PROMOTING LEADERSHIP IN THOUGHT
THAT LEADS TO ACTION

THE WEALTH OF NATIONS REVISITED

CADMUS

NEW PERSPECTIVES ON MAJOR GLOBAL ISSUES

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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 to 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 integrates knowledge from all fields of science, arts 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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CADMUS VISION

The world is in need of guiding ideas, a vision, to more effectively direct our intellectual, moral and scientific capabilities for world peace, global security, human dignity and social justice. Today we face myriad challenges. Unprecedented material and technological achievements co-exist with unconscionable and in some cases increasing poverty, inequality and injustice. Advances in science have unleashed remarkable powers, yet these very powers as presently wielded threaten to undermine the very future of our planet. Rapidly rising expectations have increased frustrations and tensions that threaten the fabric of global society. Prosperity itself has become a source of instability and destruction when wantonly pursued without organizational safeguards for our collective well-being. No longer able to afford the luxury of competition and strife based primarily on national, ethnic or religious interests and prejudices, we need urgently to acquire the knowledge and fashion the institutions required for free, fair and effective global governance.

In recent centuries the world has been propelled by the battle cry of revolutionary ideas — freedom, equality, fraternity, universal education, workers of the world unite. Past revolutions have always brought vast upheaval and destruction in their wake, tumultuous and violent change that has torn societies asunder and precipitated devastating wars. Today the world needs evolutionary ideas that can spur our collective progress without the wake of destructive violence that threatens to undermine the huge but fragile political, social, financial and ecological infrastructures on which we depend and strive to build a better world.

Until recently, history has recorded the acts of creative individual thinkers and dynamic leaders who altered the path of human progress and left a lasting mark on society. Over the past half century, the role of pioneering individuals is increasingly being replaced by that of new and progressive organizations, including the international organizations of the UN system and NGOs such as the Club of Rome, Pugwash and the International Physicians for the Prevention of Nuclear War. These organizations stand out because they are inspired by high values and committed to the achievement of practical, but far-reaching goals. This was, no doubt, the intention of the founders of the World Academy of Art & Science when they established this institution in 1960 as a transnational association to explore the major concerns of humanity in a non-governmental context.

The founders of WAAS were motivated by a deep emotional commitment and sense of responsibility to work for the betterment of all humankind. Their overriding conviction was on the need for a united global effort to control the forces of science and technology and govern the peaceful evolution of human society. Inhibiting conditions limited their ability to translate these powerful motives into action, but they still retain their original power for realization. Today circumstances are more conducive, the international environment is more developed. No single organization can by itself harness the motive force needed to change the world, but a group of like-minded organizations founded with such powerful intentions can become a magnet and focal point to project creative ideas that possess the inherent dynamism for self-fulfillment.

Ivo Šlaus *Orio Giarini* *Garry Jacobs*

CADMUS
New Perspectives on Major Global Issues
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The need for revolutionary transformation of higher education discussed in previous issues of *Cadmus* is acquiring momentum. In spite of the initial problems, skepticism and resistance, online education is rapidly gaining ground both within universities and outside them in MOOCs and alternative educational delivery systems. Today more than 17 million students are participating in online courses in the US and those numbers are rising fast in other countries as well. But the quantitative expansion of higher education represents only one side of the essential change that is needed. The work of the World Academy of Art & Science to evolve solutions to pressing global challenges has also called for revolutionary changes in the content and pedagogy of higher education that are needed to move beyond the inadequate piecemeal approach to knowledge and social problems prevalent today.

This issue of *Cadmus* focuses on the qualitative revolution in higher education that is needed to complement and complete its quantitative extension. It contains articles and a report on the World University Consortium's three-day meeting on Future Education, which was conducted at Inter-University Centre, Dubrovnik from September 21-23, 2015. Information is multiplying at a phenomenal rate. The world is changing with unprecedented speed. The world's educational system must learn how to consciously evolve and transform itself in order to support the critical transition. The meeting focused on the need for a multidimensional shift in higher education from an overemphasis on information in an age of information glut to greater emphasis on understanding organizing principles and relationships between phenomena, from memorization of facts to creative thinking, from passive to active learning, from fragmented to contextual knowledge, from mechanistic to organic or ecological conceptions, from abstract to life-centric studies, from discipline-specific to trans-disciplinary perspectives, from abstract principles to spiritual values, and from subject to person-centered and personality-centered education. This issue of *Cadmus* raises many critical questions that require further exploration so that more effective approaches can be widely implemented.

This issue of *Cadmus* also continues our inquiry into the need for a reformulation of Economics and its integration with the social sciences. It contains several articles presented at the XII International Colloquium at the University of Florida at Gainesville in May 2015. These form initial contributions to the New Economic Theory working group constituted by WAAS and WUC at the Gainesville conference, which already includes 22 other collaborating institutions and 47 contributing individuals. For more information, readers are invited to visit www.neweconomictheory.org.

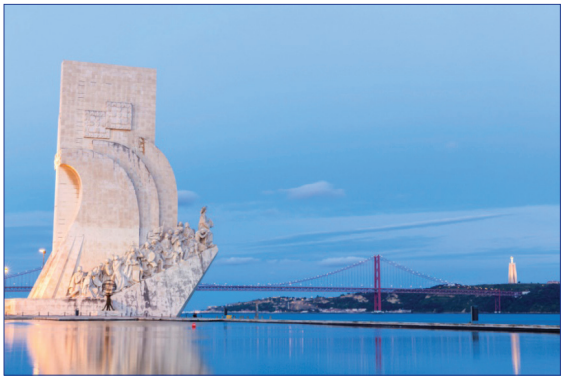
We hope you enjoy this issue.

The Editors

XIII International Colloquium
ISEG-ULISBOA | 11-13 May, 2016

Post-2008 Global Dynamics & Structural Changes: Economic, Political And Eco-Societal Transitions

Following highly successful conferences at Brazilia in 2014 and Gainesville in 2015, the World Academy of Art & Science and World University Consortium are pleased to collaborate in organizing a three-day conference on Post-2008 Global Dynamics & Structural Changes: Economic Political and Eco-Societal Transitions.at the University of Lisbon on May 11-13, 2016 in association with the Centre for African, Asian and Latin American Studies (CEsA), Research in Social Sciences and Management (CSG) and Lisbon School of Economics and Management (ISEG), and University of Brasilia (UnB).



Although the international crisis starting in 2007 managed to generate some skepticism among decisions makers, politicians and international organizations, the disturbances it created were apparently not powerful enough to inspire another shared vision of positive paradigm change. We hope the 2016 International Colloquium will stimulate thought and action on a vision of a sustainable, fair and equitable way to deal with the critical tasks society is facing. We need to examine the root causes of the current challenges and opportunities so as to formulate an integrated and comprehensive strategy towards the promotion of worldwide change to well-being.

The XIII Colloquium will discuss the current international situation and its systemic stresses with special emphasis on Europe and will explore changes in economic theory and policy needed to cope with the challenges of globalization, mechanization, employment, migration and ecology.

Paper Submission open until January 31, 2016.

Click here for more information.

CADMUS, Volume 2, No.5, October 2015, 1-15

Overcoming the Educational Time Warp:
Anticipating a Different Future

Garry Jacobs
CEO, World Academy of Art & Science;
Vice President, The Mother's Service Society

Abstract

Education abridges the time required for individual and social progress by preserving and propagating the essence of human experience. It delivers to youth the accumulated knowledge of countless past generations in an organized and abridged form, so that future generations can start off with all the capacities acquired by their predecessors. However, today education confronts a serious dilemma. We are living in an educational time warp. There is a growing gap between contemporary human experience and what is taught in our educational system and that gap is widening rapidly with each passing year. Today humanity confronts challenges of unprecedented scope, magnitude and intensity. The incremental development of educational content and pedagogy in recent decades has not kept with the ever-accelerating pace of technological and social evolution. Education is also subject to a generational time warp resulting from the fact that many of today's teachers were educated decades ago during very different times and based on different values and perspectives. The challenge of preparing youth for the future is exasperated by the fact that the future for which we are educating youth does not yet exist and to a large extent is unknown or unknowable. The resulting gap between the content of education and societal needs inhibits our capacity to anticipate and effectively respond to social problems. All these factors argue for a major reorientation of educational content and pedagogy from transmission of acquired knowledge based on past experience to development of the knowledge, skills and capacities of personality needed in a future we cannot clearly envision. We may not be able to anticipate the precise nature of the future, but we can provide an education based on the understanding that it will be very different from the present. In terms of content, the emphasis needs to shift from facts regarding the actual state of affairs in the past, present and future to the process governing the continuous evolution of the society and the deep drivers that are catalysts of that process. In terms of pedagogy, there should be a shift from emphasis on comprehension of what is taught to development of the capacity to think independently and creatively about the future. In terms of objectives, it requires a shift from promoting socialization to fostering individualization and from educating the mind to educating the whole person.

