A new science for global governance

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Abstract

Scientific breakthroughs in the last century have produced technologies with great benefits for human well-being. They have also produced a range of WMD: nuclear weapons of mass destruction and digital weapons of mass disruption. Global governance systems are straining to stop the proliferation of these WMD. They are also unable to find solutions for systemic problems that are the unintended consequences of relentless pursuit of economic growth such as climate change and increasing inequality.

The emerging science of complex *self*- adaptive systems provides a framework for a new science of economics and a new architecture of global governance to solve these systemic problems. The key to evolution of new systemic solutions is listening to 'people not like us'. Ways of mass dialogue is the WMD that must be proliferated to improve the well-being of the planet and all life on it.

Introduction

"Humanity groans, half crushed by the weight of the progress it has made…the ever-growing body awaits the addition of a soul, and the machine requires a mystic faith."

Henri Bergson

The world is in crisis; it is at war with itself. Humanity, pursuing economic growth blindly, is at war with Nature. Humans are destroying each other in uncivilly brutal "civil wars" within countries. Nations are at war again: the Cold War was apparently not dead when it was prematurely buried in 1991 with the fall of the Soviet Union.

Sciences and technologies have advanced remarkably in the last fifty years. Some billionaires may soon be able to fly away to other planets if they find life on Earth too hot, leaving behind poorer people to survive as best they can on a planet ravaged by a paradigm of progress of which billionaires are the greatest beneficiaries.

Governments must act now; it is becoming too late, climate scientists say. Civil activists, and some economists too, say that inequities accompanying free market capitalism are unjust and have become intolerable.

Urgent action is required, separately and collectively, by all governments. However, their actions must be guided by new thinking. Pushing harder with the same underlying thinking that has caused the problems is madness, as Albert Einstein said.

The time has come to rethink the fundamentals of economics, science, and governance.

Part 1 of my paper describes a paradigm shift in economics science, from the mathematised science it has become in the 20th century, which basically views an economy as a machine that converts inputs into measurable outputs, and the increase of whose efficiency and size

must be the principal purpose of economic policy, to a paradigm of an economy as an organism which evolves over time and develops new forms and capabilities. The science of evolutionary biology provides a framework for this shift that David Sloan Wilson and Dennis J. Snower have described in their paper, “Rethinking the Theoretical Foundations of Economics”.

Wilson and Snower describe an economy as a “complex adaptive system”. They aim to change the paradigm of economics, away from its drive to increase the material and financial size of economies with the mistaken belief that this improves human well-being; a paradigm that seems blind to its deleterious impacts on the natural environment and social solidarity. They have also discussed their insights in *Evonomics* magazine (March 24, 2022). I use Wilson and Snower’s leap out of the present paradigm of economics, and where they land with it, as a stepping stone to make further leaps.

In the next leap, in Part 2, I analyze an on-going evolution of the science of complex systems. The predominant paradigm of “objective” and “rational” science that pervades all natural, and now social sciences as well, leaves little room for “subjectivity”. It leaves out the forces of ego, political power, and human intentions. Current models of complex adaptive systems do not include these primal forces. However they must, to provide good guidance for designing institutions for the governance of human society.

I leap from models of systems into the realities of global governance in Part 3. A new economics will not be sufficient to cover deeper fault-lines in global governance. The inadequacy of scientific solutions that do not adequately factor in matters of equity to resolve the global climate crisis, and the rumbling fissures in geo-politics that have become vivid with the war in Ukraine, reveal deeper flaws in paradigms of global governance, as well as paradigms of science which have dominated epistemics with the European Enlightenment since the seventeenth century.

Thomas Kuhn’s insight about paradigm shifts (in his seminal treatise, *The Structure of Scientific Revolutions,* 1962) was this: a paradigm is an internally coherent system of thought that results in useful insights but also finds it difficult to escape its own assumptions. Paradigm shifts require old ways to be unlearned to clear space for new ways. Unlearning is hard. It requires letting go of “theories-in-use” that have produced results. Paradigm shifts are also emotionally hard for powerful people, and thought-leaders in the present paradigm. They risk losing their status and their power to others.

“We will not just build back…we will build resilient and equitable social and economic systems when the crisis passes.” So global leaders have declared in each crisis, so far, in this millennium: the global financial crisis of 2008, the Covid pandemic of 2020, and the geopolitical (and economic) crisis caused by the dispute in Ukraine and disputes about Ukraine. The impacts of these sequential crises have been widening from the governance of the financial system and economy to the governance of international relations. The world cannot wait until the new paradigm of economics is formally adopted by economists. Methods of governance must change much sooner.

Economists must step out of the silo of their own science and listen to and learn from scientists in other disciplines. Powerful people must listen to powerless people for equitable global governance. People like us must listen to people who, in our minds, are not like us so that we can live together in harmony. I end with a recommendation for more listening to people not like us. Listening is necessary for learning. Listening is essential for good governance.

1. Evolutionary science's transformation of classical economics

Wilson and Snower's paper is a significant advance in the science of economics. It explains fundamental flaws in the present economics' paradigm: its focus on self-contained individuals as the principal agents of change; its presumption that humans always act "rationally", and that their interactions with each other can be modeled into mathematically computable systems. These fundamental flaws in economics are now acknowledged by many economists. Yet economists continue to measure the progress of economies, and to confidently provide solutions to policy-makers derived from such flawed models of societies, because they seem to be the only models they have.

Highlighting the gap between prevalent economics science and reality, Wilson and Snower say, "When seen in this light, the economy is entirely self-subsistent, whose workings are understandable quite independently of society or the political system." Whereas a new economics "becomes a purposeful discipline, rather than something based on dispassionate observation of mechanical systems."

Wilson explains in *This View of Life: Completing the Darwinian Revolution (2019)* how evolutionary science has evolved. Darwin's seminal insight was to identify the trio of variation, selection, and replication as the mechanism of evolution.
"A modern definition of Darwinian evolution is any process that includes this trio, including but not restricted to genetic evolution (e.g., cultural evolution, antibody evolution, computer evolutionary algorithms)", Wilson explains in Evonomics.

I apply the three mechanisms to the design of governance systems.

Requisite variety
Variation is essential to provide the variety/diversity which is the soil for any process of evolution/innovation. If a system becomes homogenized, with all parts of it adopting the best practice and the best solution, further evolution will cease. This insight from the science of complex adaptive systems has important implications for 'development sciences' generally and for the architecture of global governance institutions.

Imposing any 'best' model of human development, or management of the economy, or of democracy, on all countries to make all fit into a standard model of an efficient global machine, may, theoretically, bring about a one-time improvement in the performance of the system. But it will end possibilities for further evolution. Seen in this light, the resistance of "less developed" countries to the imposition of solutions devised by experts in more powerful countries, can be seen as a struggle for sustaining an equitable evolution of the lives of everyone on the planet.

