



PROMOTING LEADERSHIP IN THOUGHT
THAT LEADS TO ACTION

THE WEALTH OF NATIONS REVISITED

CADMUS

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The CADMUS Journal

The acronym of the South-East European Division of The World Academy of Art and Science – SEED – prompted us to initiate a journal devoted to seed ideas - to leadership in thought that leads to action. Cadmus (or Kadmos in Greek and Phoenician mythology) was a son of King Agenor and Queen Telephassa of Tyre, and brother of Cilix, Phoenix and Europa. Cadmus is credited with introducing the original alphabet – the Phoenician alphabet, with “the invention” of agriculture, and with founding the city of Thebes. His marriage with Harmonia represents the symbolic coupling of Eastern learning and Western love of beauty. The youngest son of Cadmus and Harmonia is Illyrius. The city of Zagreb, which is the formal seat of SEED, was once a part of Illyria, a region including what is today referred to as the Western Balkans and even more. Cadmus will be a journal for fresh thinking and new perspectives that integrate knowledge from all fields of science, art and humanities to address real-life issues, inform policy and decision-making, and enhance our collective response to the challenges and opportunities facing the world today.

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Slower economic growth, financial instability, rising levels of unemployment and inequality, and depletion of scarce resources seem to be inextricably linked together, a gruesome set of omens prophesying the failure of free market, industrial capitalism and an early end to the exhilarating rates of growth witnessed by the industrialized nations in the aftermath of the Second World War. The current international financial crisis, economic contraction in some countries, slower growth in many others, high unemployment and rising inequality in OECD countries today appear, in retrospect, to be a natural outcome of a long historical trend. Recent global concern regarding climate change arising from the increasing and unsustainable consumption of fossil fuels seems only to confirm the deepest suspicions of those who believe that something is fundamentally wrong with current economic theory and the prevailing industrial growth model. But none of this was very clear at the time it was taking place. It was at this crucial juncture in recent history that Club of Rome published its landmark report *The Limits to Growth*, stirring vigorous debate and raising fundamental questions about humanity's future economic prospects.

Today we are poised like the 15th century Portuguese sailors who were urged by Henry the Navigator to navigate around the Cape of Bahador, and feared to travel to what so many believed was the edge and end of the world. As the whole world grapples for new ideas and practical solutions to fundamental economic and ecological challenges, it may be reassuring to discover that a significant groundwork has already been laid for the new theoretical perspectives so desperately required. Orio Giarini has been an eye-witness to these unfolding events, a keen observer of each step in the process, a critical analyst of prevailing ideas, and a cauldron for the brewing of new perspectives that gradually distilled over decades into profound insights. An unusual mix of academic economist, business practitioner, scientific research manager and original thinker, his four reports to the Club of Rome present provocative questions and fresh insights that press back the borders of conventional thinking in economics and extend beyond to the entire field of social sciences, challenging our very conception of knowledge. Raised in the fading old-world humanistic cultural values of Trieste, he learned to think freely and unconventionally while on Fulbright Scholarship at the University of Texas, acquired a disciplined realism and practicality during years directing industrial and scientific research at the Battelle Institute in Geneva, and learned to peer beyond the veil into the uncharted waters of uncertainty for almost three decades as founding Director of the Geneva Association, a global think tank established by the most important leaders of the world's insurance companies.

1. Origins of the Club and the Report

Revolutionary advances often begin with a crisis. That is true of intellectual revolutions as well. The crisis of the early 70s was pre-eminently a crisis of the mind. It arose from a study commissioned by an informal think tank established by Aurelio Peccei and Alexander King in April 1968, a month prior to the largest ever general strike and massive public protests in France concerning the economic and social evolution of democracy. Peccei's rich and varied experience working in China before WWII, as one of the leaders of anti-fascist resistance during WWII at Fiat in Argentina after the war, and back in his native Italy as vice president of Olivetti and an important consulting group in the 1960s, exposed him to a wide range of social and economic conditions. The Cold War confrontation between the USSR and USA combined with the persistence of poverty and rapid population growth in developing

countries made him acutely concerned about the increasing vulnerability of the world to global disaster. He set forth these concerns in a book on global interdependence and planetary challenges entitled *Chasm Ahead* (1969).

Peccei was an industrialist. His co-founder was a scientist. Alexander King was at that time director-general of education and science at the Paris-based Organisation for Economic Cooperation and Development. A Scot by birth, a chemist by education, he coordinated Anglo-American military research during WWII, and later served as chief scientist at the British Department of Scientific and Industrial Research and then as director of the European Productivity Agency in Paris during the 1950s. He emerged from this experience with a strong commitment to work for the peaceful application of science for the betterment of humanity. These two were joined by Saburo Okita, a key economic adviser to the Japanese government who later became Foreign Minister; engineer Eduard Pestel, President of the Volkswagen Foundation, who founded the Institute for Applied Systems Analysis and Forecast eV (now Pestel Institute) and later became Minister of Science and Arts in Lower Saxony; and Hugo Thiemann, Director General of the Battelle Institute of Geneva, who requested Giarini to attend meetings and organize the first official conference of the Club of Rome at Berne in June 1970.

That meeting proved decisive. Hasan Özbekhan had been charged by the Club with preparing a project to describe and analyze the world “problematique” and launch a debate on possible solutions. Özbekhan was an American intellectual of Turkish descent, who had produced some reports for OECD on how to develop a modern economic plan. When he frankly confessed to Club members in Berne that his proposal had almost no chance of producing useful results, Jay Forrester of MIT’s Sloan School of Management bravely offered as an alternative to apply systems analysis to develop a model of global interdependence. Forrester drew up the basis for what would become the Club’s famous report on limits to growth during his flight back to the USA. Incorporating data on population growth, industrialization, food production, pollution and depletion of resources within a single model, he produced graphs illustrating that the world’s development would reach unsustainable levels within forty years, leading to a blind alley or a planetary crisis. After his preliminary text was endorsed by the Club’s executive committee at a meeting in Boston, Forrester entrusted verification of the simulations, assumptions and data to his assistant, Dennis Meadows, who drew on other university resources to organize special sectoral studies on key issues.