Education is the most remarkable technology so far invented by human beings. Education organizes knowledge and abridges time. It transmits the essence of humanity's cumulative past learnings to future generations in a systematic and condensed form. It enables future generations to commence their productive lives with the essential knowledge acquired

by countless generations in the past, rather than having to rediscover and reinvent all that has been learned by their ancestors. This extraordinary device enables society to convert individual experience into a possession of the entire collective. It also makes it possible for society to synthesize the external experience of the collective and apply it to develop the inner, psychological endowments and capacities of each of its members. Oriented in this manner, education becomes the catalyst for conscious social evolution.

Education widens our sense of identity from the family and community to larger social groups. It helps prepare us for responsible citizenship at the national level and for participation in the wider life of the global community. It provides a foundation for the spread of effective democracy and establishment of universal human rights. Education equips us with the practical knowledge and skills needed to productively and creatively contribute to the advances of modern economy, science and technology. Education expands our consciousness of the impact of human activities on distant places, on future generations and on the environment.

In 1870 one new PhD was awarded in the entire USA. Today more than 67,000 are awarded annually. During the same period, the number of BA degrees awarded rose from 9400 to 1.6 million. India's higher educational system expanded from 1.1 million students in 1961 to accommodate 26.5 million last year. Over the last four decades, the world total tertiary enrollment in education has grown nearly five-fold from 37.5 million to 184.5 million.* Were it not for the enormous quantitative expansion and diversification of higher education, it is inconceivable that humanity could have made such enormous strides in raising food production, abolishing famine, eradicating a host of fatal diseases, reducing infant mortality, extending life expectancy, multiplying real per capita global income 12-fold, weaving isolated communities into a single global community through advances in transportation and communication, ending slavery and colonialism, extending rights to women and minorities, and drastically reducing the global incidence of war between nations and war-related fatality rates.

1. The Changing Speed of Time

Education expands our sense of time. It enhances our awareness of the movement of time and extends our conscious time horizons from the origins of the universe, the evolution of Homo sapiens, and the first stirrings of civilization into the near and distant future of individuals, societies and the universe itself. Education provides us with a sense of history and a historical perspective of current events. It generates awareness of the constant process of change occurring ceaselessly in the universe around us, in society and within ourselves.

It shifts our time horizon from the past to the future. It instills belief in humanity's continuous progress, which is one of the defining characteristics of global society today, distinguishing the modern era from earlier more static, conventional periods focused almost exclusively on preservation of tradition. It alters our underlying motivation from a reverence for what has been to an anticipation of what is yet to come. It replaces the sense of fatality defined by historical determinations beyond our control with a sense of freedom, self-confidence and self-determination. It modifies our psychological orientation from conformity

* *United Nations Statistical Handbook for 1978*, NY, 1979, and *UNESCO On-line Database* http://data.uis.unesco.org/?queryid=142.

to individuality. It transforms our spiritual orientation from blind submission and adoration of ancient beliefs and practices to an intense aspiration for greater knowledge and higher accomplishment.

Education abridges and accelerates time. Historically, our sense of time conveyed continuity with the past, our relatively insignificant place in a slow, unending progression of repetitive events and historical cycles. Awareness of the brevity of our lifetimes and the inevitability of death reminds us of the severe limitations within which we move, act and aspire. Before the advent of literature, ancient and medieval humanity lived in an eternal present, unconscious of the very long, slow incremental evolution of the universe and civilization. The prevailing sense was that things were and always will be more or less as they are now. Our sense of duration in time was also severely constrained. During the Elizabethan Age, ancient Greek myth and contemporary histories, such as Shakespeare's, established both the boundaries and expanse of the social time sense. A mere three centuries ago, Sir Isaac Newton's quest to discover the unchanging universal laws of a static, immobile universe was conducted side by side with his study of Biblical sources to determine the exact beginning of the universe some 6000 years ago. Time seemed to almost stand still in Timeless India, where history, literature and education for millennia depended exclusively on oral traditions.

All things change, including time. Time is no longer what it used to be. At least our sense of it has been dramatically altered. The invention of the printing press coupled with the Reformation and the spread of education gradually altered the time sense in Europe. As consciousness of history expanded, so did awareness of change. Thomas Malthus' concern about the dire consequences of rapid population growth, Adam Smith's writings on the nascent Industrial Revolution, and Darwin's treatise on the origin of species arose from a growing awareness of evolutionary changes impacting on human beings and the world we live in. It took tens of thousands of years for the world's population to reach 100 million, but only 18 centuries to multiply another ten-fold to reach one billion. Since 1800 it has multiplied another seven-fold to cross seven billion. Over the same two centuries, global real GDP multiplied 84-fold. Parallel changes in transportation, communication, life expectancy and every other aspect of life signaled a fundamental change in the speed of time. Things began to change far more rapidly than in the past. Moreover, the spread of education ensured that an increasing proportion of humanity were informed of the fact and understood at least some of the factors and forces that were altering the speed of time and the future of humanity.

2. Time's Challenge to Education

Today the speed of time is accelerating exponentially and society is more conscious and observant than ever before. It is accumulating and analyzing enormous quantities of data every second, generating new inventions and discoveries every hour. More than two million patent applications are filed annually. According to Google, a total of 129 million original book titles have been published since the dawn of printing five centuries ago. We are now adding another 2.2 million a year in addition to the innumerable other forms of text. Born in 1991, the Internet now contains more than one billion websites. These facts provide just

a distant reflection of how rapidly global society is changing, how much new information it is acquiring, and how great is the challenge confronting the world's educational system to keep pace with the lightning rate and gargantuan quantities of facts, experiences, events, discoveries and ideas that contribute to development of knowledge and human capabilities.

> *"In an age when information about virtually everything is available at our fingertips, the educational system continues to emphasize transfer of information as the predominant objective of education."*

Education as we know it involves the transmission of knowledge from one generation to another. In practice there is usually a two to three generation gap between what instructors learned from their own instructors when they were students, what they teach to students when they become instructors, and the world in which these students will live and seek to apply what they have learned in future. A single generation ago, the Cold War, Soviet Union, Communist Bloc and 70,000 nuclear weapons were dominant realities of the day. The World Wide Web, the Human Genome Project, nanotechnology, iPods and smartphones did not yet exist. Two generations ago, Europe was still recovering from devastation of the Second World War, the US had just landed its first contingent of combat troops to fight in Vietnam, the Berlin Wall had only just been constructed, world population was less than half what it is today, Martin Luther King was just launching the American Civil Rights Movement, and the Green Revolution had not yet emancipated more than billion people from the perennial threat of famine. Three generations ago, the Great Depression still dominated the world economy, the world war was still in its early stages, penicillin was not yet in use, the atomic bomb had not yet been invented, and the population explosion had not yet begun.

3. Closing the Educational Technology Gap

Is it reasonable to rely on the perspective of instructors raised in worlds so different than today to prepare and equip our youth for life a generation from now which we cannot even imagine? The increasing speed of discovery, invention and knowledge generation imposes an ever-greater burden on the educational system and those who pass through it. One result is that the gap between information generation and transmission through education is widening rapidly. The world's educational system lags far behind in responding to the growing need for speed.

Since the dawn of the Industrial Revolution, rapid technological development has been one of the key drivers for accelerated social evolution. It has radically altered the way almost every human activity is carried out. Mass production has radically changed the nature of work and the workplace. The train, automobile and airplane have transformed beyond recognition the frequency and speed with which we move from place to place. The telephone, radio, television and internet have inconceivably altered the speed and frequency with which we communicate. Urbanization has drastically reconfigured where and how we live. Antibiotics

and other medicines have doubled our life span and abolished many ailments. The only notable exceptions are religion and education which are conducted largely as they have been for centuries in the past. Organization stifles rapid evolution in both fields.

Although the number of people engaged in higher education has increased even faster than the growth of population, the technology of higher education remains essentially unaltered. A reluctance to adopt new technologies in higher education can be traced back to the very origins of the system. The first modern university was founded at Bologna in 1088 about 360 years before the invention of the printing press. At that time oral transmission of information and ideas from scholars to assembled groups of students at a central location was the only available method for mass education. Yet six centuries after the advent of the printing press and the wide availability of printed books, the earlier model remains dominant. Since then, systems of communication have advanced from handwritten books to instant printing and global text, audio and video broadcasting, but education continues to rely on oral delivery systems akin to those used in ancient India and ancient Greece.