Selection
Multi-level selection (MLS) is an essential architecture for the Darwinian model of evolution, Wilson and Snower explain. In the Darwinian model of the evolutionary process, all entities unconsciously compete with others to develop their capabilities to obtain sustenance from a limited pool of resources. The innovation that is best is selected by a hand invisible to them at a level of the system above them.

In this respect, the Darwinian model of evolution is the same as Adam Smith's 'invisible hand' of the market, whereby, while all entities in the economy are focused, with 'rational self-interest', on their own needs, somehow the solutions that emerge from their win-lose competition turn out to be the best for all. However, this is not how it works in practice. Often "winners take all"—almost all wealth, and with it all power too, causing great hardship for losers.

The missing concept in the Smith model of the invisible hand for equitable governance, is the notion of "fairness" for all—even for the losers. "Creative destruction" is another concept justifying "free markets". The invisible hand in economics will pick the winners of the economic-power game; it will have no compassion for the losers. It is inevitable that some must die, utilitarian economists say, for the greater good of the rest. Because the size of the pie will become larger if all resources are allocated for the growth of the strong, and not wasted to sustain the weak. Indeed, this is the moral (or immoral) argument against 'socialism', and support for competitive capitalism as better for growth of the GDP.

While human beings have been evolving from, and along with, other species for thousands of years, the concept of equal human rights for all—whether they are strong or weak, rich or poor—is a recent development in the last two or three centuries only. This aspirational idea was codified in the Universal Declaration of Human Rights in 1948 by the UN General Assembly. It demands the evolution of democratic systems of governance, based on human rights as being primary, which are at odds with the much older principles of "property rights", and "economic might must be right", on which governance systems of economies continue to be based in spite of the 1948 declaration.

Good governance of any system requires effective means for regulating all processes within it, to maintain harmony amongst them for the health of the system. (This is how a human body maintains its health). Therefore, national governance systems—whether they rely on a periodic universal franchise or some other form of governance—should be instruments for nations to select the best innovations emerging within them. Evolution of their criteria for choosing the best for all, and applying these criteria equitably, with equal weights to the voices of rich and poor, must become the measure of the progress of nations.

Paradigms are hard to change because power will preserve its power. The UN system of global governance, in which real power is retained by a Security Council of five, now extended a bit to the G7 and G20 only, leaving out other members of the 197-strong UN General Assembly, is not democratic. Democracy is mocked when members of the Security Council use their powers of military force and financial sanctions to impose democracy on countries they declare are not democratic.

National systems of governance sit at a level above all entities competing within their nations. According to multi-level selection theory, nations compete with each other in an evolutionary process to discover the best model of governance. Indeed, the existential battle between 'democratic' and 'authoritarian' countries has become a Mahabharat (massive war) in geo-politics.

Geo-political governance raises several questions. For one, which entity above nations will select the winner in the competition amongst governance models? And, what values will this higher entity apply to make its selection?

Replication

Variety is a necessary condition, not a mechanism. Replication is one of two essential mechanisms of the evolutionary process, selection being the other. Howsoever selection is done, replication is necessary for the selected innovation to "scale up" for everyone's benefit.

Replication can happen when entities at lower levels voluntarily adopt best practices that emerge from their peers' better performance. A process of 'lateral learning' would require entities to be able to 'read' each other. At purely biological levels of evolution this can happen through flows of chemicals and physical energy amongst the entities: processes that have not been fully mapped yet by evolutionary scientists. However, philosophers and scientists at the frontiers of science have surmised that abstract ideas that are consciously adopted—which is an ability distinguishing 'human' levels of learning from 'animal' levels—cannot be transmitted only through chemical and digital processes. Some "non-sensory" processes are also required. Indeed, this is the "rationality" thesis of science: that humans have an ability to be "objective" (and scientific) about the world in which they live, at a level at which the minds of other species are unable to operate.

Abstract, mentally rationalized, ideas require a language to express them and communicate them to others. The language must convey the same meaning to all. Mathematics is a universal language. Sciences, as they have advanced, have mathematised their models: to make them more 'objective', and universally communicable too.

Humans have developed formal institutions to spread ideas by replicating "good practice". In religion, through missionaries; in development, through development institutions and experts; in business, through management consultants and venture capitalists. The knowledge centers in which ideas are selected, and from which ideas spread, become centers of global power—the Catholic church in Rome; development institutions in Washington; universities in the West; and headquarters of large multinational companies and large philanthropies, mostly in the West.

Resistance to paradigm shifts comes from established centers of power, as Thomas Kuhn explained. The Church feared Copernicus' discovery that the Earth was not the center of the universe, because the Catholic Church was founded on the premise that it was the central repository and protector of God's message to mankind. Any idea that threatened its power, even indirectly, was heresy.

Competition amongst ideas and ideologies propels human evolution. Successful ideas become embedded in self-reinforcing paradigms. Fundamental changes in these ideas disturb the "Establishment", which is a mutually reinforcing system of ideas and temporal power.

The competition between ideologies of free market capitalism and socialism, and between ideologies of electoral democracies and other forms of governance, is an unfinished war, which Francis Fukuyama mistakenly thought had ended with the collapse of the Soviet Union, that is simmering between the hegemony of the US in the West and China in the East, and has erupted again in Ukraine. All countries are being compelled to choose which side they are on; the world is being divided when the world must be more united to solve global problems.

2. The limits of mathematical models; and the evolving science of complex systems

The paradigm in which economics is set lies within a wider paradigm of scientific epistemology.

"Incompleteness" of all mathematical models

Kurt Gödel, winner of the Albert Einstein Award in 1951, is considered one of the most significant logicians in history (sometimes ranked alongside Aristotle). He brought three disciplines together: the theory of axiomatic reasoning, the study of mechanical computation, and the psychology of intelligence.

Gödel's Incompleteness Theorem (explained in his paper "On Formally Undecidable Propositions of *Principia Mathematica* and Related Systems 1" in 1939) is an even more formidable theorem than Arrow's Impossibility Theorem. Whereas Arrow (who won the Nobel Prize in economics) demonstrated that a single, universally satisfying, outcome is not possible to achieve mathematically while making social choices, Gödel went deeper. He showed that no mathematical system can use its own logic to prove its own accuracy and universal validity. Therefore, the results of mathematicians' and economists' experimental games cannot prove how the world outside their games actually works.

Every mathematical system is founded on a few axioms, along with some acceptable rules of computation. Axioms are statements or propositions which are regarded as being established, accepted, or self-evidently true. Gödel proved that, in their attempt to achieve *internal* consistency, mathematical systems can become disconnected from external reality and therefore *externally* invalid. They become inaccurate abstractions able, at best, to explain only some parts of complex reality, not the whole. Thus, they are always inherently 'incomplete'.

