121-130. doi:10.1177/095624789200400212; Rees, W. E. and M. Wackernagel (1994) Ecological footprints and appropriated carrying capacity: Measuring the natural capital requirements of the human economy, in Jansson, A. et al.. *Investing in Natural Capital: The Ecological Economics Approach to Sustainability*. Washington D.C.:Island Press. ISBN 1-55963-316-6; Wackernagel, M. (1994). *Ecological Footprint and Appropriated Carrying Capacity: A Tool for Planning Toward Sustainability* (PDF) (PhD thesis). Vancouver, Canada: School of Community and Regional Planning. The University of British Columbia. OCLC 41839429; Wackernagel, M. and W. Rees. 1996. *Our Ecological Footprint: Reducing Human Impact on the Earth*. Gabriola Island, BC: New Society Publishers. ISBN 0-86571-312-X; Wackernagel, M; Schulz, NB; Deumling, D; Linares, AC; Jenkins, M; Kapos, V; Monfreda, C; Loh, J et al. (2002). "Tracking the ecological overshoot of the human economy" (PDF). *Proc. Natl. Acad. Sci. U.S.A.* 99 (14): 9266-71. doi:10.1073/pnas.142033699. PMC 1
- /5/ A, Wijkman and J. Rockström, *Bankrupting Nature*, Earthscan/ Routledge, New York, 2012
- /6/ World Bank, World Development Report 1997, World Values Survey, Fig 2.
- /7/ The Real Wealth of Nations; The Economist, see also: www.ihdp.unu.edu/article/iwr
- /8/ Ivo Šlaus and Garry Jacobs, Human Capital and Sustainability, *Sustainability* 3(1) 97-154 (ISSN 2071-1050)
- /9/ C. P. Snow, *The Two Cultures and the Scientific Revolution*, The Rede Lecture, Cambridge University Press, New York, 1961. Snow's lectures stimulated many debates, pros and cons and one is a vitriolic attack by a literally critic C.F. Leavis published in 1962.
- /10/ Jerome Kagan, *The Three Cultures: Natural Sciences, Social Sciences and the Humanities in the 21st Century*, 2009, Cambridge University Press
- /11/ R. Whelan, in *Telegraph*, May 2, 2009
- /12/ Ivo Šlaus, *The University and the Link Between Two Cultures: Scientific-Technological and Humanistics*, *Interiencia* 9 (1984) 69-74; and I. Šlaus: *The Role of the Universities in Analyzing the Implications of Contemporary Scientific and Technological Changes for Society, Culture and the Preservation of Peace*, *Intl. Assoc. Univ. Paper* 17 (1983) 9-17 (Paris).
- /13/ Stig Strömhölm, former president Academia Europaea, President Swedish Academy of Letters, History and Antiquity, *European review* 2 (1994) 31
- /14/ J. Monod, *Chance and Necessity: Essay on the Natural Philosophy of Modern Biology*, Alfred A. Knopf, 1971, New York
- /15/ BICEP2 (Background Imaging of Cosmic Extragalactic Polarization aimed to measure polarization of the Cosmic Microwave Background (CMB), March 17, 2014. BICEP operates from the Amundsen-Scott South Pole Observatory. Preliminary results indicate: ordinary matter = 4.9%, dark matter = 26.8% and dark energy 68.3% and possibly even a signal for inflation and phase transition at 10^{-35} seconds enlarging, inflating our universe by 10^{26} times.
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