

# **Uncertainty, Creativity and the Concept of Limits**

Quality of life and ability to cope with threats and challenges are increased by science. «To the Age of reason we owe our prosperity, .. but also emancipation of slaves and women, the view that we are all at root the same.» (Lee Smolin, *New Scientist*, July 2008).

1970-now: over 70% of the public considers scientific research to be beneficial,

less than 15% considers it to be harmful.

Public trusts scientists and physicians more than most other professions: 40% of business leaders and 61% of political leaders considered dishonest.

Nevertheless, there is rampant pseudoscience, fundamentalism and superstition.

New Scientist special issue of October 8, 2005:

«After two centuries of the ascendancy, the Enlightenment project is under threat....Religious movements are sweeping the globe preaching unreason, intolerance and dogma, and challenging the idea that rational, secular inquiry is the best way to understand the world.»

Why - it makes no sense?

Knowledge-based society is the best approach to assure and maintain sustainable global society.

Knowledge-based society depends

1) on knowledge - unique resource - inexhaustible and increased by sharing and

2) on human beings, creators and depositors of knowledge. Human intrinsic inner resources still are being underutilized.

Al Gore «Assault on Reason» (2007) argues that propaganda and PR are major threats to reason and democracy.

# 1) Where our rationality comes from?

## How reliable is our rationality?

- Logic, rationality, thinking, doing, and truth.

Logic vs. thinking:

Niels Bohr to a friend

«You do not think, you are just being logical!»

Logic and paradoxes, Logical systems beyond our logic: not all proposition have truth value, and different propositions can have truth values depending on the larger context in which the question is being asked.

Fuzzy logic: not true or false, but «certain to some extent» taken from a «certainty-uncertainty lattice».

Context driven system using data sensed from «environment» to adaptive behavior.

«Few of the active processes occurring in our brains ever impinge on our awareness. We *do* most of our «thinking» without being conscious of it [H. von Helmholtz «unconscious inferences»]. Our brain (unconscious brain) is very good at taking many things into account at the same time. (*how about animals - they do equally well?*)

Conscious reasoning is an attempt to justify a decision after we made it.»(Chris Frith, *New Scientists* -NS, p.45). Unconscious brain cannot justify most of its actions.

## **Our brain is the result of evolution $\Rightarrow$ Can we understand?**

We are aware that our senses are incomplete and often inferior to those of animals (e.g. hearing, seeing).

Instruments we built gave us a better “view”. The Universe “we see today” is very different from what it “appeared to us” a century ago.

Can ICT and artificial intelligence “improve” our brain adequately?

Humans often prefer beliefs and hope rather than reality.

Does it mean that there is an additional “field” besides reality?

If our brain (mind?) is the product of evolution designed to survive and to have off-springs, is it reliable to answer questions such as «Why there is something rather than nothing?»

Quantum physics has shown that «nothing» is filled, bubbling with particle-antiparticle created and annihilated. The dance of quantum particles «contributes» to the dark energy that drives the universe apart.

«The unreasonable effectiveness of mathematics in natural sciences» - Wigner 1960: «mathematics is enormously useful bordering on the mysterious.

**2) Can reason give answer to everything, and if it cannot, what are the limits of rationality?**

**Rationality is an unending endeavor, as science is. Science has no final truth, beauty yes, but no final truth. Science is not a dogma.**

What is the aim of rationality: to know the truth or to be able to live and to have off-springs?

System cannot be understood apart from our actions (Heisenberg uncertainty principle) and our values (Norgaard ??)

Rationality should also apply to social systems, but are social systems in themselves rational? There is evidence that most social systems are not rational (e.g. G. Soros on functioning of the market). Can one apply rationality to an irrational system, isn't it contradiction in itself? Is it «useful» to apply rationality to an irrational system?

History is not linear, not deterministic, not predictable - each of these statements represents a different level (i.e. it can be nonlinear and still predictable).

Ponder on differences between determinism and causality!

Link between causality and time. F.M. Dostoyevsky in «Brothers Karamazovs»: «If everything on Earth were rational, nothing would happen.» vs. century earlier R. Boskovic «If everything would be fully determined, there is no need for time.»

Ponder on differences between determinism and causality! Link between causality and time.

F.M. Dostoyevsky in «Brothers Karamazovs»: «If everything on Earth were rational, nothing would happen.» vs. century earlier

R. Boskovic «If everything would be fully determined, there is no need for time.»

Proof is a model of rationality. But, after a specific issue is proved - is it closed? Keith Tyson (artist) wrote «Reason excludes creativity and intuition». It excludes also freedom!?! «The art has the advantage over science that its methodology can be tumbling and contradictory.» (KT, NS, p.47).

Aristotle wrote that all men by nature have a desire to know: «Sapere aude!» Where this desire comes from? Is this the same as curiosity, an inherent feature of human nature, as written by A. Toynbee. Why are we curious? Is our curiosity beneficial for our evolution? Without curiosity we will still be in Stone Age, but do we need rationality, knowledge? Are we more creative than evolution requires?

Time is one of the most difficult problems in philosophy, and it is connected with rationality. Newtonian concept of time is known to be inadequate.

Future = expected (predicted) + unexpected events.

Soedjatmoko (former rector of UNU):

«Future is ethical category, since we choose it.»

Greeks and Romans had Chronos and Kairos.