Euclid's geometry, which for two thousand years had seemed eternally valid, was founded on elementary notions of what a point in space is, and what a straight line looks like. In the twentieth century physicists found Euclidean geometry inadequate for explaining micro-level phenomena in physics, and even for explaining inter-stellar gravity. New concepts of

multi-dimensional space and flexible time were required as axioms of new mathematical systems—even though these axioms defied common sense.

Gödel did not seek to find the truth. He only showed why mathematics cannot prove what is true. His theorem of 'incompleteness' is a theorem of mathematical 'unprovability'. Readers interested in understanding Gödel's proof, and its implications for the development of artificial intelligence systems would enjoy reading computer and cognition scientist Douglas Hofstadter's Pulitzer Prize winning book *Gödel, Escher, Bach: The Eternal Golden Braid (1989).* He explains the complications in extracting information from data and meaning from information. He shows that the axioms (or hypotheses) on which scientific systems are founded always come from outside the system, as intuitions. They are an 'induction' from outside and cannot be 'deduced' from within the system itself. Nevertheless, for the equations in the mathematical system to consistently compute, these axioms must be considered valid even when they challenge common sense. This is the fundamental, mathematical, flaw in economics. Its' axioms of self-interested rationality of human behavior, which are convenient for mathematised modeling, are inconsistent with reality.

Hofstadter uses examples from music (Bach), and art (Escher), as well as Lewis Carrol's style of amusing conversations on profound matters between peculiar characters, such as the Walrus and the Carpenter. Though more famous for *Alice in Wonderland* and other books he wrote for children, Lewis Carrol was a logician and mathematician. He had borrowed the characters, Achilles, and the Tortoise, from Zeno of Elea, a 5th century BCE Greek philosopher known for many ingenious paradoxes.

Zeno is one of the earliest remembered philosophers in the West who highlighted problems in applying quantitative conceptions to physical bodies and to spatial expanses as ordinarily conceived. He anticipated, 2,500 years ahead, the problems that the paradigm changing physicists—Max Plank, Nils Bohr, Werner Heisenberg, Albert Einstein, and others—encountered in the twentieth century: problems of space that seems to curve and time that seems to go backwards.

Complex Systems to Complex Adaptive Systems (CS to CAS)

Physicists realized a century ago that the Newtonian view of the universe as a machine with distinct objects within it was wrong. A 'paradigm shift' in the science of physical systems came about with new insights from Max Planck, Nils Bohr, Louise Broglie, Werner Heisenberg, and others' studies of systems at the sub-atomic level.

Their insight was that human minds cannot comprehend the reality of sub-atomic phenomena. At best they can make mathematical representations of it for which they have to invent new mathematical methods. Yet there can be no way for them to know whether the sub-atomic world really works that way. Concepts of the inherent dualism of matter—it is both particles and waves at the same time, and 'uncertainty' of human knowledge of micro-atomic phenomena, were revolutionary. Concepts of 'relativity' which Albert Einstein developed around the same time proved that measurements of space and time depend on the position of the observer in relation to the phenomena being observed: in other words, the measurements are always subjective.

These new insights of physicists: that humans are only parts *within* complex ecological systems; and that it is not possible for humans to be *detached* observers; moreover that their lenses are always subjective and *shaped by the system* that humans want to study objectively—had already been expressed in ancient Vedic and Buddhist traditions of knowledge in India, as these physicists noted themselves. *The Tao of Physics: An Exploration of the Parallels between Modern Physics and Eastern Mysticism* by Fritjorf Capra (1975), *The Dancing Wu Li Masters: An Overview of the New Physics* by Gary Zukav (1979), and *The Universe in a Single Atom: The Convergence of Science and Spirituality* by His Holiness the Dalai Lama (2005) are good accounts of encounters of modern Western science and Eastern spiritualism.

Cognitive scientists are arriving at similar conclusions as these path-breaking physicists came to, that nature and nurture combine to shape how human minds work. The 'lenses' through which human minds make sense of the world around them are shaped by the environment around them, and by the histories of their societies. Nevertheless, many cognitive scientists continue to look for explanations principally within the internal chemical and electronic systems of the brain. For them the explanation must be within the machine only. Meanwhile new fields within social sciences such as 'cultural psychology' are looking into processes by which human minds are shaped by the world around them.

Economists are realizing in the new millennium that their models of the economy as a machine have been wrong. With their mathematical models of quanta of inputs and outputs, and concepts of productivity and efficiency in use of resources (including human resources) found wanting, some economists are discovering that the process by which components of complex systems interact and develop new capabilities may provide a better framework for a "new economics". Therefore, evolutionary biology, whose foundations Charles Darwin laid, provides them a different way of thinking about processes of economic change.

Meanwhile, with evolutionary biology, "systems science" is also undergoing a paradigm shift as it moves from the labs of engineering schools, where the disciplines of 'systems dynamics' originated, to the study of natural systems. With this shift, systems science has moved from the study of *complex systems* (CS) to the study of *complex **adaptive** systems* (CAS).

Complex adaptive systems to complex *self*-adaptive systems (CAS to CSAS)

The concept of the 'invisible hand' in economics, which seeks to explain how actions of purely self-interested, and rational (i.e., unemotional, and socially detached) individuals are coordinated, is like the concept of ether in physics in 19th century physics. Ether was conceived as a hypothetical substance pervading the universe to support the transmission of light and electromagnetic waves.

Physics has moved on from studying the compositions of particles to study *interactions* amongst particles. Physicists know that there are at least four different forces that affect the co-existence of diverse particles—forces of gravity, electromagnetism, weak nuclear forces, and strong nuclear forces. In 2016, they seemed to have discovered a fifth one,

called ‘X17’. Physicists are also searching for a ‘Unified Field Theory’ to explain how these forces relate to each other.

At the same time, evolutionary biology’s models of complex adaptive systems have expanded from explanations of how the biological capabilities of species develop to include the evolution of ‘cultures’ in human societies (See David Sloan Wilson’s *This View of Life: Completing the Darwinian Revolution (2019*). “Cultures”, broadly speaking, are the rules by which a species’ members organize themselves. Cultural rules give collections of individuals greater power than the individuals could have alone.

Swarms of thousands of very tiny ants and bees can coordinate their activities on very large scales for the sustainability of their whole community. Evolutionary biology has shifted the unit of analysis of a society, from the genes in individuals to the genes of collectives. It is researching how ants and bees design their collective enterprises. Research reveals that better ways of cooperative organization can enable individuals to succeed in competition against other species even if the other’s individual members may be larger and stronger. In competitive team sports too, better teamwork enables teams of relatively weaker players to defeat teams with superstars each showing off his excellence.

“Do in Rome as the Romans do”, is a popular adage. Millions of humans who live together in cities perform different roles and transact with each other. They adopt rules of the game, some as formal regulations and many as social norms, that enable them to live and work together. Different cities, even within the same legal regime, can have different “cultures”. How do cultures form? How are they adopted by all members of the community?

