



GLOBAL SOCIAL CHALLENGES: INSIGHTS FROM COMPARISON OF THE NATURAL AND SOCIAL SCIENCE

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WORLD ACADEMY OF ART & SCIENCE

- Founded in 1960 by eminent intellectuals including Einstein, Oppenheimer, Rotblat and other leading Physicists.
- WAAS' mission is to examine the social consequences and policy implications of knowledge.
- WAAS programming focuses on developing effective concepts to arrive at comprehensive solutions to pressing global social challenges.
- Our motto **“Leadership in thought that leads to action.”**
- For more information, see www.worldacademy.org

CHALLENGES STIMULATE THOUGHT

- “Thinking is not one of the natural activities of man. It is the product of disease like a high temperature in illness”
Bertrand Russell
- If thought doesn't come naturally to human beings, it does come in response to threats and challenges.
- The multiple challenges confronting humanity today necessitate fresh thinking on a wide spectrum of social issues.
- Persistent problems signal the need for new and better theory in the social sciences.
- “Nothing is more powerful than a good theory.”
Peter Drucker

OPPORTUNITIES

- World today has the capacity to feed, clothe, house and educate all human beings.
- Rapid advances in technology have made information and communication more accessible than ever before.
- World is aglut with money -- \$225 trillion in global financial assets – but less than 20% reaches the real economy. The rest threatens it.
- Other opportunities include the emergence of global civil society, spread of democracy and rising expectations.

CHALLENGES

- At the same time, humanity confronts unprecedented threats to its survival, security and welfare.
- **Political**: social unrest, civil wars, nuclear proliferation, weak international institutions.
- **Economic**: rising unemployment, inequality, persistent poverty, cuts to the welfare state.
- **Social**: incapacity to meet surging demands for education and health care.
- **Environment**: pollution, depletion of resources and climate change

OUR ACCOMPLISHMENT GENERATES NEW CHALLENGES

- Spread of information and democracy has increased instability
- Technological progress has displaced workers & increases insecurity
- Economic growth aggravates environmental threats
- **Prevailing ideas, concepts and theories do not to provide adequate answers**

ROLE OF SCIENCE

- The development of science is one of humanity's proudest achievements
- Yet at the same time, the discoveries of science are one of the sources of the problems we face – pollution, existential threats, global warming
- We applaud the capacity of the natural sciences to discover and invent
- We criticize the relative failure of the social sciences to help us manage our growing knowledge and power for the welfare of humanity
- The challenge is to enhance our knowledge of ourselves as human beings
- Science itself is a social activity -- we know its method and process. How clearly do we understand its place in the totality of human activity?
- This challenge should be the concern and responsibility of all scientists

NATURAL AND SOCIAL SCIENCES

- Parallels between NS and SS have been debated for centuries
- Debate has been fruitful of new perspectives, stimulating the development of knowledge
- Contentions remains unresolved
- **Premise: a clearer understanding of both the similarities between NS and SS can aid the further development of social sciences.**

PURPOSE

- Explore what can be learned more from an examination of the similarities and differences between NS and SS.
- Identify areas in which SS may yet profit from insights drawn from NS.
- Raise questions which may lead to fruitful collaboration between WAAS and CERN.

KEY QUESTIONS

- In what manner and to what extent are NS and SS comparable?
- What can we learn from their similarities and differences?
- How far is the concept of natural law valid for SS?
- What can SS learn from NS about the relationship between different branches of knowledge?
- Are the concepts of physical microcosm and macrocosm and their relationship to one another relevant to the social sciences?
- Is there a difference in the nature of inter-disciplinarity in NS and SS?
- Are there common underlying principles of SS equivalent to those found in NS?
- What are the prospects for the eventual evolution of an integrated science of society?

COMMON PRINCIPLES OF SCIENCE

- Natural Sciences

- Function on the basis of consistent physical and biological principles applicable to all phenomenon

- Social Sciences

- There are few definitions, concepts or principles shared by the social sciences
- Current economic theory deals with the functioning of economies almost as if they were mechanical, material systems – not living conscious social and psychological entities
- Money is regarded solely as an economic institution, ignoring its character as a networking device similar to language and the internet, the nature of social organization and psychological trust that empower it, its role as a convertible form of social power, and the social values that underpin it.

DISTINCTIONS BETWEEN NS AND SS

- Popper acknowledged SS can learn scientific method from NS – but cautioned against misguided naturalism
- **Complexity** – social phenomena involve entirely new dimensions of complexity. Human activity is governed by intangible conceptions, perceptions and sensations as well as physical forces and conditions.
- **Subjectivity** – the object of study is itself a subjective entity, so subjectivity is inherent and unavoidable in SS, as in the Placebo Effect.
- **Implicit Values** – Popper stressed that the ethical dimension and scientific responsibility are greater in SS, arguing that practical success is primary to SS, not just pursuit of knowledge.

LAWS OF NATURE

- In its quest for truth, NS has discovered fundamental laws of nature that are universal and immutable. These laws highlight the fact that the universe is orderly and consistent and not merely the result of chance or the whims of a fickle creator. The laws of NS are value free.
- SS has had very limited success in identifying immutable laws applicable to human behavior. Operation of Laws of SS is a result of human choices. Social reality is not an immutable fact -- we create our own reality. Social outcomes depend on human choices --- public policy, social aspirations, cultural values -- not immutable constants of nature.
- Social behavior is goal-oriented. Our behavior is intended to achieve objectives. Humanity seeks security, welfare and well-being. Our knowledge must be judged on the basis of its efficacy in achieving human goals.