Serious efforts to develop alternative models can be traced back a few centuries, but have only recently begun to attain the critical mass needed to meet the rapid growth in demand. The first distance education program was introduced at the University of London in 1836 and at the University of Chicago in 1892. The USA and Soviet Union introduced distance education by radio broadcasts in the 1920s. Iowa State University became the first to broadcast educational courses on TV in 1950. The UK Open University was founded in 1969. The first online program of higher education was introduced by the Western Behavioral Sciences Institute of California in 1981. After 2000, MIT and other mostly American universities began to experiment more seriously with online delivery. The creation of YouTube in 2005, followed by Khan Academy and iTunes University in 2006, opened up alternative delivery systems outside the traditional university environment. This eventually led to the founding of the first Massive Open Online Courses (MOOCs) offered by Udacity, Coursera and EdX in 2012.* Today more than 30% of American college students participate in distance learning programs. China is expected to have 100 million online learners next year.[1,2,†] These developments herald the first truly widespread change in educational technology in ten centuries. Yet, inertia and resistance from within the present system remain enormous and still retard adoption of new models.

4. Rediscovering Pedagogy

The mode of delivery is only one of the ways in which the global system of higher education is out of sync with the needs of society in the 21st century. Pedagogy is another serious constraint. The prevailing conception of what should be taught and how it should be taught remains mired in the distant past. In an age when information about virtually everything is available at our fingertips, the educational system continues to emphasize transfer of information as its predominant objective. It is time to pause and ask ourselves whether an entirely different conception of education is required.

* See http://www.worldwidelearn.com/education-articles/history-of-distance-learning.html

† See 2014 China Online Education Report (Brief Edition), http://www.iresearchchina.com

The world over memorization of facts remains the predominant and often the exclusive approach to education. The predominant measure of education remains the capacity to regurgitate facts. With rare exceptions, understanding and application of principles and independent thinking are at best given secondary importance. In many countries students learn how to read, but still do not learn how to comprehend what they read. They are taught how to read and understand individual sentences, not how to comprehend the meaning of a series of arguments. They learn to speak in grammatically correct sentences, rather than to think in coherent chains of thought. Excessive emphasis on memorization diverts mental energy from higher processes of understanding, analysis and thinking. It forges deeply engrained habits at an early age that persist throughout life. It reinforces the insatiable appetite for more news and information. It explains why the best informed, most highly educated populations in the world continue to exhibit a very poor capacity for comprehension and independent thinking, as reflected in public opinion polls and electoral behavior.

"Excessive emphasis on memorization diverts mental energy from higher processes of understanding, analysis and thinking."

While leading American universities tend to give greater emphasis to understanding and analysis than universities in most other countries, subject proficiency remains the primary qualification for lecturers around the world. At the WAAS-WUC conference at UC Berkeley in October 2013, leading educators confirmed that the perpetual race to keep up with the increasing accumulation of information to be taught has overshadowed research on the actual process of learning itself. The role of the university instructor is still primarily to transfer information, not to awaken minds and stimulate creative thinking.* The near universal effort to remember more and more has led us to neglect something more important than all the facts they commit to memory. In placing exclusive emphasis on what is to be taught, we neglect the process of learning itself. Higher education has forgotten the central importance of pedagogy. Thus, text based learning and oral language learning continue to predominate long after educators and psychologists have identified important individual differences in the way different people learn best and multiple intelligences which human beings utilize in order to learn in multiple different ways.

The recent revolution in learning technologies has revived efforts to understand the process of learning itself and to measure it more effectively. It has also facilitated the study of different individual learning patterns and their results. This research confirms what every teacher has always known—that we learn most when we teach others. The present system is designed to maximize the learning of the instructor, rather than that of the student. The mind develops when curiosity is aroused and imagination is awakened, not when it is passively absorbed processing bits and pieces of canned knowledge. The essential value of live contact with the instructor is to promote interaction that raises conscious awareness and stimulates independent thinking. Experimentation with hybrid learning models in which students study

* "The justification for a university is that it preserves the connection between knowledge and the zest of life, by uniting the young and the old in the imaginative consideration of learning. The university imparts information, but it imparts it imaginatively. At least, this is the function which it should perform for society. A university which fails in this respect has no reason for existence." Whitehead, *op. cit., p93.*

on their own and then come to class to interact with instructors and other students demonstrates rates of learning far exceeding those obtained by either conventional classroom or online methods by themselves. Moreover, the shift to online learning has greatly facilitated the adoption of multi-sensory forms of learning, incorporating text, images, sound and video that appeal to different aspects of human intelligence. A new pedagogy is needed that harnesses the new technologies to provide a more complete and effective learning experience.

"Examination of humanity's current problems makes evident that narrow specialization is a source of the problems rather than a solution to them."

Another longstanding pedagogical tenet is that students learn best when they study independently and compete with one another. Few question why this should in fact be the case. In the workplace almost all activity involves group collaboration, where the process of discovery and development is a collective process. A cooperative learning model was introduced at New Technology High School in Napa, California in 1996 at the suggestion of companies seeking to improve the learning skills and working capacities of their future recruits. The altered model was found so successful that it has resulted in the establishment of a national New Tech Network consisting of 160 schools in 26 states based on the cooperative learning model.*

5. Restoring Life to Education

There is another fundamental aspect of pedagogy which receives too little attention today—the creation of context. As Whitehead put it, "There is only one subject-matter for education, and that is Life in all its manifestations."[3] Life is a learning experience that is perceptible to all our physical senses, feelings and emotions. In addition, it is inherently contextual. Each experience occurs within a wider physical, social, cultural, intellectual and psychological context that provides essential insights into the nature of the knowledge that can be discerned from the experience. We understand very little about the unique discoveries of Copernicus and Darwin, unless we are cognizant of the constraining force of religious orthodoxy opposing the propagation of ideas that appeared to directly undermine the authority of established church doctrine. Great scientific discoveries of the 20th century met with similar resistance from the entrenched scientific community. The history of the American Civil War is hardly intelligible unless viewed in the context of the growing sentiment against slavery that began in Europe and spread around the world after 1700. Yet today the tendency toward decontextualization of information is greater than ever before. We have evolved a culture of facts devoid of knowledge. We pride ourselves on the capacity to absorb innumerable snippets of data daily on a wide range of subjects so that we can converse on all subjects without really understanding any of them. And this may be widely prevalent within academia, as well as in the outside world.

* http://www.newtechnetwork.org

This tendency toward decontextualization is fueled and aggravated by the exponential growth of information, but it has deeper, more fundamental roots in the workings of the thinking mind. The nature of the mind is to try to know by dividing reality into parts and concentrate on studying each part as if it were a whole, then subdividing it into smaller parts and studying each of them as if it too constituted a whole in its own right. We study the trees and lose sight of the forest. We study circulatory or respiratory diseases and lose the holistic perception of human health, which characterized ancient systems of medicine such as Ayurveda and Siddha. We create specialists in finance who have been taught little about the impact of finance on production, employment and human welfare. We educate experts in marketing, engineering, and human resources without imparting the knowledge of how organizations grow, develop and evolve. We educate leaders of business and research without considering the impact of their activities on society and the environment. We produce experts in each of the parts who are increasingly blind to the whole of which these parts are inseparable, integral elements.

"Growing awareness of this reductionist tendency of the human mind led to the development of systems theory, complexity theory, ecology and holistic thinking as efforts to reconstruct the whole that has been infinitely subdivided."

The quantum of information is growing so rapidly that keeping up with new knowledge in a single field has become a full-time job that leaves little time for either teaching other people or applying that knowledge in other occupations. The knee-jerk response to information overload has been a proliferation of new disciplines and more specialized fields of study, resulting in an increasing fragmentation and compartmentalization of knowledge. The ideal of higher education a century ago was to equip people with broad general knowledge coupled with specialized expertise. Today higher education turns out specialists in innumerable narrow technical disciplines of business, chemistry, economics, engineering, law, medicine, physics, psychology, etc., but almost no generalists with a broad perspective of the whole subject or the wider reality of life of which all disciplines are a part.

The world's problems today arise from a divorce between ourselves and the reality we live in. Financial markets are divorced from the real economy, economy is divorced from ecology and business and science are divorced from social responsibility and accountability. This results in a tendency to affirm the exclusive truth or greater truth of one side or aspect of reality at the expense of the other: we mistake the elusive gains of financial speculation for real economic progress; higher GDP for greater human welfare; and huge arsenals of nuclear weapons for enhanced cooperative security. After centuries of progress in all fields of natural science, we are baffled and helpless before the destructive impact of human activity on our environment, a consequence intuitively self-evident to far less advanced civilizations who lived in touch with nature.