Evolutionary biologists’ experiments reveal that collective capabilities are developed by a process of “Multi Level Selection” (MLS). Multi-Level Selection theory says that competition at a ‘higher’ level, i.e., amongst *forms* of organization, is a *necessary* mechanism for evolution of new forms of organization at levels below. Some evolutionary biologists go so far to suggest that violent wars amongst collectives are essential for the progress of a species, as Peter Turchin says in *Ultrasociety: How 10,000 years of war made humans the greatest cooperators on earth (2016).*

Turchin interprets Hindu philosophy to claim that thought leaders in ancient India had understood the necessity of war and destruction for the continuation of life. His claim raises many questions.

Firstly, if the ancients already knew this, then why has it taken so long for modern scientists to rediscover this truth? Why were they blind to it so long?

The second question though is, has Turchin really understood Hindu philosophy or is he choosing an interpretation to support a conclusion he has already come to in his own mind? Hindu philosophy, like Hindu mythology, is an encyclopedia. It examines many questions about reality, including the purpose of human existence, human intentionality, and ethics in human actions. Turchin has picked evidence to support his prior conclusions. All smart human beings do this: they find the evidence they want to support their biases. The biases of ‘experts’ are especially dangerous. Because they are trusted to be telling the truth and

nothing but the truth. When "experts" are blatantly partisan in public debates, they destroy public faith in all scientists and experts.

The short Bhagavada Gita, sitting within the massive text of the epic Mahabharata ("the massive war", circa 400BCE to 400CE) is a discussion between Arjuna and Krishna (the manifestation of Vishnu, the preserver of the universe) about the purpose of war. Krishna asks Arjuna to consider *why* he is going to war and *who* will benefit. He tells Arjuna, "You only have a right to the action, and not to the fruits thereof." In other words, you must take the action not because it will bring you more fame and power (or material wealth), but because it is the *right* thing to do.

Arjuna was a great warrior; Krishna a great charioteer. Together they had superior technology than their opponents. Krishna compelled Arjuna to reflect on the ethics and the purpose of war.

Returning to the first question: why have scientists blinded themselves to the wisdom in ancient knowledge? Are there limitations in their 'scientific' method that became privileged with the European Enlightenment since the seventeenth century, which denies the value of faith and endorses only rational reasoning supported by objective measurement?

Physicists had discovered the limitations of the Enlightenment's scientific method a hundred years ago. Economics, and evolutionary biology too, are reaching the limits of their scientific methods when they venture to explain how human systems function. Faith, trust, and ethics are forces within human systems that must be incorporated into their systems models, to produce a more complete theory of how human minds and socio-ecological-economic systems actually work. Such "irrational" forces are hard to quantify. Nevertheless, they must have a central place in any models of systems in which humans are important actors.

Human intentions in selection

Multi-Level Selection (MLS) is the mechanism by which biological systems evolve according to evolutionary biologists. In the MLS mechanism the individuals of a species, like ants and bees, are not consciously designing the rules by which they govern themselves. They "do and die and not question why". An "invisible hand", which they cannot understand, guides them. The difference between ants and bees and human beings is that humans are *self-aware* of their place in their social order and in the universal scheme. They also sometimes question *why* it must be so, whereas ants and bees do not.

The missing ingredient in models of complex adaptive systems (CAS) is human *intentions*. Intentions to change the world, and to consciously invent 'institutions' (i.e., rules of the game for cooperation) seems to be a unique property of humans, not other species. When humans insert their intentions into the process of natural evolution, they interfere with it with self-serving intentions. Moreover, they do this with only limited understanding of their place within the system that has brought them into existence. Thus, their solutions can have unintended consequences and can backfire on them.

A fundamental premise of modern science has been that there are 'objective' facts which must be known independently regardless of 'subjective' views of the scientist. The new

physics (and Gödel's Impossibility Theorem) says this is not possible. The scientist is *within* the system and the scientists' lenses are shaped by the culture in which the scientist lives.

The dominant academic school of systems thinking, which has its origins in schools of engineering, is to observe systems and their designs from *outside* the system. Designers in the world of economic enterprises and technology sit, in their minds, outside the systems and machines they design. Whereas scientists studying living systems can never be detachedly objective about the systems they are modelling. Because whenever they study systems, they use their own minds which are shaped by the system they are studying.

CAS (complex adaptive systems) models must expand to models of complex *self*-adaptive systems (C*S*AS) to include many more forces within human systems, such as faith in nature and trust in the universe, which spiritual traditions within all religions have been recommending for thousands of years. Spiritual knowledge is *The Perennial Philosophy* which Aldous Huxley had described in his eponymous book in 1946.

The role of *Power* within social systems

By the turn of the millennium some economists were including *emotions* and subjective *identities* as important forces within their models. The study of the *politics* of economic change also began to move towards center stage. Politics, in its broadest definition is the process of aggregating and using power to control and change systems.

"Multi-level *selection*" is limited in its ability to explain all the forces that shape complex systems. It cannot adequately explain the process by which humans deliberately create institutions and the role of power in that process. Powerful institutions and powerful people (whether political rulers or dominant scientists) instinctively promote rules that preserve their own power. It is in their "rational self-interest". The difficulty of letting go power retards the acceptance of better scientific ideas even in the physical sciences as Thomas Kuhn had explained in *The Structure of Scientific Revolutions*.

(Here, an intellectual curiosity about gravity and power. Gravity is the force by which larger objects attract smaller objects towards them even from a distance. Gravity is the one force that physicists have not yet been able to incorporate into a Unified Field Theory!)

The work of Douglas North and other economists on 'institutions' is attracting attention again; as well as Amartya Sen's and others' work on 'social choice'. Moreover, Elinor Ostrom's work on self-governing communities challenged Hardin's "tragedy of the commons". Hardin's work has provided a theoretical foundation for private property ownership and a justification for conversion of natural resources into private capital. Ostrom provided solutions for designs of cooperative institutions for the management of common properties and for recovering the "promise of the commons".

Within the 'systems sciences', many models of construction of complex systems have emerged in the last seventy years: systems dynamics with its engineering foundations; biological systems with foundations in nature; cognitive systems mapping flows of information and sense-making; etc.

Fritjorf Capra and Pier Luigi Luisi have analyzed the many paradigms of 'systems' that have emerged in different sciences, in *The Systems View of Life: A Unifying Vision* (2014). Amongst them is the model of living systems that Humberto Maturana and Francisco Varella of the Santiago school had developed. They said that "to live is to know". Cognition, they explained in words uncannily like the language of quantum physicists in the last century, is "not a representation of an independently existing world but rather a continual bringing forth of a world through the process of living".