Forrester’s model highlighted a serious increase in pollution (already so very apparent in the rivers and urban centers of the Western world), the impacts of continued high rates of population growth, and the negative environmental effects of rapid economic growth. Coincidentally, this was the time when Battelle Institute was conducting research sponsored by major corporations examining the hypothetical impact of a quadrupling of oil prices. Prophetically, the actual price of oil did rise from \$3 a barrel to \$12 between 1971 and 1974.

“The Limits to Growth portrayed the dark face of the benevolent God of infinite human well-being aspiring to liberate growth from its negative stigma by challenging the superstitions that support its irresponsible, destructive and extravagant excesses.”

2. Intellectual Challenges

Like the worldwide protest movements of the late 1960s, which spread like wildfire because they were negative expressions of positive social urges for greater freedom, social equality, human dignity and self-affirmation, *The Limits to Growth* portrayed the dark face of the benevolent God of infinite human well-being aspiring to liberate growth from its negative stigma by challenging the superstitions that support its irresponsible, destructive and extravagant excesses. No one had anticipated the magnitude and intensity of fervor that would be generated when the report was published in 1972. Journals were inundated with articles, often written or inspired by economists, loudly and vigorously denouncing the false conclusions and deceptive logic applied in the report, challenging the very notion that a crisis or a slowdown in economic growth was at all likely. Harsh attacks by many economists centered on one point: according to them, the report under-rated the infinite or almost infinite capacity of research. Many confidently proclaimed that as soon as resources became scarce, pricing mechanisms would stimulate research which would in turn supply new solutions. These authors apparently believed that discovery and invention were merely a matter of short term investment. Conveniently, forgetting the long list of qualifying and rarely realizable conditions required for equilibrium between supply and demand taught in every first year economics course, this faith in the power of price to dictate results was tantamount to belief in myth or magic.

Giarini's experience directing long term research and technology development projects at Battelle did not support this blithe assessment. While fully cognizant of the remarkable achievements of modern science and technology, he knew firsthand the inherent risks involved in all research activities and the very high probabilities of failure. In pharmaceutical research, for instance, less than one in a hundred new ideas reaches clinical trials and fewer than ten percent of those ever reach the market. He realized that it was simply unrealistic to assume research could always be relied upon to generate any specific set of desirable results within a given budget and timeframe. Otherwise, how to explain why a cure for cancer and low priced electric cars had not been developed long ago? He was astonished by the unquestioning faith of those

"The inherent uncertainty of future events was overlooked, which meant not only the possibility of unexpected failures, but equally the onset of unanticipated discoveries."

who believed that the fundamental research was, in modern society, a factor totally within the economic system and subject to the same law of supply and demand that governed the production of toothpaste and TVs. This view failed to take into account limiting conditions, inertia, perceived risk factors and structural rigidities. But more fundamentally, he was struck by the fact that opponents of the report failed to recognize the inherent uncertainty of future events. Later, he was to observe the same attitude of confident absolutism among prophets of economic and ecological doom. Here too, he found unquestioned conviction that extrapolation from past and present trends was proof of future catastrophe. The end of growth appeared to be a foregone and inevitable conclusion. Here too, the inherent uncertainty of future events was overlooked, which meant not only the possibility of unexpected failures, but equally the onset of unanticipated discoveries. As none had expected the quadrupling

of oil prices in the early 70s, whoever imagined or anticipated the sudden emergence and exponential growth of the Internet since the mid 90s?

Gradually, the controversy over the Club of Rome report spread from the economists to the political arena in Europe. European Commission President Sicco Mansholt broadened the debate regarding ecological problems. Conservative French economist Raymond Barre and others condemned the report's dire economic prognosis as a provocation for social unrest. Secretary General of the French Communist Party, Georges Marchais, denounced it as a conspiracy of the industrial right to undermine labor union wage negotiations. Some Soviet intellectuals hailed it as a sign of the coming crisis of capitalism. Both the praise and vehement attacks on the report helped spread the word and boost circulation of the book, which was translated into ten languages and eventually sold over 10 million copies. Unexpectedly, quotations from the report regarding growth, ecology, population growth even found their way into academic text books. In spite of repeated efforts to emphasize the environmental and demographic issues, to the dismay of Peccei and King, the Club became widely regarded as an advocate of "zero growth". Academia and public opinion generally found themselves on opposite sides of the debate, but eventually it was public opinion that held sway. Calls to respect the environment, conserve natural resources, and strive for sustainable growth became increasingly frequent.

2.1 Scientific Certainty vs. Social Reality

The wide gulf between economic thinking and actual economic reality points to a more profound gulf in knowledge underlying failures of modern economic theory as well as social theory in many other fields – the profound disconnect between theory and human life. The remarkable success of the natural sciences in earlier centuries had generated a blind confidence in the ability of science to measure, analyze, and deconstruct reality and then reassemble it in a more perfect configuration and working order. The mathematical precision of astronomical projections by Copernicus and Galileo, the infallible accuracy of the laws of motion which Newton deciphered, and countless other discoveries had created a widespread belief, which matured into a pervasive and unquestioned assumption, that a similar application of mathematical principles to economic and social life could lead to equally valid principles. Ironically, physicists had abandoned this simplistic notion almost a century earlier when Heisenberg first postulated his uncertainty principle. Yet, 19th century belief systems continue to pervade the social sciences.

2.2 Equilibrium vs. Evolution

Furthermore, while the motion of objects, the behavior of gases and other physical processes could be accurately defined by equilibrium equations, it became apparent that social processes could never be adequately explained based on laws of equilibrium, because society undergoes a continuous process of development and evolution. Giarini argues that the well-known economic principle that the supply equals demand is not a law at all, but only a tautology. Economic systems very rarely and only transiently reach anything close to equilibrium. Indeed, as Soros and others have observed in diagnosing the current international financial crisis, markets tend to be inherently unstable, moving far from equilibrium before swinging back in the opposite direction. This is especially true of financial markets which are subject to unregulated speculation and profit-taking.