Is more and more specialized expertise really the type of knowledge we need in the 21st century? The evidence suggests it is not. Examination of humanity's current problems makes evident that narrow specialization is a source of the problems rather than a solution to them. A narrow focusing on financial economics is a root cause of the divorce between finance and economy that dominates the global economy today. Real knowledge is knowledge of the whole. Exercise of fragmentary partial knowledge without a wider perspective undermines the integrity of living systems, just like unlimited production devours the earth and unidimensional treatment of specific diseases often cures one ailment while creating another one in its place.

"Only when we are able to conceive of the personality as a living, organic whole will we be able to formulate concepts that are sufficiently inclusive and integrated."

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6. Trans-disciplinarity

To compensate for this fragmentation of reality, mind seeks to aggregate and recombine what it divides to form larger wholes, like the dictionaries and encyclopedias that gather all available information on a subject and place it in a container alphabetically. Then we seek to reconstruct relationships between the parts that have become separate by creating interdisciplinary, cross-disciplinary and multi-disciplinary studies that never succeed in encompassing the vitality, complexity and organic integrality of the original holistic reality they examine.

Growing awareness of this reductionist tendency of the human mind led to the development of systems theory, complexity theory, ecology and holistic thinking as efforts to reconstruct the whole that has been infinitely subdivided. This is a welcome and important development. Systems theory is based on the mind's capacity for organization. The principle of organization is one of the characteristic ways in which mind aggregates its perceptions of separate ideas, objects and activities. Organization is an example of a trans-disciplinary principle applicable to all academic fields and all human activities. A study of the fundamental characteristics of organization is relevant to all fields of knowledge and life. Organization is the means by which human beings give form and structure to our consciousness and aspirations. We organize our ideas into theories, beliefs into philosophies and religions, values into modes of conduct and cultures, emotional commitments into relationships, activities into fields of social existence, land and material objects into property, etc. Organization is creative. It generates power for accomplishment. It can also become obstructive, rigid, inflexible and stifling to creativity, freshness and life itself.

Organization is essentially a mechanical construction of reality designed to divide and aggregate parts, the way a business subdivides work into specialized functions and activities and then aggregates them through structures, systems, rules and procedures. In contrast, the natural and social worlds in which we function are dynamic living systems, with the characteristics of all living organisms. The organizations we create often are a combination of the two—their organic character makes them dynamic and creative, their mechanical character

makes them conservative, inflexible and bureaucratic. The reality they seek to create, nurture, manage and preserve evolves continuously over time, but the organizations themselves tend to become fixed in time, rigid and inflexible. These characteristics are relevant to the development and understanding of languages, societies, religions, political establishments, businesses, economic systems, scientific research and educational institutions.

> *"The artificial detachment of the observer absolves scientists and universities from demands for social relevance, social responsibility and social accountability."*

The principle of organization is only one example of a wide range of trans-disciplinary principles and processes that characterize life, society, growth, development and evolution. A shift of emphasis from retention of facts to understanding of the trans-disciplinary principles applicable to all fields of study and life is one of the ways to counter information overload by raising the field of study from concepts that divide and contrast to concepts that differentiate even as they unify.

7. Reuniting Life and Knowledge

The tendency of mind to divide reality occurs in multiple dimensions. Horizontally, it divides reality into innumerable specialized fields of knowledge and activity. Vertically, it places an artificial divide between Life and Mind. It divides knowing from living, education from society, the universities from the real world. The tendency of mind to separate idea from fact divides knowledge from the reality it seeks to comprehend. Mind's capacity for abstraction generalizes from the particular to formulate universal principles, laws and theories. Abstraction is one of mind's greatest powers, yet at the same time the source of some of the greatest weaknesses and deficiencies of modern education. It fosters an ever-widening gulf between idea and reality, theory and practice.

All reality is multi-dimensional and complex. It admits of differing perspectives and interpretations, depending on the vantage point of the knower. Viewing the complexity of reality from different perspectives—each valid in its own right—leads to the formulation of mutually contradictory theories in physics, evolutionary biology, genetics, economics, psychology, philosophy and other fields—each internally consistent, but irreconcilable with one another or with the facts they seek to explain. In psychology it has led to multiple theories of personality that appear more applicable to different species of life than to different individual human beings. Only when we are able to conceive of the personality as a living, organic whole will we be able to formulate concepts that are sufficiently inclusive and integrated.

Mind's ultimate act of abstraction is its own separation from the world in which it lives. While we are increasingly informed about the world around us, we are also increasingly separated, divorced and alienated from it. The Cartesian separation between mind and world

"Big Data is not a synonym for more knowledge."

is the implicit rationale for the poise of the scientist as an impartial, detached observer of nature, even when he is observing detonation of a nuclear explosion, designing a new biological weapon, or creating a computerized trading platform that can destabilize global financial markets. Nearly a century after physicists discovered the importance of the relationship between the observer and the observation in the study of matter, the knowledge dispensed by institutions of higher education continues to regard the objective reality of the world around us as if we were in some way separate and independent. The artificial detachment of the observer absolves scientists and universities from demands for social relevance, social responsibility and social accountability. Perhaps it also explains the relative complacency of the general public to concerns about nuclear stockpiles, Fukushima type disasters in other countries, global climate change and soaring homicide rates in the USA. Is there an alternative?

8. Values-Based Education

The Cartesian divide between mind and life led naturally to the development of science as the impersonal study of an objective reality independent of the scientist. We easily forget that all knowledge and education are a product of interaction between the person and the world, between human consciousness and the universe in which we live. In that interaction, the subject, the object and the conscious act of knowing are inseparable and of equal importance. There is no such thing as purely objective knowledge. All knowledge involves and is determined by the subjective consciousness of the observer. Absence of personal partiality and prejudice in scientific investigation is highly desirable, though very difficult to attain; but this type of objectivity is too often confused with efforts to eliminate the valid perspective of the subject, which is neither possible nor desirable. All knowledge depends on the viewpoint and perspective of the observer. All knowledge is subjective. All knowledge is mentally constructed and socially construed.

So too, all knowledge is implicitly or explicitly values-based. We decry investment bankers who destabilize financial markets in pursuit of personal benefit, but ignore the fact that scientific research can equally be driven by personal motives of money, career or fame. Even curiosity can lead to consequences that harm society and endanger humanity, as Pandora demonstrated. Every human action must be accessed on the basis of the motives that actuate it and judged in terms of the values it aspires to realize. The quest for impersonal laws of nature in the social sciences divorced from human values and aspirations dehumanizes the study of economics, business, law and even psychology. At a deeper level, the effort to separate and divorce science from philosophy and spirituality is another reflection of the schizophrenia that characterizes society and education today.

9. Conceptions of Knowledge

Is it possible to continuously expand the horizons of our knowledge through education without being drowned by information overload, fragmentation, specialization and alienation

of knowledge from reality? The answer to this depends very much on the conception of knowledge on which our educational system is based. Today the words data, information and knowledge are often used interchangeably. We speak of the 'knowledge society' with reference to a world in which a plethora of data circles the globe at the speed of light and is accessible at our fingertips. We refer to the continuous doubling or tripling of humanity's information or knowledge base, when what we really mean is the emerging technologies enable us to collect, store and process an infinitely greater amount of data than in the past. Big Data is not a synonym for more knowledge. It simply means that we now have technologies that can measure and computers that can analyze mountains of data, such as the amount of radiation falling on every square mile of earth 365 days a year or the number of search queries, tweets or Facebook hits every hour.

The ambiguity of terms relating to knowledge leads to ambiguity regarding the aims and content of education as well. It is, therefore, necessary to define the way we use these terms. The process by which we learn from life experience commences with the observation of the world around us and the gathering of innumerable bits of sensory data. The correlation of these bits of data generates Information. We see a flash of lightning in the sky and then hear the sound of thunder a few seconds later. We correlate the light and the sound to conclude that they result from an approaching storm. We learn to estimate the distance of the storm relative to our location by the time delay between the two events. The storm is five miles away is information derived by analysis of the data. Correlating repeated experiences of this type leads to the thought that sound travels more slowly than light. Correlating two or more pieces of information generates Thought. We also note that the lightning may be obscured by cloud cover, but transmission of the sound persists in spite of the clouds. Correlating two or more thoughts born of the information derived by analysis of the data, we eventually formulate an idea or theory that explains all these experiences in a coherent, consistent manner. In the measure our conceptual conclusion is confirmed by further observations, analysis and careful correlation of thoughts, we come to regard the idea or theory as a form of knowledge. Neither data, information, thoughts nor ideas themselves constitute knowledge.