Here is a passage from Capra and Luigi Luisi's *A Systems' View of Life:*
"Autopoiesis" is a term coined by Maturana and Varela in the 1970s. *Auto,* of course, means "self" and refers to the autonomy of self-organizing systems; and *poiesis* (which shares the same Greek root as "poetry") means "making". So, *autopoiesis* means "self-making". According to Maturana and Varela, the main characteristic of life is self-maintenance due to the internal networking of a chemical system that continuously reproduces itself within a boundary of its own making."

Capra and Luigi Luisi explain the role of power in social systems. They say,
"Power plays a central role in the emergence of social structures. In social theory, all rules of conduct are included in the concept of social structures, whether they are informal, resulting from continual coordination of behavior, or formalized, documented, and enforced by laws. All such formal structures, or social institutions, are ultimately rules of behavior that facilitate decision-making and embody relationships of power."

Ethics in science
Ethical questions have concerned philosophers on many continents for millennia along with questions about the purpose of human existence. Questions of purpose, ethics, and equity must be brought to the table in global forums while shaping global solutions that are good for everyone, and not only for the most competitive, strongest, and most powerful countries.

Ethical questions do not seem to bother technologists who are mostly concerned with finding innovative and practical solutions. Technological developments have been racing far ahead of ethics. Advances in genetics are enabling humans to change themselves to defeat natural forces and extend their own lives. Those who own these technologies could make themselves supermen and overpower other human beings too.

Artificially intelligent machines can soon replace human beings, scientists promise. However, artificial intelligence can never comprehend ethical questions, as Thomas Fuchs, professor of philosophy and psychiatry at Heidelberg University, explains in *In Defense of the Human Being: Foundational Questions of an Embodied Anthropology* (2021). Artificial Intelligence is formed by computational algorithms. The only inputs these algorithms can process are digital ones: therefore, they can do 'big data analytics'. Whereas human minds can imagine futures without data. Human beings have common sense which digitally smart machines cannot have. Further, human beings can even wonder about the limitations of their own minds, as ancient philosophers in the East have for millennia.

In the earlier part of the twentieth century, Nobel Laureates Albert Einstein, Max Planck, Werner Heisenberg, Nils Bohr, and Louise de Broglie took physics across the boundaries of rational knowledge into realms of relativity, uncertainty, and unknowability. They shook physics out of the Newtonian paradigm that had ruled physics for two centuries. In the Newtonian worldview the Universe is a machine composed of distinct parts. Whereas these pathbreakers pointed to the need to understand the relationships among the various parts of systems, including the human minds within them. They also grappled with fundamental concepts of space and time. They were compelled to acknowledge that the human mind is inherently limited in its capacity to understand the complex world around it which has created it. Because, a part of a system cannot fully know the whole of which it is a part.

These physicists broke science out of the Newtonian paradigm of a machine-like world in which engineers can locate levers to pull to improve the machine's productivity. Economists also model economies as machines with inputs and outputs; within which they try to find smart levers to pull to improve the economy's performance and increase its size, such as interest rates and carbon prices. They are like medical specialists who may unintentionally kill a patient with strong medicines they prescribe which solve only the problem they understand in a complex system.

Without a full understanding of the complexity of social systems, including human motivations for power and control, scientific solutions can have unintended consequences for the system that they want to improve. The scientists' own motivations, and mistaken beliefs in their science's certainties, are great risks for the health of complex socio-economic systems.

A philosophical doodle

Physics has gone through several paradigm shifts in the last five hundred years. In the 16th century, Copernicus displaced the Earth (and Man) from the center of the Universe. Isaac Newton's discovery of gravity and his formulation of the laws of motion of bodies under a system of forces in the 17th century laid the foundations of modern physics and mechanical engineering. In the early 20th century, Albert Einstein revolutionized science with the general theory of relativity. He made time just another dimension of a four-dimensional space.

The philosopher Henri Bergsen disagreed with Einstein. He said that time was different to space. The elapse of time is an experience. By objectifying time and converting it into merely another measurable quantity, Einstein was able to convert the reality of the universe into a computable model. However, he had removed the variability in subjective experiences of the passage of time, which were the essence of life and human history.

Increasing longevity is a metric of the benefits of science and economic growth. Longevity of the human species is increasing around the world. My mother, who lived alone for 25 years after my father died, and passed away herself when she was 97, used to say she "wanted to add more life to her remaining years, not more years to her life". For her, like for Bergsen, the elapse of time was a subjective experience; the essence of time is not what is objectively measured by clocks and calendars.

HelpAge International works to improve the well-being of older persons around the world. It listens to them. The larger numbers of older persons in countries are seen as an economic burden. They are no longer as productive as younger persons can be, and do not add to economic growth. What older persons want everywhere, HelpAge finds, is more dignity, more inclusion in the community, and closer connections with their families if possible. Money cannot buy these social determinants of well-being, which are essential for the health and well-being of all humans, even the very young.

Einstein was never able to accept the insights of quantum mechanics. The principle of uncertainty was abhorrent for him. “God does not play dice”, he said.

Gödel, a friend of Einstein at Princeton, who formulated the theory of “incompleteness” of all mathematical models, also disagreed with Einstein’s conception of time. Einstein had defined time to make his model of general relativity internally consistent. But that did not mean that his definition was the reality of time.

Economists are often accused of “physics envy”. They want their models to be as predictable as the models that physicists develop. The evolution of physics has reached the edge of reality. Physicists struggle to put human experience back into their models. Economists must connect their models with social realities too.

3.Global governance: cooperation and power dynamics

Humanity is facing enormous problems. Many are listed in the 17 SDGs which the global community has accepted. They include problems of environmental degradation and climate change; problems of persistent poverty and increasing economic inequalities between countries and within countries; problems with new technologies that are destroying societal well-being; and problems of designs of institutions of governance and the distribution of power in them. Without a new approach to collaboration between diverse stakeholders, and between countries, humanity cannot achieve its goals.

Competition and Cooperation

Garrett Hardin’s premise of “The Tragedy of the Commons”, a foundational premise in economics, states, erroneously, that citizens cannot govern a resource that belongs to everybody. And, therefore, anything that is not somebody’s private property, will be ruined. This is a justification for the foundational principle of capitalist economies, viz. “private property rights”. Hardin’s theory seemed to set aside historical evidence from all continents that human beings have developed methods of governing resources that belong to nobody and are therefore the responsibility of everybody.

Elinor Ostrom, who was the first woman to get a Nobel Prize in economics (in 2009, fifty years after the first Prize was awarded), found evidence of communities who have nurtured “common property resources”, such as forests, water sources, fisheries, and grazing lands, sustainably and equitably (Elinor Ostrom, *Governing the Commons: The Evolution of Institutions for Collective Action* (1990). In fact, such resources were destroyed when they became private property. Mono-culture plantations to produce palm oil and industrial timber on scale, and large-scale farms for sugar cane, cereals, and cotton, which enable

corporations to improve their productivity, by applying more capital and mechanization, destroy diversity; they have upset the ecological balance in the Earth's resources. They have also displaced human beings who were managing their commons sustainably; and who are hardly ever equitably compensated for their losses of livelihoods and habitats.