“Problems created by mankind can be solved by mankind.”

former German Chancellor Willy Brandt

UNITY AND INTEGRATION OF THE SCIENCES

- Hierarchy in Natural Sciences
 - Graded organization of knowledge into levels and fields
 - Fundamental laws of physics and chemistry apply uniformly to all other fields
- Hierarchy in Social Sciences
 - Psychology – the microcosm of individual behavior – is akin to atoms and particles in Physics
 - Sociology -- interactions and relationships between people, groups and institutions – akin to the interactions and groupings of atoms and molecules in Chemistry
 - Yet economics, political science, history, law and management generally ignore the substratum of psychology & sociology.

COMPARTMENTALIZATION AND INTERDISCIPLINARITY

- **Natural Sciences**

- Interdisciplinarity is inherent in the interrelationship between different levels and fields of reality
- Ecology cannot ignore the impact of soil chemistry, meteorology, biology, physiology, genetics, zoology in understanding the evolution of ecosystems.

- **Social Sciences**

- Interdisciplinarity in SS centers on common problems rather than common concepts
- Fragmented thinking leads to partial, fragmented policies, and a disconnect in both theory and practice, as in the divorce between finance and economy, economy and ecology, employment and social welfare.

SYSTEMS THEORY

- Recent advances in systems theory show that common principles do exist governing social behavior across and linking all disciplines.
- ST provides a set of principles applicable to all SS -- nodes, network effects, feedback loops, emergent properties.
- ST permits systematic examination of complex interactions and relationships between fields and the application of mathematic principles.
- Its value is undermined by a tendency to reduce or collapse social reality into the physical, mechanical system of interaction.

ENERGY, FORCE, POWER, WORK

- The relationship between energy and results formulated by mechanics offers a useful model for analysis of social phenomena.
- All social existence involves a flow, interaction and transformation of human energy
- The concept of **ENERGY** in SS must include mental and emotional as well as physical dimensions.
- Energy is given a direction by goals, values, beliefs, attitudes and converted into **FORCE** for work.
- Social **POWER** can be defined as the capacity to achieve any social objective – defense, production, governance, etc.
- Social **ORGANIZATION** plays a key role in multiplying the effective power of a force, similar to the role of the lever and pulley in physics.
- Various forms of social power are inter-convertible by society, as money is converted into political power and vice versa.
- In SS, **WORK** is accomplishment of whatever goals human beings strive toward.
- This model is applicable to all fields and all levels of human activity from the individual, family and organization to the collective.
- It accounts for the contribution of psychological commitment or intensity, the role of the leader in directing energy, the role of the organization in channeling and transforming it.

INDIVIDUALITY

- Atom is the material microcosm. Particles are elements of that infinitely complex microcosm. All material forms have atoms as their building blocks.
- Individual is the microcosm of society. Thoughts, emotions, values, impulses, sensations are some of its component elements. Individuals are the building blocks of all social groups.
- SS focuses on the aggregate group behavior, largely ignoring the role of the individual as too unpredictable.
- Each individual is not merely a complex impersonal system, and therefore unpredictable. It is an integrated, living, conscious whole that is more than the sum of all its parts with unique properties as well as common characteristics.
- **The emergence of conscious personality out of impersonal mechanism remains an inexplicable mystery to both physical and social science.**

INDIVIDUAL & COLLECTIVE

- NS has constructed a coherent model of the universe from atom to molecule to cell, organ, organism, ecosystem, planet, solar system and galaxy – from infinitesimal to infinitely large.
- In SS, relationship between the individual and the collective is poorly understood.
- Individuals are not merely building blocks but catalytic elements.
- Individual is the source of variation, creativity, development, social evolution --the Adventurer, pioneer, discoverer, inventor, thinker, leader, entrepreneur, innovator, genius.
- Society is responsible for imitating, replicating, assimilating, organizing, institutionalizing new behavior in the group.
- Discoveries of individual genius are propagated and applied by social organization.

ONE INDIVIDUAL CAN CHANGE THE WORLD

- History confirms that the conscious choices of a single person can alter the whole society or change the whole world, as Alexander, Napoleon, Lincoln, Gandhi, Churchill, Gorbachev, Copernicus, Newton, Darwin, Einstein, Edison, Tesla, Ford, Jobs, da Vinci, Shakespeare. Steve Jobs and countless others have changed it in the past by the power of an idea, an aspiration or an action.
- SS theory must come to terms with the fact that a single individual can change the world.
- Individuality appears to be increasing over time

PROCESS OF DISCOVERY

- Popper and many great scientists describe original concept formation as an intuitive process, similar to the process of creativity in the arts.
- Science tends to ignore the process of concept formation and focus only on methods for validation.
- One characteristic of genius is the capacity to perceive relationships between apparently unrelated, even contradictory phenomenon, as in the unifying discoveries of Newton, Maxwell, and Einstein.
- Could great discoveries and manifestations of intellectual genius result from different ways of thinking and knowing?
- If so, is it possible to consciously develop these other mental processes?

OTHER AREAS FOR COMPARISON

- Uncertainty and Free Will
- Entanglement – non-locality – in physical and social systems
- Backward causation and the role of anticipation (the future as an attractor) in human causality

CONCLUSIONS

- NS and SS possess both marked similarities and striking contrasts.
- A clearer understanding of the similarities and differences can stimulate the development of new concepts while eliminating faulty analogies and forms of imitation that blind us to essential differences.
- This inquiry offers fertile ground for future collaboration between CERN and WAAS.

THANK YOU