The process of education currently involves all four of these stages in the process of knowledge generation—observation of data, analysis of data to derive information, correlation of information to form thoughts, and integration of thoughts to constitute coherent principles. It is noteworthy that in this entire process we rarely reflect on the characteristics of the human mind that is engaged in the process of knowledge acquisition. Brain research may be a specialty of Psychology and Neuroscience, but the application of the instrument we call mind to our understanding of reality is of essential importance to all fields of knowledge. Social scientists emphasize the limitations and distortions imposed by our social construction of knowledge. We interpret experience in terms of our own conscious and subconscious values, beliefs and experiences.

The tendency of mind to divide and re-aggregate, to abstract theory from reality and to divorce the observer from the phenomena observed constitutes essential knowledge for understanding the past history of human social evolution and knowledge generation. It is at the root of the errors and problems that now confront humanity in the fields of economy, ecology,

politics, science, society and culture. But even more importantly, in a world that is changing so rapidly and in which retention of all available information has become both untenable and detrimental to human intelligence, essential knowledge about the way we human beings observe, perceive, understand and interpret reality is vitally important knowledge that needs to be transmitted to future generations.

It is ironic that we spend so much time using our minds in search of knowledge and so little trying to acquire knowledge as the instrument we utilize for that purpose. The study of the mind, the way we think and other ways in which we seek to know reality is essential for every human being in search for knowledge, regardless of the field. It is not a subject that can simply be left to philosophers, psychologists or neuroscientists. Education that anticipates the future and prepares for it needs to encompass knowledge of the fundamental characteristics of mind applicable to all human activities, both mental and social.

10. Person-Centered Education

Mistaking the means for the end is a common human folly beautifully depicted by George Bernard Shaw in his play *Pygmalion*. Professor Henry Higgins, an expert in the science of phonetics, takes on the seemingly impossible challenge of educating a flower girl named Eliza within three months to acquire the speech and manners of a high-born aristocrat. On achieving this remarkable feat by passing her off as a princess at a gala ball, he and his associate celebrate in triumphant self-satisfaction, never for a moment considering the effort that Eliza has made to acquire the specialized knowledge he offered, the psychological process that motivated her to make such a prodigious effort, the impact of that training on her as a person, or its utility in her future life. At the height of his celebration, Eliza bursts out in frustration and throws his slippers at him. Higgins was guilty of the unpardonable crime of priding himself on his knowledge of phonetics, forgetful of the fact that education is all about developing human beings, not creating mannequins or robots with perfect diction.

Shaw's play is a satire on an educational system that mistakes specialized subject knowledge for real education. The worship of abstract knowledge divorced from life and devoid of relevance to human beings is at best a superstition, at worst a tragic crime against the human mind, heart and soul. In depersonalizing knowledge, it dehumanizes both the instructor and the student.

The real subject and object of education are the same. The subject of education is a human being. The object of education is to develop the mind and personality of that human being. Everything else is secondary, often irrelevant and many times detrimental to mental, emotional, social and physical health and well-being. The real challenge confronting education for the 21st century is not about altering the curriculum to focus on STEM, ITC, nanotechnology, microbiology or any other discipline. It is about abandoning the superstition that transfer of information and narrow disciplinary expertise is education. Mistaking the object for the subject has led to a world of scarcity in the midst of inconceivable abundance. Robots of either the metallic or flesh and blood variety may be great at high speed calculations but are utterly incapable of grasping or dealing with the subtlety and complexity of human life.

Knowledge is and always will be central and essential to education, but the knowledge we so desperately need now is about how human beings think, feel, act, interact, respond to each other, innovate, create, seek and find fulfillment, overcome the limitations of the past and embrace the possibilities of the future, grow physically and mature emotionally, develop organizationally and evolve consciously.

"How can we shift the focus of learning from reverence for the past to anticipation of the future, from information to understanding and thinking, from passive to active, from abstracted to contextualized, from fragmented to integrated, from subject centered to person centered, and from productive to creative?"

Education is the means evolved by humanity over millennia to consciously accelerate the development of the individual and the evolution of the society. In an earlier age when information and specialized professional expertise were scarce and extremely difficult to come by, the emphasis on these goals was understandable. In the coming age when information is superabundant and growing exponentially, what we desperately need to develop is the capacity to correlate and synthesize, to place isolated pieces of information within a cohesive framework of thought, to think independently from first principles and originally outside the sanctioned boundaries of accepted knowledge, to reintegrate abstract thought with the world in which we live, and apply it for the growth and development of our own personalities.

Person-centered education needs to be founded on a comprehensive conception of what a human being is and of all the aspects and dimensions of the human mind and personality that can benefit from education. This encompasses a wide range of physical, interpersonal, and mental skills, faculties, capacities, abilities and values. It encompasses all the functions of the human mind, such as observation, perception, judgment, understanding, thinking, will, imagination, and intuition, as well as social and emotional faculties for interactions and relationships with other people. It encompasses all the layers of personality from the most external manners and behaviors to deeper levels of character and individuality. The development of these capacities can be done through many different types of learning experience, including all academic subjects, where the objective is to develop the person and not merely transfer information. Biography, contemporary events, literature and drama, anthropology, the study of accomplishment in business and politics, achievement in sports and the arts, the study of scientific discoveries, philosophy, and all fields of history provide rich material.

Employment is cited as a primary goal of higher education in an age of increasing computerization and robotization. Today, we are aggressively pursuing a course that transforms human beings into robots far more efficiently than it imparts human capacities to computers. We need to be educating people to do what computers and robots can never do, rather than preparing living, breathing people to compete with the memory capacity or calculating speed of a mainframe. The knowledge and skills society needs in the 21st century are those that nurture the mental, emotional and social development of individuals who know how to live

and interact with other people, to lead and collaborate with others, to understand themselves and empathize with others. It needs individuals with the courage to question and disagree, not the submissiveness to unquestionably accept as wisdom all that science proclaims as the present version of truth. It needs individuals who seek opportunities to be creative, not merely productive; to create employment for themselves and others, rather than seeking a job; who know the value of values, not merely laws, rules and procedures.

"A right starting point might be a systematic effort to identify the seeds of future education wherever they already exist and consider how these seeds can be multiplied and further developed."

The response of the educational system to the issues flagged in this article will have enormous impact on the future of global higher education and evolution of global society. The questions raised here are far easier to ask than to answer and far easier to comprehend than to act upon. But these are among the most critical questions that need to become central to the discussion about the future of education and the human community. How can we shift the focus of learning from reverence for the past to anticipation of the future, from information to understanding and thinking, from passive to active, from abstracted to contextualized, from fragmented to integrated, from subject centered to person centered, and from productive to creative?

Such a radical change cannot be made universally in a year or a decade, but it can begin, grow and spread rapidly. It cannot be done so long as we look up in awe to the pillars of the old system and imbue them with a sanctity or prestige that, however warranted in the past, is insufficient for the future. True education is to replace superstition with knowledge, and that includes a superstitious reverence for past glories. Our blind faith in the present system is the greatest bar to evolving a better one for the future. The strategy of striving to emulate the current best and raising the average to the level of the best is valid and useful in many fields, but only in the measure the best truly represents a viable model for the future. Otherwise we risk reinforcing an outmoded version of perfection, like striving for benevolent monarchy when what we really need is liberal democracy. A right starting point might be a systematic effort to identify the seeds of future education wherever they already exist and consider how these seeds can be multiplied and further developed.

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Notes

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Contextual Education

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Abstract

When the knowledge gained over centuries has to be presented to students through a 12-15 year study, it has to be abridged and organized elaborately. This process of encapsulating all knowledge into an educational course often results in fragmentation of knowledge and a mental divorce from life. Life knowledge that is reduced to objective principles may be intelligible to the intellect, but is incomprehensible to the imagination, creativity and emotional intelligence, all of which are important to the full development of personality. A study of Economics without the human and social dimensions, industrialization detached from ecology, or science devoid of moral accountability results in problems. Education of each part must be in the context of the whole. Knowing the whole context helps one get the right perspective to address the issue effectively. In the education of the future, the gap between abstract concept and social relevance must be bridged. The following article explores the need for contextual education and the ways in which it can be implemented.

