



Employment and the Unity of Social Sciences*

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Abstract

Employment and the unity of social sciences are discussed. The paper argues that employment is the simplest and the best indicator of human-centered sustainable and secure development.

1. Introduction

The 20th century is referred as the measuring century.¹ Indeed, the conception of Gross Domestic Product (GDP) and its operational definition were introduced in the 30s by Simon Kuznets. Later, various improvements of GDP such as Human Development Index (HDI),² Environmental Performance Index (EPI),³ Happy Planet Index (HPI),⁴ Globalization Index (GI),⁵ Competitiveness Index (CI),⁶ etc. were formulated.^{7,8} It is instructive to compare this flood of measurements with the development of the Standard Units in physical sciences. It took millennia before measures such as meter, kilogram and second could be precisely defined and internationally accepted, and the system of how to improve their precision could be defined and implemented. It is also important to stress that when Kuznets introduced GDP he emphasized its shortcomings. The inadequacy of the GDP has been pointed out by Jan Tinbergen, the first Nobel laureate in economics, and also by R.F. Kennedy in one of his last speeches:⁹ “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 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 the fact that the first metal to be used 11,000 years ago was gold which was used only for decoration, for beauty.

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Lord Kelvin emphasized the importance of measurement and stressed that unless we can measure (and define), the discussion is pointless. If it is correct that measurements relevant for social sciences are rather ill-defined, is it possible to develop the social sciences, notably economics? Again, comparison with physical sciences is useful: pyramids were built and Newtonian laws were formulated before meter, kilogram and second were precisely defined. We have to address important issues with whatever information 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^{10,11} is over 50% larger than the Earth's capacity, and in two decades we will need two Earths to tackle pollution and consumption of natural resources.

The data clearly show that many countries have a 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 are done without any improvement in human development.¹² Comparison of subjective wellbeing and happiness with GDP¹³ also shows that at a 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, they moved the clock to 2 minutes to Midnight, and at the end of the Cold War the clock 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 failures 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 underemployment and misemployment, mal-employment compounded by unnecessary retirement affecting a large and constantly larger percentage of population. Apparently, the social structure is wasting more than 30-40% of human capital, and it looks like we are not even concerned about it. Throughout human history human capital has played a very important role even when its physical aspects were mainly used.

Before proceeding further we have to answer two questions. First, how important is human capital? Is it just a minor fraction of 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.¹⁴ Table 1 summarizes results presented in *The Economist* in 2012.

Table 1: Real Wealth of Nations (2008): Human, Natural and Human-made Capital

USA	=	\$ 117.8 trillion	(HC = 75%)
UK	=	\$ 13.4 trillion	(HC = 88%)
Saudi Arabia	=	\$ 4.9 trillion	(HC = 35%)
Brazil	=	\$ 7.4 trillion	(HC = 62%)
Russian Federation	=	\$ 10.3 trillion	(HC = 21%)

(1 T\$ = \$1012, values in parentheses list the percentage of the total wealth of each nation that is contributed by 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 they are corrected for inflation by purchasing power parity (PPP), and what does PPP mean 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. Garry Jacobs and I have argued in a previous paper that human capital is self-augmenting by a bootstrapping process.¹⁵

2. Two Cultures and Three Cultures

On May 7, 1959 in his now famous Rede lecture entitled “The Two Cultures and The Scientific Revolution,”¹⁶ C.P. Snow emphasized that science and art were becoming two different cultures. It looks like the split is getting worse nowadays: split into three cultures,¹⁷ i.e. natural sciences, social sciences, and arts 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 the 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 of “forsaking virtue for pleasure”.¹⁸ 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 1982.¹⁹ Recently, the World Academy of Art and Science established the World University Consortium with the aim to contribute 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.”²⁰

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 found the speed of light and consequently, optics. Quantum physics united physics and chemistry, and it seems biology was influenced as well, as Jacques Monod describes in his 1970 book *Chance and Necessity: Essay on the Natural Philosophy of Modern Biology*.²¹ 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,²² possibly just one of the infinite number of universes.²³ [The fact that our universe is fine-tuned to the existence of humans led to the idea of infinitely many universes where one has laws and basic constants fine-tuned to our existence]. On the other hand methodology and pattern of thought of physics and mathematics infiltrate into many scientific/scholarly activities. Several new disciplines are emerging such as astro-archaeology, bio-archaeology, and anthropology (anthropology for quite some time was split into physical and cultural anthropology). Most Nobel prizes in economics were given for econometrics and 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.