“The report proved the inherent limitations of the existing industrial model of economic growth, not any inherent limits to growth itself.”

But Giarini’s challenge goes even further. He argues that the very nature of economy is evolving and that the rules and formulas applicable to the old industrial economy which is receding are decreasingly relevant to the knowledge-based service economy which is emerging. Without our realizing it, the fundamental laws of economics have changed. Indeed he contested the widespread viewpoint of many both within and outside the Club of Rome that the report conclusively establishes finite limits to growth. *Rather, he argued that the report proved the inherent limitations of the existing industrial model of economic growth, not any inherent limits to growth itself.*

2.3 Divorce in the Social Sciences

The Limits to Growth pointed to one of the major reasons for this disconnect between theory and reality – a specific instance of a more fundamental schizophrenic malady – the tendency of the modern mind to dissect reality into slices and then further detail them into smaller and smaller segments which become increasingly separated and unconnected to the larger whole of which they form a part. He discovered this tendency not merely among theorists, but among business practitioners as well as scientists. The plight of humanity which the Club of Rome identified arose from a tendency to focus on economic growth for its own sake divorced from its wider impact on society and the environment. Theoretically, this translated into a narrowing and specialization of focus – the divorce of economics from political science, society, ecology and culture; the divorce of economic growth from employment and social welfare; and, as we now witness with increasing dismay its consequences, the divorce of financial markets from the real economy. Long ago he concluded that this fragmentation gives rise to a partial, fragmented and grossly distorted view of reality. More importantly, it gives rise to uni-dimensional strategies that sooner or later run into brick walls or threaten to bring down the entire edifice of civilization.

The controversy presented repeated occasions for serious reflection on fundamental assumptions underlying modern economics and prompted him to return for fresh insights to the great classics of economics, from Adam Smith to John Stuart Mill, by way of Marshall and Schumpeter. His reading compelled him to undertake a fundamental reassessment of the entire role of economy in the wider field of social existence. He was aided in this effort by continuous opportunities to interact and exchange views with other leading thinkers of the day. In addition to Aurelio Peccei, Alexander King, and other original members of the Club of Rome, his thought was stimulated by interactions with Nobel economist Jan Tinbergen; Karl Schwab, founder of the World Economic Forum; Michel Albert, Director General of the European Community and later President of the second largest French insurance group, Assurances de France; and many other prominent thinkers. In 1986 he set up the organizing committee for the Risk Institute, whose members came to include Nobel physicist Ilya Prigogine; science philosopher Karl Popper; futurists Alvin and Heidi Toffler; Raymond Barre, former EU Vice President before he became the first President of the Geneva Association and then the French Prime Minister; and Fabio Padoa, Managing Director of Generali Insurance in Trieste and founder of the Geneva Association.

3. Breaking the Limits

Giarini's four reports to the Club of Rome pinpoint limitations in prevailing theory when confronted with a rapidly evolving social reality. Saved from cynicism by a keen sense of history and a deep faith in human values, his books present an analysis of these limited conceptions and a plethora of fresh perspectives struggling desperately to be grasped, formulated and communicated.

In *Dialogue on Wealth and Welfare* (1980) he examined underlying premises regarding contemporary economic theory and its relationship with human welfare. Drawing on insights from Smith's *Wealth of Nations*, he traced back the roots of modern economic theory to the crucial point where theory became divorced from social reality. Smith had always regarded himself foremost as a moral philosopher and his interest in economics arose directly from his interest in promoting the welfare of humankind, both in his own country and in the world-at-large. For him, economic theory was a means to an end and never an end in itself. The task of the economist was not to discover the inalienable laws governing economic systems but to discover the means by which economic systems could be made to best promote the welfare of human beings. For him, economy was an inextricable part of a greater social whole. It is true that Smith advocated removal of barriers to free international trade, which under mercantilist regimes had become so burdensome that they stifled enterprise, supported monopolies and discouraged efficiency. But at the same time he regaled the blind pursuit of self-interest by business at the expense of public welfare and was deeply concerned by the concentration of wealth and power among a small group of influential producers.

“Adam Smith’s interest in economics arose directly from his interest in promoting the welfare of humankind. For him, economy was an inextricable part of a greater social whole.”

3.1 What Type of Growth?

In his first report to the Club, Giarini argues that the central question regarding growth is not ‘How much?’ but ‘What kind?’ The simple, self-evident conclusion he arrived at was that the value of economic growth depended solely on its contribution to human welfare. Growth for growth’s sake is not only meaningless, but potentially disastrous. The problems highlighted in the Club of Rome report arose directly as the result of fundamental defects in the prevailing concept of economic growth.

That concept of growth is based in turn on a distorted view of economic value. Economics was founded at a time when scarcity appeared to be the inevitable human condition. Industrialization was viewed as a means to mitigate shortages by raising human productivity and lowering production costs. It was natural enough under these circumstances for the early economists to consider any increase in production as a net addition to national wealth, but that ceased to be a valid assumption long ago.

“While most economists worried about how to stimulate demand to keep pace with growth of production, the changed circumstances compel us to ask a more fundamental question: “What type of growth do we really want?””

Before the end of the 19th century, the problem of limited supply was supplanted by the problem of limited demand. Industrial economies could produce an endless supply of goods, but unless purchasing power were widely distributed and continuously rising, there would soon be too few people with the capacity to procure them. The principal economic crises of the 19th century were crises of demand. In recognition of this fact, Marshall first and then Keynes and later on more and more economists shifted their focus from the supply side to the demand side of the equation, which gave rise to a new set of economic principles that guided public policy in market economies throughout most of the 20th century. In the process of trying to keep growing, economists lost sight of a larger issue; namely, that unlimited capacity for production would inevitably tax the carrying capacity of the earth's resources. While most economists worried about how to stimulate demand to keep pace with growth of production, the changed circumstances compel us to ask a more fundamental question: "What type of growth do we really want?"

"The only sound basis for assessing the value of any economic activity is according to its contribution to human welfare."