1. Our Education Today

Watching a tiny seed sprout and grow into a plant, early humans stopped foraging for food as they had been doing for tens of thousands of years before. They found when the sprouted seed flourishes, when it shrivels, what makes the plant bear flower and fruit, what makes it wilt, how much water a plant needs, how much sun helps this bush, and what type of soil that tree grows best in. Then they perfected this art over thousands of years, which resulted in agriculture that feeds seven billion people today.

When people traded their nomadic lives to a more settled one, they stayed in caves and trees. Then they fashioned crude shelters with mud, stone, animal skin, wood. Small settlements grew into villages. People began to produce what they required—food, clothes, vessels, tools—and traded them with each other. Roads were laid, connecting people. This networking of people and their ideas set off an explosive growth of civilization. Towns and cities developed. Countries, governments and the rule of law came to be. Money, banking, financial systems and trade evolved. Today as we look down from our glass and steel skyscrapers to see megacities develop, we continue our attempts to create perfect organizations, and learn.

We have seen tides rise and fall, and traced them to the impact of the moon. We have sent people to the moon, and brought them back safely to earth. We spoke to people on the other

side of the earth, first through wires. Then we began to do the same without the wires. Now we have virtually fitted the entire world in little devices that fit in our palm. We have split the atom and decoded the DNA. We have lengthened life spans, made human life more comfortable, and continue to make marvellous inventions. But among all the greatest achievements of humanity, education ranks close to the top.

Universal education, schools, colleges, distance education, MOOCs and education reforms draw so much debate that the wonder of their origin and evolution is often lost. When something soft and cold fell from above, the early man, or woman, looked up to find where it came from, and could not find anything. What fell on them seemed like the same substance that they found flowing, or stagnant, in different places around them—water. It made them wet and uncomfortable. But they needed to consume it every now and then, just as the animals and birds did. Also, plants seemed to do better with it. You never knew when it suddenly fell from above. At times, you could tell somewhat in advance. When dark clouds were above, it fell. Sometimes, it kept falling for many suns and moons. Then there was a long gap, after which it began again. There were also other times when it was accompanied by strong winds. People told each other what they knew about it, one generation taught another. Slowly, the occurrence, rain, was connected to the water that was in the lakes and rivers that the sun heated. Patterns were detected. People sowed their seeds in sync with the pattern, and planned their travel and stocked up on essentials keeping it in mind. Superstitions as to the causes of rain were weeded out. The cleansing power of water was found and used. Connections were detected between diseases and stagnant water. Methods to purify water and transport it over long distances were developed. All this that a primary school student learns from a science text book today, as the simple concepts of clouds, water cycle, rain, weather and seasons, was discovered over thousands of years of living and learning, sometimes consciously, sometimes unconsciously. This knowledge, along with a large dose of misinformation and superstition that was regularly pruned, was transferred first orally and then by the written word, over generations and across regions separated by journeys that were often weeks or months in length.

As a far cry from our age of information overload, knowledge was such a precious commodity that it came to be treasured, even hoarded. Schools were set up by the Church to train young monks and nuns. Kings established universities to train scholars who would serve the royalty. Books were chained to libraries because of their rarity. Education was at first only for the aristocracy, then it included all the wealthy. Hesitantly, it reached women. It spread horizontally, to include more and new academic disciplines. To the traditional 3 Rs of education—*Reading, Writing and Arithmetic*—were included science, literature, history, philosophy, law. From the university towns and the 'developed' world, it moved to every town and village, and to all the 'developing' countries to varying extents. It grew vertically, and delved into each subject more and more. Beginning from kindergarten up to the post doctorate level, education has been classified and organized most elaborately.

Through this marvellous system of education that we have devised, we take all the knowledge that humanity has learnt in the past few millennia, weed out mistakes and superstitions, organize all the componential elements within a comprehensive framework and

multi-layered structure, encapsulate everything into a 15 or 20 year study, and offer it to our youngsters. Anyone who enrols in school today has a fair chance of being equipped, at the end of a 12 or more year long period of study, with a gist of all that has been accumulatively learnt by all people, all over the world, from the first instance of recorded history till date. For those with the inclination and means to pursue education further, it is possible to specialize in one or more topics, and learn all that there is to be learnt on the subject, and carry out research to find out more.

"When it is forecast that 60% of today's youth will work in jobs that aren't invented yet, what am I preparing myself for by reading this textbook?"

Added to this system is the few-years-old phenomenon of online education that is accelerating the spread of education, while erasing the horizontal and vertical limits in unimaginable ways. Though the UN Millennium Development Goal of Universal Primary Education by 2015 has been missed by a gap of 58 million children, aided by communication technology, education is well on its way to becoming universal, accessible, affordable and lifelong.

2. The Problem of Abstraction

A cartoon that did the rounds on the internet had a man looking at a lengthy calculus problem from a high school Mathematics textbook and declaring, 'I'm still waiting for the day when I will actually use this in life'. There are many similar statements one hears from students, such as

What is the use of learning about the French Revolution?

Will I get a job because I can quote Shakespeare?

Why should I read another man's biography?

Why should I memorize the Latin names of plants? Who speaks Latin these days anyway?

Why history, isn't it the future that is relevant?

After graduating, does anyone use Pythagorean theorem or recite lines from Macbeth?

Why are we still following the pattern that our colonial rulers set?

Why do we still use a curriculum that was designed for the Industrial Revolution?

When it is forecast that 60% of today's youth will work in jobs that aren't invented yet, what am I preparing myself for by reading this textbook?

and so on. Marvellous as the system of education is, many students do not connect to it any more than they need to, which is simply to pass the grade and get on with the next, with exams appearing to be hurdles that need to be cleared along the way. The fascination of discovery and the joy of learning are no longer real to many. How and why did this happen?

All those who have seen a famous beautiful painting, or any painting for that matter, from very close know the difference between the big picture that one can admire from a distance, and the apparently rough brush strokes that appear when the same painting is viewed from a few inches away. A digital version of the same phenomenon can be experienced when a person's photo is zoomed to 1000% of its actual size, to show the pixels that make up the photo. The beauty of the face is no longer visible, in its place is a jarring mix of dots in different shades. When one sees the close-up and the close-up alone, there is nothing beautiful or admirable there. Similarly, with education.

When all the knowledge that humanity has collected over millennia is to be presented to every new generation in one or two decades, it has to be abridged and organized elaborately. Knowledge is broken into different parts, what we call subjects. The spoken and written word become Literature. Everything connected with the living world we call Biology. The study of the world and natural phenomena is Geography. The world of numbers and computations is called Mathematics. Within each subject, we again classify knowledge into smaller parts. That part of Geography that studies the earth is Geology, the weather is classified under Meteorology, outer space study becomes Astronomy. Then there are those parts of knowledge that are subsets of two subjects, and we name them accordingly—Biochemistry, Behavioural Economics, Geopolitics, Marine Biology. In thus partitioning knowledge into smaller and smaller portions, we begin to stare at the large picture from closer and closer, losing sight of the beauty of the whole. This horizontal divorce of knowledge from the real world context is described by Marilyn Ferguson, American author and speaker, when she says that our educational institutions "*break knowledge and experience into subjects, relentlessly turning wholes into parts, flowers into petals, history into events*."

Another process by which we have accomplished the organization and abridgement of all knowledge into educational courses is by condensing knowledge of life experience into a series of generalized mental abstract principles. When we do this, the divorce is vertical—it leads to the separation of mind from life. It divides whole perceptions of truth into partial aspects of reality in which the sum of the parts is far less than the whole and each partial truth remains incomplete when divorced from the wider context of which it is a part.

Take the topic of the French Revolution or the Indian independence movement, for example. The injustice in French society and the poverty and hardship of centuries that the lower classes had faced reached a point where they could be contained no longer, resulting in the French Revolution of 1898. A lot of concurrent and subsequent events that transpired in different parts of the world were a reaction to this violent means to equalize society and usher in liberty, equality and fraternity. A hundred years later, shunning all violence, against a better armed colonial ruler, Mahatma Gandhi awoke the dormant aspiration of all Indians, channelized their energy and obtained independence for India. This event was followed by three dozen more countries obtaining political independence in Asia and Africa. Gandhi's life and struggle inspired and continues to inspire movements for civil rights and freedom across the world. But when such complex and multidisciplinary themes are reduced to facts that students are required to memorize—*King Louis XVI ruled France from 1774 to 1792, and was executed in 1793, during the French Revolution, a period of social and political*

upheaval that lasted from 1789 until 1799, and M.K. Gandhi (2 October 1869–30 January 1948) employed nonviolent civil disobedience and led India to independence from the British on August 15, 1947—profound ideas are condensed into definitions and formulae, such as the algebraic formula $(a + b)^2 = a^2 + 2ab + b^2$. In this process, the student is lost, and so is much precious knowledge.