Examples of cooperative governance of the commons are available everywhere to learn from, if only we would look for them. However, they are looked down upon, even if noticed, because they do not "scale". Such ideas do not spread and scale because they fly in the face of mainstream theories of economics and management and therefore are suppressed by the dominant paradigm.

Multi-Level *Systems*; rather than Multi Level Selection

Studies of patterns of complex systems reveal they have "fractal" properties. Each part of the system has the same character as the whole system, albeit on a different scale. Zooming in to examine the structures of snowflakes or the curves in coastlines for example, reveals an uncanny similarity in the shapes of wholes and their parts. Human societies too contain the same forces—of power, emotions, material needs, and need for respect—at all levels of the system, from the local to the global.

Biological evolution emerges from an interplay of forces of competition and collaboration. These fundamental forces combine at all scales of human systems—within the family, within the village and the city, within the country; and even at the global level where countries compete though they are realizing that they must cooperate for the well-being of the whole system.

Cooperative systems of governance are required at many levels, from the local to the global. Ostrom's seven principles provide a framework for cooperation amongst individual entities for maintaining the well-being of the commons they all share. Potentially, these principles can apply to all levels of the system. They outline mechanisms for preventing the tragedy of the commons and realizing its promise.

Processes alone do not give systems their shapes. Systems have structures also to give them shape and enable processes to function within them. Processes of interactions between people are supported by social structures; and processes of evolution in nature are supported by Nature's structures. For example, mechanisms of selection and replication, which are the essence of biological evolution, require sufficient variety as a structural condition to enable them to perform. Processes also impact the structures within which they operate. If not mindful of the interplay between process and structure, a system can destroy the structures it needs for its continuation.

The architecture of complex organic systems

Organic systems have "fractal" structures as mentioned before. A dominant pattern in the system is revealed at many levels of scale. The shape of the whole reappears in the shapes of its parts. However, all parts are not identical: just as all the leaves of an oak tree are recognizable as leaves of an oak though each is unique. They are similar, not the same. Though the ingredients that compose all of them are the same, a standard template of precise shape and size will not fit all.

The reason for this "self-similarity", systems scientists have discovered, is that patterns that 'scale' are created by the interaction of a few architectural principles along with a few algorithms for the system to sustain itself. This minimal set of fundamental rules produces the same pattern at multiple levels of the system.

Studies of naturally constructed systems (such as those that proliferate in Nature), as well as the structures of institutions designed by humans, such as corporate enterprises, reveal four basic architectural principles that can enable complex organic (and human) systems to cooperatively adapt to their changing environments. Each principle applies to an essential 'structure' to complete the design of an institution.

1. The structure of its *Boundaries:* **Permeable Boundaries**
2. The structure of its *Resources:* **Flexibility in Resources** (with three sub-principles: Requisite Variety; Adequate Redundancy; and Latent Valency)
3. The structure of its *Processes:* **Minimal Critical Rules**
4. How the system discovers its *Strategy* (a path for its evolution): **Aligned Aspirations**

Like fractals, these principles apply at all "scales" of human enterprises.
The basis of these principles is explained in *Redesigning the Aeroplane While Flying: Reforming Institutions* (Arun Maira, 2014).

Elinor Ostrom has distilled eight "Common Design Principles" from her research of self-governing communities. They are congruent with these four architectural principles. The four principles apply to the overall architecture of institutions. Ostrom's eight principles explain the process of 'governance' within them.

The four principles outline the requisite architecture of a complex system for it to sustain its own evolution.

- Every unit must have a sufficient variety of resources within it to enable its own innovation.
- Units must have permeable boundaries within themselves and permeable boundaries with their environment.
- Aspirations of those above who govern agglomerations of units must be aligned with aspirations of the units; and members of units must be internally aligned too.
- Units must apply only critically necessary rules in their internal governance, and those above must apply only a few critically necessary rules for the governance of the agglomerations of units below them.

Three of these principles (permeability, flexibility, minimal rules and only critical rules) were discovered from studies of complex systems in Nature and experiments with complex computer systems such as the Game of Life. The fourth principle, for alignment of human aspirations, cannot be derived from natural systems and computer systems. It was derived from studies of human institutions inside and outside the corporate sector. These principles and how they were discovered has been explained by my elsewhere. (See pages 111-126 and 227-241 in *The Solutions Factory*, Arun Maira, 2021).

The four principles describe the architectures of living systems at all levels that are 'on the edge' between stasis on one hand and chaos on the other. Ostrom's seven principles and these four architectural principles are congruent with each other. Fractal like, they provide a framework for governing systems at all levels from the local, and intermediate, to the global.

Local cooperation to solve global problems

The 17th SDG is a goal for improving the quality of partnerships at all levels of the global system. Cooperation is also essential among the experts and multi-stakeholder teams operating in silos on separate goals. Because there will be no use in achieving a global goal for carbon reduction for example, if the solutions for net zero carbon make goals for poverty reduction harder to achieve in many parts of the world.

Sadly, we have learned that solutions for saving people from dying from Covid alone can kill many more people from other conditions that are aggravated by the diversion of attention, and resources, to prevent deaths from Covid. We are also learning that communities that have suffered the least *all round* during the pandemic appear to be those where local stakeholders collaboratively found solutions for all the problems affecting them simultaneously.

Every human body is unique, even though all human bodies are composed of organs with similar shapes and compositions: hearts, livers, lungs, brains, etc. Therefore, good general physicians, who are sadly becoming a rare breed in a world of hyper specialization, don't jump too quickly to any conclusion about the problem to be solved. They try to understand what, "all things considered", will be the best course of treatment for their patient. They know that all humans are not the same, and that even the same person's condition changes over time. They know that "one size fits all" solutions, which may be prescribed for the sake of efficiency in healthcare, are likely to be wrong for many patients.

Every country in the world must improve the conditions of its society, economy, and environment. However, the shapes of complex socio-economic-environment systems are different in different parts of the world—even within countries. "One size fits all" solutions imposed from the top is a scientifically unsound approach to solving dynamic systems problems and building resilience in every country and every community. *Local systems solutions developed and cooperatively implemented by communities is the solution to global systemic problems.*

A battle of ideologies

The concept of economies and societies as machines, in which levers can be pulled by controllers outside them, or sitting above them in positions of power, which is the present paradigm of economic policy-making, is a fundamental flaw in the design of governance systems within countries and globally.