3.2 The Problem of Value

This led Giarini to one of the most vexing problems of modern economics, the fundamental notion of value. You get what you measure, according to the management dictum; and the type of economic growth prevalent for the past two centuries is a direct reflection and result of the way we define and measure economic value. A truly constructive science of economics that eliminates the wasteful excesses and destructive aspects of unregulated activity can only be founded on a wholly positive conception of economic value. In *Dialogue on Wealth and Welfare*, he analyzed the fundamental flaws in the prevailing notion of value and how it is measured. Although many of his insights have now been widely recognized, his arguments still carry the force of his original perception and theoretical clarity. Value is a purely human conception and the only sound basis for assessing the value of any economic activity is according to its contribution to human welfare.

This led him inevitably to the concept of negative value. It could well be, he argued, that many transactions recorded as productive may be destroying more than they produce. Prevailing measures of economic growth and national wealth are based on the implicit assumption that all monetarized activity adds to the total stock of wealth and that this is the sole or major determinant of the wealth of nations. This premise ignores the now obvious fact that current wealth creation is largely based on the consumption of non-renewable natural resources, whose true replacement value is not being measured. Long before the consequences of climate change threatened to undermine all conventional notions of economic value, he argued that the real future cleanup costs of pollution from industrialization

"Much of what we measure and record as growth represents activity which may actually reflect a deterioration in human welfare."

and fossil fuel consumption were not reflected in measures of GDP and when later they came to be included, the expenditure to address pollution would be recorded as a further positive contribution to growth. Is expenditure on treatment and management of refuse really a net addition to wealth and welfare? Obviously, not all economic activity reflects a real enhancement in human welfare. Indeed, much of what we measure and record as growth represents activity which may actually reflect a deterioration in human welfare. Rising costs of medical care resulting from pollution and lifestyle stress, expenditure on bottled water to replace contaminated natural sources, rising costs of the criminal justice system due to higher rates of crime and drug abuse, increased military expenditure in response to high levels of youth unemployment, social unrest and terrorism abroad, all contribute to growth of GDP, yet result from a deterioration rather than an enhancement in human welfare. So too, the divergence of capital from the real economy to speculative financial markets has generated higher rates of growth for the financial service sector over the past two decades, but far fewer jobs and widening levels of income inequality.

A central theme of the report is the vital distinction between wealth and income. The right goal of economic activity is to enhance the wealth of the population, which means to enhance its accumulated capacity for consumption (stock), rather than striving to perpetually stimulate greater production (flow) for its own sake. The report challenged the very notion of trying to measure human welfare in terms of the flow of economic activity, as GDP measures it. Is the wealth of nations really enhanced, if rapid mechanization leads to a drastic increase in production at the cost of large scale unemployment, rising crime rates and mounting industrial pollution? Theoretically, it might be possible to generate an endless array and volume of goods, but of what significance would that be unless the entire population benefits from them?

The simple analogy of a bathtub full of water is illustrative. The water in the tub represents the cumulative stock of wealth in society. The tub is equipped with cold and hot water taps, representing the inflow of natural and human contributions to the creation of wealth. One tap represents the contribution of monetarized activities to wealth creation, the other represents non-monetarized activities such as air and water quality and depletion of resources. Sensors on both taps record only total inflow, regardless of whether the flow involves production of useful products and services or remediation for deterioration of health, social stability and the environment.* Elizabeth Mann Borgese, daughter of the great German writer Thomas Mann, embraced this model and applied it to assess the economic value of ocean wealth in a report to the Club of Rome entitled *The Future of the Oceans* (1986).

Traditional growth measures also failed to reflect positive off-balance sheet transactions. When economic or technological development delivers useful goods and services at little or no cost, such as free email, internet chat, voice conferencing or global positioning, GDP remains untouched, while the real wealth and welfare of people increase substantially. Without more reliable measures, how can we ensure economic policy encourages the right type of activities? The obvious answer is that we cannot. An economics of human welfare necessitates a reconceptualization of value and development of new ways to measure it.

* For more on the bathtub analogy, see <http://cadmusjournal.org/article/issue-3/evolution-wealth-human-security-paradox-value-and-uncertainty>

4. Extending Disciplinary Boundaries

One of the reasons Giarini's writings have not gained wider recognition is because his vision is all-encompassing and, therefore, foreign to the thinking of traditional academic economists. While others divide and subdivide economy into smaller specialized fields – finance, marketing, public policy, banking, central banking, employment, monetary policy and the like – this perspective constantly expands the boundaries of thought to encompass domains lying outside traditional economic thought. Apart from extending economy to encompass ecology and negative value, it expands the boundaries of economics in at least three other directions until it becomes co-terminus with society as a whole.

4.1 The Moving Line of Money

First is the emphasis on the non-monetarized sector comprising welfare-related activities which did not involve any monetary exchange. In Smith's day, only a fraction of those activities required to sustain human life involved money transactions. The majority of people lived or worked on farms producing their own food and clothing, building their own homes and either making or resorting to barter exchange to acquire other essential articles. The use of money was largely utilized for public expenditure, urban living, international trade and maintenance of standing armies. Today, both self-production and barter have largely been replaced by monetary transactions which contribute to growth of GDP but do not necessarily reflect a real enhancement in human welfare. In earlier decades very few people paid for drinking water. This raises concerns regarding the deteriorating quality of ordinary water today which has spurred the growth of the bottled water industry to \$60 billion globally. But does that growth really reflect a \$60 billion enhancement in human welfare?

“Economists tend to focus on the defined field of the monetarized sector and overlook the potential of the greater non-monetarized sector from which it emerges.”

Although passing largely unnoticed, the line between the monetarized and non-monetarized sectors is continuously shifting one way or the other. Due to the skyrocketing cost of medical care, doctors' home-visits are almost a forgotten service, but the cost and inconvenience to patients of travelling to clinics and hospitals go unrecorded. Household work remains one of the largest domains in the non-monetarized sector. Fewer middle class families can afford housemaids, chauffeurs and cooks today. Many people fill their own gas tanks, wash their own cars and mow their own lawns, where previously they may have paid someone else to do it. An obvious example is the housewife who seeks employment and hires others to clean her home and cook for the family or ends up serving nutrition-poor fast food to her children, because she has no time to prepare healthy meals at home. These monetarized activities all contribute to an increase in GDP, yet in the process the health of her children, the cleanliness of the house, the harmony of her family and her own peace of mind may have deteriorated.