It is this horizontal and vertical fragmentation of knowledge from life, the abstraction, the divorce of the part from the whole, this breaking of flowers into petals that creates the disconnect that students experience from education. No wonder students quip, "Dear Algebra, Please do not ask me to find your x, I don't know, and don't ask y".

3. Contextual Education

That we are all connected to each other and to this universe is not some metaphysical idea, it is a truth of life. Every particle in the universe is connected to every other particle. Each galaxy is connected to all the other galaxies. All living systems on earth are part of a web of relationships. Symbiotic relationships begin at the microorganism level onwards. Plants and animals engage with each other, and their environment. Humans influence and are influenced by their environment. The power of the internet comes from its web of connections. Alienation, for anything, anyone, is a theoretical impossibility. Therefore, to understand any part, we also need to understand the whole and the relationship of the part to the whole. In other words, we understand anything when we see it in a context.

Poetry and art can be appreciated better if one knows the period when it was created. Literature can be understood to a greater depth when the environment in which the author wrote is known. Understanding population explosion requires a knowledge of the economic realities and religious sentiments of communities. Pollution can be checked when we understand all about industrialization. Fundamentalism can be tackled only when its root causes, such as illiteracy, unemployment, poverty and marginalization, are addressed. Even a bodily ailment can be treated more effectively when instead of treating the diseases, the whole person is treated. Nothing exists in isolation. Everything needs to be seen in a context.

In the same way, our education acquires meaning and comes to life when we make it contextual.

Contextual education is a method of teaching and learning, based on a constructivist theory, where information is presented in a way that students are able to construct meaning based on their own experiences. Everything is studied within the physical, social, cultural, political, economic and personal circumstances characterizing real life situations, the subjective mental and emotional processes that prompt human action, and the creative role of individuals in the collective social process. Students are able to process new information or knowledge with reference to their memory, experience and to knowledge already acquired. The opinions and perspectives of students are valued, and so are the student's life context and prior knowledge. Along with teaching the subject, there is a constant emphasis on establishing relationships—between the subject and all other subjects, between the data and

the circumstances in which it was generated, between the lesson and the learner, between knowledge and life.

The concept of contextual education is not new or uncommon. Maths problems such as "There are two apples and three oranges, how many fruits are there in all?" and "A tree is 17 feet from the wall, and forms an angle of 45° from it. What is the height of the tree?" are common in school. But in higher education, teaching becomes more abstract and detached from the student's context, and with increasing specialization, becomes divorced from all other academic disciplines. Some institutions attempt to contextualize education through teamwork, discussions, peer learning, project-based learning, internship and service learning. However, contextualizing education is not systematized in the curriculum, and remains highly dependent on the creativity and innovation of the individual teachers and institutions. An organized, collective effort to add context to the information imparted is needed. This way, we can put the petals back together so the flower comes to view.

"Meaning emerges from the relationship between the content and its context."

4. Support for Contextual Education

Contextual Education parallels nature. All universe is contained in a web of relationships, its very meaning is derived from these relationships. Robinson Crusoes do not exist in nature. After twenty four years, even they need a Friday. Individuals are the content, our relationships with each other are the context: It is the context that gives meaning to the individual existence. Similarly in education, no subject or topic can in isolation provide any meaningful knowledge. Meaning emerges from the relationship between the content and its context. The context gives meaning to content. The broader the context within which the learner makes connections, the more meaning the content, the text book, the lesson holds. Physicists and biologists have discovered that the three principles of interdependence, differentiation and self-organization infuse everything in the universe. Contextual education that is also based on these three principles, therefore corresponds to the way the universe works, and is the most natural way for anyone to learn.

Austrian psychiatrist and Holocaust survivor Viktor E. Frankl said that 'Man's main concern is not to gain pleasure or to avoid pain but rather to see a meaning in his life'. Contextual education answers an innate longing for meaning that is characteristic to all humans. It also satisfies the brain's habit of connecting new information with existing knowledge. The brain naturally seeks meaning in context by searching for relationships that make sense and appear useful. Neuroscientists show that making connections is a natural human activity. The brain tries to give new information significance by connecting it with existing knowledge and skills. When we are asked to do something we have not done before, we immediately try to recall whether we have done anything similar before. Much as a child who is learning to read, reads the word 'dome' that he sees for the first time based on his knowledge of the familiar word 'home', or the student tries to understand the flow of electricity with the flow of water, the brain tries to connect to the new task with the task it already recognizes.

Einstein used this principle when he explained his Theory of Relativity humorously, 'Put your hand on a hot stove for a minute, and it seems like an hour. Sit with a pretty girl for an hour, and it seems like a minute. That's relativity.' Analogy bridges the gap between the familiar and the new. It personalizes learning and lets students learn intuitively. Comparing sound waves to ripples in water, aerodynamics of a plane to the shape of a bird, earth to a magnet, animal or plant cell to a city, DNA to a blueprint—analogy teaches effectively because it builds on the existing foundation, so the resulting building is stronger.

The brain's connection with the environment shapes its physical structure, its neurons connect in different patterns in response to stimuli from outside. To help the brain become more powerful requires that it make connections, so it can weave patterns that generate its own sense of meaning. The more connections the neurons make, the more the brain is stimulated. When these connections are used more often, they become stronger. On the other hand, if these pathways are not used, they eventually disappear. So making different kinds of connections and strengthening them increase the learner's chances of learning more and better.

Studies show that memory is best when we process an item deeply, rather than simply superficially. Learning and remembering are maximum when we relate the things we are trying to learn to each other, and see what common features they share, and how they differ. When we group them into categories and find links among them, our learning is more efficient. The essential principle is that education is at its best when it is progressive, building up on the basis of old knowledge.

Instead of accentuating the dualism between thought and action, contextual education unites concept and practice. When the parts are united, the resulting whole is greater than the sum of the parts. Teachers are discovering that most students' interest and achievement in math, science and language improve dramatically when they are helped to make connections between new knowledge and old experience and knowledge. Their engagement in work, motivation and comprehension increases when they are taught why they are learning what they are learning, and how the lessons can be used in real-world contexts. It eliminates the question, 'Why am I learning this stuff?'. It helps the discouraged and disillusioned student who is accustomed to fail, as well as the eager student who earns 'A's.

Currently, most of our courses teach concepts and theories, but not the way these relate to the workplace, society and our lives. That is left out of the syllabus, for the students to figure out on their own, outside the classroom or once out of school. Its consequences are seen in the workplace as skills shortage.

According to the UNESCO Background paper prepared for the Education for All Global Monitoring Report 2012, CEOs from around the world consider unemployability or the skills gap as one of their top five pressing concerns.* Not only are skills in short supply, but there is a skills mismatch among fresh graduates. They lack the skills to fill a position, due to a misalignment of the education system to the needs of the labour market. *The Harvard Business Review* article 'Employers Aren't Just Whining – the "Skills Gap" Is Real' shows

* See UNESCO Report Education for All Global Monitoring Report 2012 http://unesdoc.unesco.org/images/0021/002178/217874e.pdf

that the skills gap cannot be dismissed as 'employer whining' anymore.* It quotes the Manpower Group 'Talent Shortage Survey' that found that 35% of 38,000 employers in 42 countries reported difficulty filling jobs due to lack of available talent in 2013.†

In fact, top companies in the technology industry like Google do not care about hiring top college graduates. Google's head of People Operations, Laszlo Bock, says that graduates of top schools lack 'intellectual humility', a quality without which one is unable to learn, and which is essential in the work place. Google receives 2 million job applications every year, and Bock who has seen some 25,000 resumes says that college grades predict performance for the first two years of a career, but after that, do not matter. Leadership skills, sense of responsibility, problem solving ability, focus and persistence are important, what is least important is expertise! Google's newly appointed CEO, Sundar Pichai, is said to be a natural diplomat. He avoids making enemies, and is responsible for maintaining smooth ties with partners. He is known to navigate internal politics in such a way as to make his team succeed while inflicting the least possible damage on others. There isn't a single person at Google who doesn't like him. Computer science courses do not teach good manners and behavior, but Pichai has obviously learnt that they are needed, to rise all the way to the top. How many of our students are taught that 'humility' is essential to get an ace job? Or to get into a much envied company, what is needed is a sense of responsibility, not high grades? Our universities are producing graduates who are not only not ready for the workplace, but have a totally different impression of what is needed to succeed. There is huge gap, the skills gap as the employers see it, between the competitive, knowledgeable graduate available and the responsible, humble, team worker needed. Contextual education helps bridge this gap.