A corollary of a multi-level systems model of evolution, which is the appropriate model for the governance of human and environmental affairs on Earth, is that the 'global' level of governance on Earth cannot rely on the mechanism of multi-level selection for improvement of its construction. There is no level above it with which it is closely

connected, and no system close to it with which it is competing for resources. Therefore, governments of all nations on Earth must cooperate to develop good rules to govern creative competition amongst themselves, and also equitable rules for governing the commons of the Earth they all share, to avoid mutual destruction.

Moreover*, they must build their collective capacity to enforce such rules democratically*. This has not been possible so far in spite of the creation of the United Nations after the horrendous world war that ended with the use of nuclear weapons of mass destruction on innocent civilians. Humanity seems to be on the brink again. Hopefully, violence in Ukraine will end soon. However it will not end history: the competition of ideologies, and battles for hegemony, will continue in other ways.

The West and the Soviet Union competed to develop weapons of mass destruction during the long Cold War. John F Kennedy rallied US public and private institutions to collaborate to put a man on the moon ahead of the Soviets. The Cold War ended with the collapse of the Soviet Union. Now another cold war has begun. The US, China, and Russia, are racing against each other to develop digital weapons, and financial and trade weapons. Sadly, the same leaders who must cooperate to solve global problems are once again appealing to their own country's citizens and other countries to unite to defeat an external enemy.

When the Soviet Union collapsed in 1991, political scientist Francis Fukuyama prematurely declared the 'end of history'. According to him, the ideologies of private capital and multi-party electoral democracy had defeated the opposing ideologies of large government (along with government provisioning of public services) and one-party political systems. Capitalism and democracy had finally prevailed over socialism and totalitarianism it seemed.

History has returned. The history of ideological conflict between democracy and capitalism has not ended even within the Western victors of the old Cold War. Resistance to reduction of the role of governments continues in social movements in the West, who speak on behalf of people being left behind by the "free market" of private enterprise. Other voices on the Left speak for protection of the natural environment. Meanwhile the Right advocates for more freedom for capital to roam the world, and the World Bank ranks governments by the ease of capital doing business in their countries.

The fundamental conflict between the principles of capitalism and democracy—between the rights of owners of capital and the rights of all humans—continues. It is a conflict between political conservatives and political progressives—between those who want to retain their power to fix the rules of the game from which they have benefitted, and those who want to change the rules for the benefit of those left behind.

The trade-off between returns to labor and capital has been a perennial problem for economists. Marx favored labor. The political economies of all countries around the world have veered, for the past fifty years, towards increasing returns for capital. This has resulted in social (and economic) pathologies. The Japanese model seemed to balance the interests of workers and the interests of capital by providing life-time employment, and unions to represent workers' interests. Whereas, in the 'Anglo-Saxon' model of the political economy, favored by the Chicago School of economics, and Margaret Thatcher and Ronald Regan,

which began to prevail after the collapse of the Soviet Union and the rise of the 'Washington Consensus' in the 1990s, capital, which became globally mobile, demanded 'flexible' labor markets to attract it, even suppressing the rights of workers to unite and demand fair treatment. Thus, capital suppresses democracy when its own interests are affected. Capitalists have propped up many dictatorships against socialists.

The global power shift towards capitalist institutions in the last fifty years has weakened democratic institutions. More wealth provides more political power in determining economic policies in countries, even 'democratic' ones, and in international institutions such as WTO and IMF. In capitalist institutions, it is fair that those own more must have more rights to decide how the enterprise should be managed: one dollar provides one vote, and a million dollars must provide a million votes. On the other hand, in democracies, all humans, whether they own a lot or nothing at all have equal votes—one human heart is one vote.

The provision of "universal basic incomes" has been proposed by some economists as the solution to the macro-economic (and political) problems that elimination of jobs and suppression of workers' wages have created. Universal basic incomes handed out to people may ease social unease and increase markets for goods and services produced by increasingly automated systems owned by capitalists. But they create resource problems for governments, who are discouraged from increasing taxes on capitalists and, at the same time, constrained by their economic advisers to keep budgets balanced.

Universal basic incomes will not enhance individual agency in the political economy. The poor will have to depend on the continuing kindness of wealthy and powerful people to improve their well-being. People want to stand on their own feet, earn wealth, and gain respect. Therefore, structures of economies, and business enterprises, must be changed to enable the growth of "universal basic wealth" to provide all persons with greater agency in the governance of their lives. Mahatma Gandhi understood this and therefore advocated concepts of cooperative enterprises and "trusteeship" in capitalism.

Truth to Power; Listening to "People Not Like Us"

Theories of governance must change fundamentally. They must be guided by a new science of complex *self*-adaptive systems, with an understanding of the motivations of human beings as forces within them.

The story of human institutions is a story of power: of the means to acquire power; of the ways of using power; and equity in the acquisition and use of power. It is a story of the interplay between competition and cooperation. Much more cooperation is required, rather than competition, at *all levels on the Planet*—locally within communities, and at the top amongst nations. Excessive competition to improve the fitness of individuals, firms, and nations is destroying the world for everyone.

The evolution of the 'human self' is integral to the evolution of healthy social systems. The purpose of a human life cannot be limited to merely being a resource for an economic machine. Moreover, concern for the well-being of others rather than only oneself, which is an ethical principle in all religions and spiritual traditions, must guide human actions rather than self-interest and competition.

Gandhi gave a talisman to reformers and policy-makers. “Think of the impact your policy will have on the poorest and most powerless person you can see.” Like canaries in a mine, their lives are the most vulnerable: the condition of their lives is a test of the overall health of the system.

What cannot be counted

The power of information technology to read, manipulate, and store data in digital form has expanded unimaginably in the last twenty years. Digital devices communicating directly with each other are making human intervention unnecessary and human beings even irrelevant. “Big data analytics” is the new game of power and progress.

The Prisoner’s Dilemma examines the question of whether cheating or cooperating with another is a more gainful strategy. Prof. Kaushik Basu has introduced a variant of this game he calls Greta’s Dilemma (*Greta’s Dilemma: Conventions, Morals and Strategy: Greta’s Dilemma and the Incarceration Game, Kaushik Basu, 2021)* to explain the conundrum in demanding sacrifices in the present to save the planet for future generations. Applying the principles of game theory, it seems the future would be worse if leaders were to accept Greta Thunberg’s demands at the UN General Assembly.

The Prisoner’s Dilemma is a simple game. It pits two players against each other. The players could be corporations or nations, but it is always someone against another. The players are stripped of their histories, their values, and their qualities. Instead they are given a simple, digital identity for the convenience of the game. When there are millions playing simultaneously, they must be aggregated—those who “think like Greta” and those who do not—so that the two “strategies” can be pitted against each other for the game to determine which is a better strategy. Such over-simplification of their identities and preferences, for the sake of playing a mathematical game, can make whatever theories are derived from it wrong in real life.