Monetarized and non-monetarized sectors are related by an ever-changing and evolving interaction. Together they constitute a greater social and economic reality out of which monetarized economic potential emerges and from which it disappears. Economists tend

to focus on the defined field of the monetarized sector and overlook the potential of the greater non-monetarized sector from which it emerges. They see what exists today, but do not consider the unrealized potential. The Internet provides the most dramatic example of the unlimited potential of the non-monetarized sector. Internet companies have found a way to monetarize the value of human attention. The mere fact that so many people visit and view a web page or website is now recognized to be of immense value, so much so that the market value of Facebook is estimated at about \$100 billion at a time when its revenues are only about \$4 billion.

5. The Evolution of Economy

Smith published *Wealth of Nations* a year after James Watt perfected the improved steam engine which ushered in the first industrial revolution. The premises of modern economics and the conclusions of the Club of Rome's report were both based on the 19th century concept of industrial economy. The crises of the 1970s were a clear message that these premises were inadequate as a foundation for further social progress.

Even while the report was being written, society was in the process of rapid evolutionary changes that have led to a new model of knowledge-based service economy. This transition is characterized by an increasing shift from material resources and industrial capital to intellectual and scientific resources and human capital. The industrial worker was a proverbial cog in the wheel. The knowledge worker is a self-contained production unit, productive of new and improved ideas, processes, products and services. Human beings, not material resources, financial capital and technology, are the key to this radical transition. Based on this recognition, Peccei wrote in *The Human Quality* (1977), "It is only by developing adequately human quality and capacities all over the world that our material civilization can be transformed and its immense potential put to good use. This is the human revolution, which is more urgent than anything else..."²¹

While the growing importance of the service sector has been evident through much of the 20th century, its profoundest implications remain largely unrecognized even today. Society strives now to accord human beings an equivalent or greater value than money and technology, but that is at best a feeble halfway measure, which only places humanity on a par with what it creates. Development of human beings is still regarded as a means to an end, rather than an end in itself. In its early development, Giarini's thought points to the far greater potential that is yet to be recognized.

Apart from the increasing importance of education, human and social capital formation, the dematerialization of economy has had ecological implications, pointing to the possibility that future economic growth could become far less demanding of scarce and vulnerable environment resources. Over the last half century, this has resulted in a dramatic reduction in energy consumption per unit of GDP in OECD countries; but these energy savings have been more than offset by the dramatic increase in energy consumption by industry in developing countries.

The dematerialization of production by the service economy is complemented by an equally or more important dematerialization of needs. The growing centrality of services results from the fact that once basic material requirements are met, the aspiration is released for

the satisfaction of higher order, non-material needs – communication, information, education, healthcare, entertainment, recreation, and culture – which are not only far less demanding of material inputs but also far less limited in their growth potential. Food consumption is subject to limits; knowledge, human relationship and enjoyment are not. Thus, the growth in relative importance of the service economy represents a progressive shift from the pursuit of physical security to the quest for human security, welfare, well-being and unending development of our individual and collective human potential. Of even greater significance are two other implications of the modern service economy that have gone largely unrecognized.

5.1 Valuing Systems and Utilization Time

Discovering the full significance of the transition to services is the main theme of his second report to the Club of Rome, *The Limits to Certainty* (1993), co-authored with Walter R. Stahel. The report sets forth the need for a new general theoretical framework for economics to reflect fundamental changes in the nature of economic activity. “That which in the 1970s was interpreted as a problem of limits to economic growth in general, increasingly appears to be the description of the end of the great cycle of the classical Industrial Revolution. The simulations by Jay Forrester and Dennis Meadows indicate precisely this, not the end of economic growth as such, but rather the end of a certain kind of economic growth, that was based on priority and above all on hardware and machines instead of on software and organizational systems, on tangible products rather than services of every type. Of course, an important part of economic activity will always depend on tools and hardware, just as today we need agricultural products. Now, however, within most traditional industrial and agricultural sectors, service functions predominate.”

The growing contribution of services to GDP and employment is well-known, but its impact on the problem of value is still poorly understood. A major component of the service sector consists of large delivery systems, such as those related to telecommunications, transport, research, education, healthcare, banking, and research. The cost of delivering specific services through these huge systems is difficult to measure, because most of that cost consists of fixed overheads. The marginal cost of producing one more book, watch or computer can easily be computed, but not the cost of delivering an extra hour of high speed internet connection time, round-the-clock access to health maintenance facilities, or research to discover a cure for cancer. In the case of the first two, the cost of the service is largely dependent on overall usage of the system, rather than on individual transactions. In the case of research, costs might be accurately assessed or fixed in advance, but the outcome of the research and its real value cannot be known until after the fact, sometimes years or even decades after it is undertaken. The cost of a college education is even more problematic, since neither the individual delivery cost nor the value of the service to the individual customer can be easily measured.

In addition, valuing both products and services in today’s service economy presents a more fundamental challenge – the problem of utilization time. Unlike the traditional factory that produces so many loaves of bread or reams of paper every day, ‘cost of production’ for many products today commences years before the product enters the production line or ever leaves the factory. It includes costs such as materials research, product development, and process engineering. Furthermore, the actual cost of the product may not be accurately known for months or years after the actual date of sale, since it may include additional costs such as

after sales service, warranties, product liability, recycling and waste disposal. The \$25 billion mortgage settlement imposed by the US government on American banks in February 2012 is an example of a cost that could never have been anticipated at the time the mortgages were originally sold. Under these circumstances, assessment of the true cost and true value of any economic activity becomes far more difficult to assess.