The thought pattern 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 the 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, Merrill Flood, S. Kaufmann and Murray Gell-Mann’s *The Quark and the Jaguar: Adventures in the Simple and the Complex*)), fractals, game theory (John von Neumann and Oskar Morgenstern, 1944) and Catastrophe theory.²⁴

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 the natural sciences:²⁵ “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”,²⁶ 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.”²⁷ Is common sense that segment of our thought that is generated by evolution, and can we ask the unthinkable – for e.g. in the third generation warfare, where plans are prepared for unthinkable attacks? Of course, art knew it much earlier.

“Einstein stressed that the most incomprehensible thing about the world is that it is comprehensible.”

Dostoyevsky wrote in *Notes from Underground* that 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.²⁸

3. Social Sciences

Social sciences are focused on human beings. Contrary to unchangeable “elementary particles” and physical laws, humans undergo biological and cultural evolution. Humans change and they change the world they live in, so the current geological epoch could be appropriately called Anthropocene Epoch.²⁹ 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 chimpanzee, our nearest cousin, and possibly suggests why humans have diabetes and chimpanzees do not). Ongoing and future developments are becoming 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), 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 the 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, 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 such as nanotechnology (manipulation with atoms), biotechnology (manipulation of genes), information technology (manipulation of bits) and cognitive neuroscience (of neurons) will be integrated.

It is doubtful whether social sciences developed 100 to 200 years ago are adequate for our times. A brief outline of some social sciences follows:

Language is one of the most important “innovations”, but grammar and linguistics developed much later. It was Panini in 5th century BC, India and Sibawayh in the Arab world in 760 AD, who 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 Physiocracy (18c) are among the first schools in economics, though economic problems were addressed earlier by Aristotle, Xenophon, Kautilya, Th. Aquinas and Ibn Khaldun. Adam Smith (his *Wealth of Nations* was published in 1776), who called himself a moral philosopher, is credited as the first economist and notably the first political economist, followed by T. R. Malthus (1798 – year indicates publication of their most important work), David Ricardo (1817), John Stuart Mills (1848), Karl Marx (1867), Alfred Marshal (1890), J. M. Keynes (1936), M. Friedman (1970), Jan Tinbergen (first Nobel laureate in economics in 1969), Simon Kuznets (1971 NP), J. Schumpeter (1942), J. Stiglitz (2001), P. Krugman (2008), A. Sen (1999) and N.N. Taleb who introduced Black Swan (for studies on uncertainties D. Kahneman got the Nobel Prize in 2002).

Sociology was studied by Confucius, Plato and Ibn Khaldun, and it is quoted in the Domsday Book of AD 1086. Modern sociology started 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 first set up the 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 has its roots in the works of W. Wundt in 1897 in Leipzig, with W. James, Sigmund Freud and Carl Jung, known for their work on psychoanalysis followed by E. Fromm, E. Erikson, B.F. Skinner, A. Maslow and Ch. von Ehrenfeld and later Kurt Koffka and Wolfgang Köhler, who are known for their Gestalt theories.

Anthropology is a study of humans and therefore a very wide area. It has developed into many branches particularly after the work of Franz Boas and B. Malinowski at the turn of the 20th century.

And then it comes to politics, which was referred by Aristotle as a master science. Politics is 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.”³⁰ “It is absurd to believe that everything is going to change, but politics will and can remain the same.”³¹

Each technological development survives only when accepted and used by humans, therefore, engineering and technology have their matching counterpart in the 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.”³² According to Aurelio Peccei, “Humankind became the basic factor of

change in this corner of the universe.”³³ And similarly, robotics, ICT and artificial intelligence are merged with psychology, sociology, economics and politics.