«Time is creation, or nothing» (H. Bergson)

History of science shows that science does not proceed only rationally. Rationality is just one method - not always and not necessarily the best one. Gödel's theorem: there are truths beyond proof. R. Penrose «Reason destroys itself» (NS, p.49) Science teaches us self-confidence and modesty. Scientists become arrogant, e.g. «Standard model» (SM) or «Theory of everything». This is jargon, and scientists quickly learn that the reality (truth??) is more complex:

R. Williams, archbishop of Canterbury (NS, p. 44.):  
«being reasonable meant being aware where you belong  
in the cosmos...- “singing in tune”. (My comment: *Then  
scientific research, except incremental research, is  
«unreasonable», since paradigmatic changes always  
transcend «singing in tune». However, “singing in tune”  
is one crucially important “tool” for our evolutionary  
development - role of social dimension.*) From 16. c.  
reason came to be seen as opposed to tradition and  
authority, ...but... we need to pause before we assume that  
instrumental reason will answer all the questions about  
how to shape a moral and humane world.»

Reason and values should be the product of evolution  $\Rightarrow$  thus, not in conflict.

Rationality, ideology, faith, irrationality, chaotic irrationality, intuition. Human actions are associated and stimulated by any and all of these, by tacit knowledge (M. Polanyi) and by reflexes.

Explaining religiosity (project EXREL) (leading theory: religiosity exist because of the functioning of the human cognitive architecture.

Is reason another faith? (M. Midgley, NS p.50)

Should we know all we can? Should we do all we can?

Eugenics (F. Galton)

Inherent in human nature is to ask all, any questions. John Donne warned centuries ago «He that seeks proffe for every mystery of Religion shall meet with much darkness.»

Science (rationality) and religion can interact according to Ian Barbour in four ways to be:

1) in conflict, 2) in dialogue, 3) independent, 4) to integrate. S.J. Gould argued for non-overlapping magisteria (NOMA), i.e. independence and dialogue. John Paul II favored integration with dialogue (“Religion and science are two wings of a human spirit”).

Rationality and common sense.

Theory of relativity and quantum physics taught us the limits of common sense.

Is common sense that segment of rationality that is caused by evolution? Do we have another segment of rationality? Where it came from? Can we ask the unthinkable? (In 3rd generation warfare plans are prepared for unthinkable attacks.)

### **3) Rationality (and science) has been, is and will be isused and abused - what are the safeguards?**

Is s blind *faith* in reason dangerous? «The most destructive and dangerous of all religions is the newfound faith in the power of reason and the perfectibility of man.» F.M. Dostoyevsky in «Notes from Underground» and in «Crime and Punishment». The great inquisitor («Brothers Karamazovs»): three forces capable of enslaving us are miracle, mystery and authority.

Is rationality guilty of creating a perception that it is in command of all: miracles, mystery and authority

History of scientific research deserves to be labeled «progress». But, it is not straight, it is full of mistakes, wrong turns. Intuition, discrete leaps of faith, but also of unjustified beliefs and of prejudices (Einstein rejected the probabilistic interpretation of quantum physics, and cosmological constant. Two errors of Einstein)

Significant progress is made when instead of asking general questions specific «small» questions were asked, leading to specialization and to scientific disciplines.

This led to a definition of an «expert as a person knowing more and more about less and less and finally knowing everything about nothing.»

Malignant version: meeting of CEO and generals: “I have a group of very intelligent expert who do not think”

Expert limiting themselves to their narrow expertise and leave decision-making to ?? However, can expert at their current level of edu act beyond their narrow domain?

Everybody has a duty to be concerned and should (?) interfere.

Rationality involves language and communication.  
Meaning of words change in time and in context.

Pythagora → “city of the wise”, Plato: philosopher-king

V.I. Vernadsky (1863-1945) and

P. Teilhard de Chardin (1881-1955): “collective consciousness – noosphere”

Noocracy = rule of the wise.

Cf.:

- rational decision-making
- noosphere
- knowledge-based society

In the enormous potentialities of the world is our freedom based, our freedom  $\leftrightarrow$  uncertainty.

Many problems:

- manipulation of our opinions - fishermen of human souls.
- suppression of doubt and enforcement of strict obedience.
- perception that all rational inquiries serve hidden interest.

Are human beings responsible and guilty if they persevere in business-as-usual and/or do nothing?

Breaking the causality chain: rain-dance, but also chemistry (we do know the basic laws)

**“Humankind cannot live by rational thoughts alone” (Editorial, NS, 10 Nov 2007).**

Human beings are rational beings and have free will. By birth we have rights - human rights. Through our rationality and free will we have responsibilities. Not acting when we should is irresponsible, and we are responsible for our actions. Rationality helps us to decide when to act and to minimize possible errors.

# **Information (I) – knowledge(K) – wisdom (W)**

(facts, errors)

religious persons wiser?

*more than*

*much more*

*do*

*we can handle*

*knowledge*

*challenge*

*needed*

*change*

*Wisdom and happiness are not correlates – vs. Aristotle*

**Are we less wise than evolution needs?**

☀ “I is not K, K is not W, W is not truth, truth is not beauty” F. Zappa (vs. J. Keats “Ode on a Grecian Urn”)

☀ **Is there more beauty than evolution requires?**

beauty - symmetry - multidimensional space - conservation laws

World: *rapidly changing+globalized+interconnected*

└-----┘ → *cooperation*

*all science generated*      *win-win games*

### ***Win-win strategy:***

Reciprocal altruism – evolutionary stable strategy - tit for tat (John Maynard Smith: win-win games)

“Best place to store food is in another person belly” (Eskimo)

“It is ours what we give to others” (St. Bernard of Clairvaux)

### **Golden Rule:**

♥ **In our own selfish interest we have to get involved in the betterment of global conditions. We need to emphasize cooperation, networking and solidarity, increasing human options and freedom.**