Human beings have many needs, many fears, and many aspirations. They have emotions; they want dignity, and respect for whoever they may be—black or white, rich or poor. It is impossible to get agreement on what the objective of any broad policy should be that will satisfy all human beings equally. When there are diverse interests, whose concerns should matter most?

Kenneth Arrow (who won the Nobel Prize in economics in 1972) propounded the Impossibility Theorem. He proved, mathematically, that when voters have three or more distinct alternatives (options), no ranked voting electoral system can convert the ranked preferences of individuals into a community-wide agreement. The Arrow Impossibility Theorem is a fundamental dilemma in social choice theory, a discipline within economics in which Nobel Laureates Douglass North and Amartya Sen worked extensively too.

The Impossibility Theorem proves there is no voting method in which voters by expressing their votes as ‘yay’ or ‘nay’ can produce a unanimous outcome, no matter how many rounds of votes there are. The mathematical problem here is that individual voters’ preferences cannot be sliced and diced; nor can the choice before them be made too simply as ‘this or

that' to enable easy voting and counting (as was done for Brexit for example.) Human beings' preferences are formed by combinations of many factors in their histories and in their present circumstances; also, by what they value most, which may differ from what other citizens value more.

Choices must be framed clearly before digital voting. Therefore, deliberations among citizens who have diverse views are essential *before* votes are called. The Brexit vote, though close, was quickly counted. But the dispute within Britain continues about what all citizens really want.

What must count

In a diverse society, people speak in many languages. In an economy, they adopt money as their common language. While this enables efficiency in transactions, it can strip out what is human among the transactors. Digital platforms for financial transactions reduce the costs and increase the efficiencies of transactions. The platforms are not concerned with the "values" of the parties transacting among themselves.

The value of money is precise, whereas the meanings of justice and the values of happiness cannot be expressed digitally. When people speak to demand justice or demand more happiness, what they want is not measurable in monetary terms. Therefore, it is confusing for economists to listen to what they are saying, as Milton Friedman, the author of the theory that "the business of business must be only business", had complained according to his contemporary, Albert O. Hirschman, an eminent political scientist.

Friedman had expressed difficulty in accepting the notion that people should desire to speak their views to make them prevail. He described people's desires to be heard as a resort to "cumbersome political channels". He would much rather they resorted to "efficient market mechanisms" and used their money to make their opinions known. In markets, consumers have a choice to buy or not buy a product. Consumers can make themselves heard by simply walking out. "Exit is the sort of mechanism economics thrives on. It is neat—either one exits, or one does not; it is impersonal—any face-to-face confrontation between customer and firm with its imponderable and unpredictable elements is avoided," Hirschman explained.

"Put your money where your mouth is", is the way in a market economy. And "money must be heard", is morally right too for otherwise the economy would not work. People who have little money, or no money, count less in business and political lobbies. Thus, money speaks loudly to shape economic policies even in electoral democracies, as Thomas Piketty explains in his extensive, and data-supported, history of the evolution of economic policies in many countries, *Capital and Ideology (2020).*

Milton Friedman's problem with voice is a dilemma of measurement that pervades economics. Marianna Mazucatto explains, in *The Value of Everything: Making and Taking in the Global Economy (2017),* how the concept of 'value' has been corrupted in the financialized world where 'valuations' in money terms matter more that 'values'. The philosopher Michael Sandel goes further. In *What Money Can't Buy: The Moral Limits of*

Markets (2012), he explains how societies can be corrupted when human values are replaced by money values.

IV. A way forward: deep listening to 'people not like us'

Climate change, social injustice, and weak global governance are systemic problems. They cannot be solved by experts in separate academic silos. "Systems thinking", combining many disciplines and many perspectives, is essential. Many points-of-view must be seen, and many voices heard, especially of "people not like us", to understand the reality of which we are all only parts, and which we have created by our actions. Our actions may be deliberately in opposition to others or unwittingly misaligned.

Listening to others is not easy when what they say seems so wrong. It may seem wrong because others see the same reality through different lenses. Like the blind men around the elephant, each of us is convinced that what we see is the truth, which it may be. But it is not the whole truth.

Listening is for the health of a society, like breathing is for the health of the body. Like breathing, listening is a very simple mechanism. Breathing and listening are amongst the first mechanisms babies learn when they are born. However, bad habits form with growth. Bodies become unhealthy with poor breathing; and democracies become unhealthy with poor listening. Deep breathing tones up all the organs of the body and relaxes the mind. Deep listening opens minds, unclogs conversations, and tones up democratic institutions.

The central question of our times is, "How on Earth can we live together?" How can people live harmoniously together within their national boundaries? How can the people of all countries live harmoniously together and with their one shared earth?

Good yoga teachers train their pupils to breathe well. They encourage them to concentrate on their breathing for a few moments each day: sitting on a chair at home, or even while traveling in the sub-way. Similarly, deep listening can be practiced everywhere: in a conversation with one's spouse, a discussion amongst a few friends, deliberations amongst stakeholders in a project, in small meetings, and in large conventions too.

The more we listen to each other, and the better we get at it, the faster and further we will go towards achieving the SDGs. Which we must to improve the world for everyone, and to make the world better for ourselves too.

The question, "What sort of world are we leaving for our grandchildren?" has become a cliché. We cannot continue to live as we are, and leave it to our children to produce a more just, more harmonious, and more sustainable world for our grandchildren. All generations must work together. Greta Thunberg was right to demand that the older people in power in governments and in the UN General Assembly take responsibility for the world they have created. They must unlearn the ways that have brought them the power they have. But Greta's generation must take responsibility too for shaping a new world, even when they are young, because it is the world they will live in when they are grandparents.

We must change, and we must collaborate with others to shape our collective future. Let us listen to our own aspirations. We must listen also to the aspirations of people not like us for the better world they want to leave for their grandchildren.

Scientific breakthroughs in the last century have produced technologies with great benefits for human well-being. They have also produced a range of WMD: nuclear weapons of mass destruction and digital weapons of mass disruption. Global governance systems are straining to stop the proliferation of these WMD. They are also unable to find solutions for systemic problems that are the unintended consequences of relentless pursuit of economic growth such as climate change and increasing inequality.

The emerging science of complex *self*- adaptive systems provides a framework for a new science of economics and a new architecture of global governance to solve these systemic problems. The key to evolution of new systemic solutions is listening to 'people not like us'. Ways of mass dialogue is the WMD that must be proliferated to improve the well-being of the planet and all life on it.

I end with a poem from my book, *Listening for Well-Being: Conversations with People Not Like Us (2017)*

LISTEN TO THE WORLD

It is time to press the pause button; put our smartphones on silent;
Shut out the tweets, trolls, and sound-bites;
And stop the windmills in our minds.
It is time to listen.
To listen to the whisper in the trees; the caring in our hearts;
And most of all, to the voices of people not like us.
Then we will learn and find solutions for living together on this earth.

Arun Maira
May 14th 2022