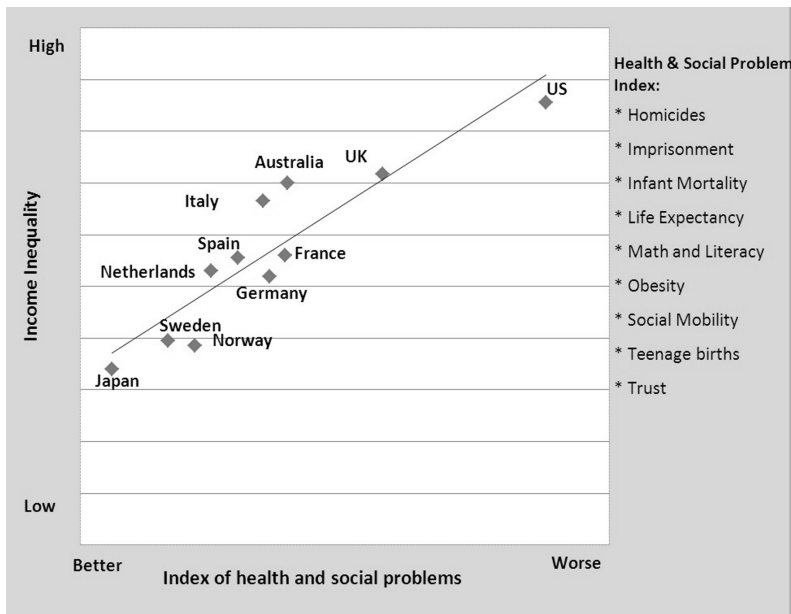
4. Paradigm Change

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*³⁴ to describe “universally accepted scientific achievements that – for a time – provide model problems and solutions for a community of practitioners.” ‘Paradigm’ means a pattern of activity and an accepted worldview. Mattei Dogan argued in 2001³⁵ 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) introduce social paradigms.³⁶

5. Employment

Full employment is desirable and possible.³⁷ Employment increases human capital and decreases income inequalities. Inequalities are negatively correlated with most socio-economic-health indicators such as life expectancy, infant mortality and crime rate, and decrease Human Development Index (HDI) (see Fig. 1³⁸ and Table 2). Taking inequality into account 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) sectors.

Fig. 1: Income Inequality vs Health and Social Problems Index³⁹



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”,⁴⁰ needs enforced upon us through advertizing agencies.

Human needs include spiritual, emotional, artistic, intellectual, physical and material needs, and fulfillment of many of them requires work – often jobs by other people. If there are more jobs needed 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 every 5-10 years and new technologies are introduced at the same rate (e.g. Moore’s law), demography will superimpose the demographic transition (i.e. decreasing fertility rate in many countries to below 2.1) until 2060 increasing global population close to ten billion producing migration and cultural problems. These clashing time scales add to already alarming destruction 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) incremental 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 a 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). Insights into human needs suggest that the “jobs” will undergo major paradigmatic changes. 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 adding 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 in and more and more creative, revolutionary and out-of-the-box ideas to achieve a 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: Indicators of Development

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 quite rapidly now and social sciences describing specific aspects are not adequately explaining the changes. If one appreciates that social sciences deal with a society composed of humans, then a human-centered approach could lead to unity of all social sciences. Achievements of social sciences during the 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*.⁴¹
2. Humans are curious – *Sapere aude* – as stressed by Aristotle in the opening words of his *Metaphysics*. We should never succumb to vanity and believe that we know everything – our knowledge and understanding are very small and inadequate.
3. Humans are social beings living on Earth. Preservation of natural capital is our duty.
4. The 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).⁴² Comparison of identical and fraternal twins shows 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 cling to. It looks like there is a sort of granularity, the need to accept partial rather than universal explanations for biological phenomena. A person's gene can propel him/her more easily in one direction than another. Her/his free will may be a little freer to turn right than left, or vice versa.

It is not US vs. THEM, but rather WE and THEY.⁴³ This is the only and the best way to overcome crises, to eliminate threats and to assure prosperous, sustainable and secure development.⁴⁴ "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."⁴⁵

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