6. Managing Uncertainty & Human Security

But the subject that has most deeply occupied Giarini and constitutes his most original and potentially important contribution is one which by its very nature defies clear delineation and measurement – the problem of uncertainty. The most tangible result of the publication of *The Limits to Growth* was to challenge projections regarding the future progress of industrial economy. It created doubt and over subsequent decades that doubt has continued to grow, further fueled by every subsequent crisis. His experience managing big-budget industrial research projects at Battelle had taught him the importance of managing uncertainty. His years operating the world's largest insurance industry think tank taught him the difficulty of costing and pricing future events. This led him to the perception that uncertainty was central to all economic activity, indeed to life itself. After all, when we speak of human welfare and well-being, we really refer to human security – personal health and safety, assured access to basic needs, protection of our basic rights and property, employment opportunities, job security and retirement. The fundamental objective of every economic system is to provide security to every citizen.

“Uncertainty is an indefinable something out of which both problems and opportunities, crises and creativity emerge. People tend to perceive uncertainty as a risk, rarely as an opportunity.”

But he also perceived that eliminating uncertainty represented only one side of the coin. For at the same time, insecurity and uncertainty are sources of human creativity and unbounded potential for wealth creation. His writings bring out both the creative and destructive aspects of uncertainty. Uncertainty is something we seek to minimize insecurity. Uncertainty is the ultimate, ever-present reality of social life from which new economic and business potentials continuously emerge. Uncertainty is an indefinable something out of which both problems and opportunities, crises and creativity emerge. People tend to perceive uncertainty as a risk, rarely as an opportunity. Uncertainty spurred the invention of limited liability corporations, without which the remarkable economic achievements of the past two centuries would have been unthinkable. Uncertainty brought down the international financial markets and wrought the catastrophe at Fukushima.

6.1 Insuring Security

Uncertainty also has given birth to the \$4+ trillion global insurance industry. But the positive contribution of insurance to human security and human welfare is incalculably greater. Insurance is an ingenious mechanism that converts uncertainty into a positive business opportunity and a precious source of human security. Insurance makes possible the entire modern health care infrastructure of the Western world, without which a bare few could

afford the protection and expertise it provides now to hundreds of millions. As a result, health care is one of the world's fastest growing industries, accounting for more than ten percent of the economy of most developed nations. A 2009 report from the US President's Council of Economic Advisors states that extending medical insurance to uninsured Americans would boost net economic welfare by \$100 billion annually. By 2007, health care insurance in Korea reached 96% of the population, whereas in India it hovers around 5 percent today, so the untapped scope is enormous. Life insurance penetration is still less than ten percent even in developed countries, but with five percent penetration India has shown that even countries with far lower national income can achieve disproportionately higher coverage.

The contribution of all types of insurance to the growth and sustenance of real estate, transportation, financial services, personal income security and countless other activities may be less perceptible but is of great significance. This accounts for the strong correlation between development of the insurance industry and overall rates of economic growth in both developed and developing countries worldwide. Over the past decade, China, which is the top ranked country in terms of both agricultural production and farm output, has put in place the world's second largest crop insurance program to further boost crop production.

There are limits to insurability of risks that can be covered commercially by the private sector, where only the entire society through government can act effectively, but the underlying principle remains valid. Collective action to promote individual security has immense potential for raising welfare and well-being by creating complementarity between public and private risk coverage. Thus, the principle of insurance can very beneficially be extended to life-long education, employment, entrepreneurship, self-employment and other activities that can open up unparalleled vistas for wholesome growth and human welfare. Low levels of education are strongly correlated with low earnings and high levels of unemployment globally. A program that ensures better earning employment opportunities for those who complete specific types and levels of higher education would be a powerful means to close the skill gap, raise productive capacity and reduce unemployment.

6.2 Transforming Contradictions into Complements

Uncertainty and security are not contradictory or mutually exclusive concepts. They are really complements and the interaction between them represents a virtually unlimited source for wealth creation. Humanity creates structured arrangements to enhance security. In doing so, it imposes limits on the infinite possibilities of nature. The very creation of these structures imposes limits on what is possible, including limits on original thinking, creativity, invention, innovation and freedom of action. It defines specific roles, rules, laws, hierarchical structures, ways of life in order to create a field of certainty and security. In the process it tends to mistake the structured field for the whole reality, to focus so intently on the limited field that it loses sight of the limitless possibilities and the progressive evolutionary process that is unfolding. Society develops when it gives up this defensive posture of self-preservation with relation to the unknown and uncertain and explores how best that uncharted territory can be tapped and harnessed for its advancement. Adventurers risked their lives in search of sea routes to India. Pioneers gave up the security of the Old World for freedom from the stifling limitations of religious and social structure to found a New World. Entrepreneurs risk their capital to prove the profitability of new types of businesses. Inventors seek to transcend and

improve upon the limits of nature by growing their own food, creating new objects, substances and energy sources. Original thinkers challenge the limits of established dogma and belief, venturing into the unknown in quest of wider and greater truth. Humanity's entire historical experience confirms that present limits – limits in knowledge, power and accomplishment – inevitably give way before wider potentials. Uncertainty and the non-monetarized wider society, of which monetary economic activity constitutes a small portion, are the creative and unlimited source of humanity's future evolution.

6.3 Transcending the Dichotomy

It is at this point the problem of wealth and welfare transcends economics and becomes one of governance, human values and moral philosophy. Here the economist becomes the humanist and world federalist. As humanity expands exploration of the unknown and uncertain, comforts and conveniences increase, but we also discover that problems and threats increase as well. In search of security, humanity created 70,000 nuclear weapons, computerized stock exchanges whose gyrations no human being can control, installed industrial robots that displace human workers and render them unemployed, while exhausting our resources and polluting the environment.

“Humanity strives continuously to organize opportunities out of uncertainty, but does so mainly from the perspective of narrow self-interest.”

Our human mode of development seems to always confront us with this dichotomy that the quest for greater good seems to inevitably lead to greater evil. Problems and crises arise because of our ignorant egoistic attitudes, such as the possessiveness of the rich who refuse to pay taxes and reject any responsibility for the welfare of the rest of the society or the assertiveness of the speculators who insist on their right to destabilize financial markets in search of greater profit. Humanity strives continuously to organize opportunities out of uncertainty, but does so mainly from the perspective of narrow self-interest, rather than for the benefit of humanity as a whole. We overexploit groundwater for personal gain without regard for the future. Our laws protect and empower some at the expense of others, accord rights and status to some by excluding others. These structures are the essential mechanism for organizing life out of uncertainty. They are the essential means of development at one stage, but they later become the greatest obstacles, because they become rigid and fixed, base themselves on ideas and values that refuse to evolve with the changing times, like the resurrected American Tea Party pretending this is still 1776. The unregulated market structure that once so effectively released social energy through freedom now prevents that energy from expanding by more equitable distribution of the benefits. Instead it generates negative intensities – problems and conflicts that eventually lead to the destruction of those structures that refuse to evolve, as in the French Revolution, the Crash of 1929, and the two great world wars involving sovereign nation states.

The complexity of modern life compels us to transcend the dichotomy between certainty and uncertainty. When we do so we perceive that risk can by a change of view be converted into opportunity. Insurance is a social organization that creatively relates certainty with uncertainty. Today it protects against unforeseen loss. But it has the potential to evolve into

something even greater. It can in the next stage help build the society, bringing more of the uncertain areas under the protection of certainty. Uncertainty viewed from the perspective and for the benefit of all beings – without the restricting beliefs and values of the structure of narrow self-interest by which the world is now governed – can create a wider base for economics capable of generating unlimited wealth and well-being without crises. Such a change is conceivable. With the spread of education and emergence of an intelligentsia, the narrow vested interests of monarchy and aristocracy have progressively given way to a structure that is far more encompassing and more productive of human welfare and well-being. The spread of education among the once ignorant masses was formerly inconceivable. Now it is recognized as desirable and necessary. Such a change in perception regarding uncertainty in economics is possible too.

7. Future of Work

Never content with pure abstract theoretical reflections, Giarini always returns to the concrete practical problems of humanity and none today is more pressing than the future of employment. What purpose, he asks, does an economic system serve if it does not provide the most basic of all economic functions, access to the means of obtaining the essential necessities and non-essential components of a modern civilized life? Today hundreds of millions of able-bodied human beings, including more than 75 million youth, are deprived of access to gainful employment opportunities, not by their own or anyone else's willful refusal but by the structural rigidities and blatant inequalities of an economic system that values money more than it values human welfare. While squandering the earth's rare natural resources, it blindly neglects the most precious and perishable of all resources, human aspirations and capabilities.

Mindful of the utter failure of unregulated markets and unsocialized systems to address this most basic need, in 1996 he authored his third report to the Club of Rome *The Employment Dilemma and The Future of Work* in collaboration with Patrick Liedtke, his successor as Secretary General and Managing Director of the Geneva Association and a member of the Club of Rome and the World Academy of Art & Science. Written at the request of the then Club of Rome President Ricardo Diez Hochleitner and originally published in Spanish, the report traces the evolution and transformation of the nature of work from the agrarian age through the industrial revolution to the modern service economy. In this report the authors discard both market and socialist philosophies in favor of a pragmatic, comprehensive, four-layered solution designed to provide basic economic security to all, while optimizing the incentives for those who have the capacity and will to work and earn more. Their objective is nothing less than full employment and economic security for all.

Recognizing the essential role of higher education and life-long learning in any permanent solution to the employment challenge, this led naturally to the last of the four reports on the subject of university education and continuous training, *The Double Helix* (UNESCO, 2003) written in collaboration with another Club of Rome member and WAAS Fellow, Mircea Malitza. There they examine the mismatch between the human life cycle and education, the fragmentation of specialized disciplines, and the lack of integration between education and real life challenges. The report calls for a reorganization of education into multi-disciplinary, integrated modules that combine all the knowledge required to address real work issues.

Then in 2005, Giarini turned his attention to the lengthening of the life cycle and the problem of economic security and productive security for a progressively aging but ever more healthy and active elderly population, by establishing and editing the journal *European Papers on The New Welfare: the counter-aging society*.

8. Globalization and Uncertainty

The 1970s opened a challenging new chapter in the unfolding saga of globalization, vulnerability and the management of uncertainty. The new millennium marks a continuation of that evolutionary process, confirming the fears of many who believed that human progress was on the ebb and challenging the naysayers who vigorously rejected the earlier warnings. But the recent past is not merely more of the same. Over the past four decades the world has become far more interdependent and the foci of risk and vulnerability have largely shifted from the national to the global level. The threats of financial instability, unemployment, inequality, nuclear weapons, terrorism, pollution, resource depletion and climate change are more truly global than ever before.

“Today, acute scarcity and overflowing abundance exist side by side. It seems odd to speak of limits at a time when global financial assets exceed \$216 trillion and \$4 trillion circles the globe daily in search of speculative returns.”

Today, the world is confronted by two kinds of reality linked to human nature and its social organization: the question of power and the legitimacy of national and international institutions. Power must be placed at the service of human freedom. Institutions must promote harmony and equity. Only then can human aspirations be fulfilled and the human propensity for destructive excesses controlled. “To what extent are the world’s economic institutions legitimate?” Giarini asks. Today, acute scarcity and overflowing abundance exist side by side. It seems odd to speak of limits at a time when global financial assets exceed \$216 trillion and \$4 trillion circles the globe daily in search of speculative returns. The world is not suffering from shortages, but non-utilization of precious human resources and misdirection of other capabilities away from the very points where they can make the greatest contribution and generate the greatest return for humanity.

All human achievement is founded on a bedrock of values. Values have no limit. Ultimately it is the values we choose to embrace that determine the real limits to growth. Narrow self-interest, mindless exploitation of earth, blindness to the needs of others, unbridled greed and extravagance can only take humanity so far. Our problems are of our own making and so are our opportunities. The very powers and institutions we forge to further our aims too easily become fetters that confine and enslave us. We are imprisoned by structures of our own device, simply because we refuse to open the door and walk out. Will humanity insist on clinging to broken systems out of fear to experiment, or will it have the courage to invent and innovate freer, fairer, more equitable, and more civilized arrangements for wealth creation and governance? Humanity’s ultimate challenge is not to cope with the forces of external nature or the problems of production, but rather to wrestle with and master human character and its inclinations.

Giarini has never been a prophet of doom. On the contrary, a close reading of his reports reveals an unparalleled potential for future prosperity. If the goal of economics is to truly generate prosperity and abundance for all, the knowledge can be found to accomplish it. Where others see the insecurity of uncertainty, he senses unrealized opportunities. That necessitates looking beyond secondary causes to discover the fundamental process of human development that propels social evolution. His study of both economic theory and the real economy convinced him that the theory was deficient, not humanity's collective capacity to generate wealth for all. He has the insight and courage to look beyond the traditional boundaries and 'scientific' respectability of accepted concepts and econometric formulas to the vague hinterlands where economy merges in identity with the society of which it is a part and society engages in a creative interaction with the unformed potentialities of its own future. Still he gazes into the unknown, mindful of real and present dangers, but ever confident and hopeful of what will emerge.

“Giarini has never been a prophet of doom. Where others see the insecurity of uncertainty, he senses unrealized opportunities.”

8.1 Theory and Practice

Social theory can only be perfected in the cauldron of real life where the enormous complexity of living systems refines intellectual conception into practical strategy. Ever questioning, but never satisfied by the answers he himself could derive, he has the good sense and humility to know how much more there is to be known. His thought points compellingly to the uncharted boundaries of human social potential. What remains is for a society, even a community, to come forward to break out of the straight-jacket of arbitrary rules and constricting institutions to fully harness the enormous creative potential of its human and social capital. Full employment, equitable income distribution, life-long learning, ecological sustainability, welfare and well-being are the objectives. Freedom, harmony and equality are the values. An endless development of human capacity is the means. Unparalleled prosperity will be the result.

Economic evolution, whether in theory or practice, is inseparable from cultural evolution. That inevitably led Giarini to ponder the ultimate implications of a world in which scientific determinism and human choice seem to be juxtaposed in perpetual conflict. Is it possible to imagine a culture which reconciles social order and human security with the creative freedom to continuously evolve by exploring and engaging the unknown which contains the ultimate mystery of life? That is the challenge which now confronts science and humanity.

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Notes

1. Aurelio Peccei, *The Human Quality* (Oxford: Pergamon Press, 1977).

At the root of the current crisis are not subprime mortgages, credit rating agencies, financial institutions or central banks. It is the Great Divorce between finance and economy, which is a subset of the widening precipice between economy and human welfare.

The Great Divorce: Finance and Economy

The Limits to Growth proved the inherent limitations of the existing industrial model of economic growth, not any inherent limits to growth itself.

Garry Jacobs & Ivo Šlaus, From Limits to Growth to Limitless Growth

Focusing on growth of the part without reference to its impact on the whole is a formula for social disease.

Economic Crisis and the Science of Economics

The idea of nuclear deterrence is a dangerous fallacy, and that the development of military systems based on nuclear weapons has been a terrible mistake, a false step that needs to be reversed.

John Scales Avery, Flaws in the Concept of Nuclear Deterrence

The first step into the direction of a world parliament would be the establishment of a Parliamentary Assembly at the United Nations.

Andreas Bummel, Social Evolution, Global Governance & a World Parliament

The evolution from physical violence to social power to authorized competence and higher values is an affirmation of the value basis of law.

Winston P. Nagan & Garry Jacobs, New Paradigm for Global Rule of Law

We propose that a new organisation be set up, perhaps called the 'World Community for Food Reserves'.

John McClintock, From European Union to World Union

A proper and well accepted definition of (forms of) misconduct, reliable means of identification, and effective corrective actions deserve a high priority on the agenda of research institutes, universities, academies and funding organs.

Pieter J. D. Drenth, Research Integrity

The clearing house should encourage thinking ahead so that law and governance can attempt to accommodate the numerous challenges of globalization, many new technologies, and the emerging Anthropocene Era.

Michael Marien, Law in Transition Biblioessay

The economics of growth must be replaced by equilibrium economics, where considerations of ecology, carrying capacity, and sustainability are given proper weight, and where the quality of life of future generations has as much importance as present profits.

John Scales Avery, Entropy & Economics

A strong and strategic knowledge system is essential for identifying, formulating, planning and implementing policy-driven actions while maintaining the necessary economic growth rate.

Jyoti Parikh, Dinoj Kumar Upadhyay & Tanu Singh,
Gender Perspectives on Climate Change & Human Security in India

CADMUS

Inside This Issue

The very possession of nuclear weapons violates the fundamental human rights of the citizens of the world and must be regarded as illegal.

Winston P. Nagan, Simulated ICJ Judgment

The emerging individual is less deferential to the past and more insistent on his or her rights; less willing to conform to regimentation, more insistent on freedom and more tolerant of diversity.

Evolution from Violence to Law to Social Justice

It is more rational to argue that developing countries cannot afford unemployment and underemployment, than to suppose that they cannot afford full employment.

Jesus Felipe, Inclusive Growth

The tremendously wasteful underutilization of precious human resources and productive capacity is Greece's most serious problem and also its greatest opportunity.

Immediate Solution for the Greek Financial Crisis

The Original thinker seeks not just ideas but original ideas which are called in Philosophy Real-Ideas. Cadmus Journal refers to them as Seed-Ideas. Ideas, sooner or later, lead to action. Pregnant ideas have the dynamism to lead to action. Real-Ideas are capable of self-effectuation, as knowledge and will are integrated in them.

Ashok Natarajan, Original Thinking

Given the remarkable progress of humanity over the past two centuries, the persistence of poverty might not be so alarming, were it not for the persistent poverty of new ideas and fresh thinking on how to eliminate the recurring crises, rectify the blatant injustices and replace unsustainable patterns with a new paradigm capable of addressing the deep flaws in the current paradigm.

Great Transformations

Our global systems can be resilient if they are based not only on efficient markets that can cope with future crises, but on principles that also allow for the projection of civic will and preference onto the global level. Stability and resilience are laudable goals but they need to be achieved in all three dimensions, the financial, the economic and the social, in a participatory fashion.

Patrick M. Liedtke, Getting Risks Right

Continued . . .