5. Teaching a Subject Contextually, with Reference to all Other Subjects

So how can the context be added to content? One way of doing it is to teach and learn a subject, not in isolation from all other subjects, but with reference to them. Take history. Names, places and dates are an essential feature of history education. The names are mostly the names of kings, queens, and leaders of countries or mass movements. The places and dates are details related to their life and work. In that way, history often tends to be the study of 0.001% of humanity, in chronological order. We begin at the beginning, with the stone age, bronze age, iron age, and then move to the ancient civilizations—Mesopotamian, Indian, Egyptian, Chinese, Greek, Roman. The Middle Ages, Reformation, Renaissance, Age of Discovery, Colonization, World Wars—history is thus a line connecting the major events that have occurred, a uni-dimensional study of the what, when, where and how. In order to make the study of history contextual, it could be related to all other subjects and made multi-dimensional.

The student of history can be taught why the cavemen made those paintings, some of which have survived to this day. What did they paint? How is art important? Inherently, are we all artists, although science and technology rule the fort today? Cave paintings are predominantly on animal and hunting themes. What was painted in India, China, Rome?

* See https://hbr.org/2014/08/employers-arent-just-whining-the-skills-gap-is-real

† See http://www.manpower.com/wps/wcm/connect/587d2b45-c47a-4647-a7c1-e7a74f68fb85/2013_Talent_Shortage_Survey_Results_US_high+res.pdf?MOD=AJPERES

Has art always reflected our chief preoccupations? What was the impact of Renaissance on art? What are we painting today, and what does it tell about us? How much did religion influence art, positively, negatively? How lucrative was art as a profession? What was the social position of artists? How did different art forms evolve? In this way, art can be taught, through history.

Not only art. Were the crude figures that the caveman made on the walls an attempt to express himself? How did writing evolve from art? When did writing become the predominant way of expression? How and where did the various forms—sonnets, ballads, drama, novel—evolve? Do writings reflect the sentiments of the period? What do the writings of Socrates and Plato show about the Greeks? What was written during the dark ages? What is the power in books that some people regarded them as a threat and ordered book burnings at different times? How does literature show the changing attitudes towards slavery, colonization, rights of women, segregation? Did books shape the course of history, or at least influence it? What was the effect of the printing press on books and knowledge? How has digitization impacted writing? This is a study of literature, branching from history.

When Gutenberg invented the printing press in 1495, how did it alter the course of history? How have inventions, beginning from the wheel, shaped history? In the absence of instant communication or fast travel, how did news of discoveries spread? With mobile phones and social networking today, can we expect more and powerful Arab Springs? How did science clear itself of superstition and misinformation? When, how did Science part ways with religion? Why did some rulers patronize science, while others stymied its development? Which places and peoples were advanced in their knowledge of science? Did the Age of Discovery provide an impetus to the maritime industry, or did increasing knowledge of sea travel and ship building along with inventions such as the chronometer and sextant result in exploration? How did science play a role in the industrial revolution? How have new inventions and theories been received? Is there any difference between the attitude of scientists to a radically new idea in the 18th century and today? Is science responsible to society? Should scientists be morally responsible? Why did the American physicist and the father of the atomic bomb, J. Robert Oppenheimer, oppose the hydrogen bomb? Why was he accused of being a communist and tried by the US government? Is there a parallel between that and treatment meted out to Galileo by the Catholic Church when he supported the Heliocentric theory? Heliocentric theory is easy to comprehend in principle, but the social and psychological process Copernicus went through in contemplating and pronouncing heretical ideas in the face of the entrenched knowledge of the times, is as relevant today as it was during his own lifetime. Is any of this of relevance to students of science today? Why did Sir Joseph Rotblat leave the Manhattan Project on the grounds of conscience? Science, studied from a historical perspective, is as equally informative as the scientific principles themselves.

Resistance to change and new ideas is a common phenomenon. The French Revolution was due to the French aristocrats' inability to give up their privileges and accommodate the aspirations of the rest of society. But when both France and England had monarchs and an aristocracy, why was there no English revolution? How has society changed since the time of the hunter-gatherer, in what ways is it essentially the same? How have the different

components of society organized themselves? How has human psychology evolved with evolution of society? How did so many thinkers and writers develop in Greece? Why were Roman sports so violent? How did the concept of universal human rights develop? How did industrialization and urbanization affect the family, values and living standards? What was the impact of women's liberation and civil rights movements? What were the lessons not learnt from World War I that resulted in World War II? What were the lessons learnt from World War II that have resulted in elimination of large scale warfare in Europe? How can this be emulated in the rest of the world? How has immigration homogenized populations? Instead of history being the study of a miniscule part of the population, it can be a study of the entire society. Sociology can be a part of study of history.

How did law come to be? What were the early governments like? How did different political systems develop? When was monarchy overthrown in most places, why and how does it still survive in some? What gave and in some regions, continues to give religious groups the power to govern? What circumstances create dictators? Is the European Union a predecessor to a World Government? What gave rise to Communism? Did anyone win the Cold War? That will be studying politics from a historical perspective.

Gorbachev was instrumental in winning the Cold War. Extensive studies have covered the process of Soviet liberalization that culminated in the break-up of the USSR and the end of the East-West confrontation. But how many history books answer, or even ask the question, why did Gorbachev do it? He stood to lose from dissolving his own post, which he willingly did. What went into moulding his personality? How are leaders created? Lincoln had in his cabinet his bitter critics. Was it shrewd political stratagem or profound wisdom? When Churchill said, 'We will not surrender' in the face of a better manned German air force, what was he thinking? What inspired Mahatma Gandhi to call on all Indians to make salt, in defiance of the British salt monopoly? Did he believe Indians could gain independence by making their own salt? Biography and the psychology of individual leaders can be a part of study of history.

How has the environment been affected through history? Which animals have become extinct, and why? Which are endangered, and how can they be saved? What have been our past superstitions, have we overcome them today, or replaced them with new ones? Do we see patterns in our history, and use them to anticipate the future? There is no limit to contextualizing education, by teaching a single subject in the context of many others.

6. Teaching Everything Contextually, with One Subject

All for one and one for all, the motto of the title characters in Alexandre Dumas' novel *The Three Musketeers*, perfectly suits contextual education too. Just as one subject can be taught in the context of all others, all subjects can be taught in the context of one.

We normally regard literature as fiction and rarely resort to literary examples to illustrate scientific principles. But life as depicted in literature is not merely the product of a writer's imagination. All great literature reflects realities of human character, society, values and aspirations. Literature can be used to complement the study of any academic discipline.

Many students and practitioners of psychology have said they have learnt about the human mind more from reading Shakespeare than from Freud and Jung. There isn't a single characteristic, personality trait, behaviour or manner that one does not find in literature. Studying Shakespeare is like studying a cross section of humanity. A strong woman ruled by passion in Lady Macbeth, a lady with a heart of gold in Juliet's nurse, the incorrigible old rogue Falstaff, the great old man Prospero, the quintessence of evil Iago, Hamlet with his internal struggles—Shakespeare has them all. Reading all great literature increases the vocabulary of thoughts and ideas, and gives a vicarious experience that one may never have otherwise. As we read literature and charge at the enemy on the battlefield, cross the ocean and weather a storm, follow a family's fortune over generations or the protagonist's life from beginning till end, solve a mystery or laugh over a romance, as we love some characters and hate some, empathize with some and wonder at others, our study of human psychology becomes more rounded.

Plato, the Greek philosopher, was apparently familiar with contextual education, he used parables and conversational prose to teach his principles, his characters asked questions and generated discussions. His Analogy of the Sun, Allegory of the Divided Line and the Parable of the Cave teach principles of philosophy such as goodness, psyche and perception. He tells the story of prisoners chained facing the wall of a cave, who have only seen the shadows of objects behind them fall on the dark cave wall. They mistake these shadows for reality. When one of them is forcibly dragged out of the cave, the sunlight hurts him, but he gradually begins to see reality. But if he were taken back to the cave, he would be unable to see in the darkness, and his fellow prisoners would be convinced that being freed from the cave would only harm them. Profound, abstract principles of philosophy can be simply illustrated and explained with a short story. 'Sour grapes' and 'the emperor's new clothes' are terms inspired by stories that convey a message succinctly.

Values cannot be taught effectively without literature. This is why we have a huge repository of folklores, fairy tales and fables in every society. Difficult thoughts can be communicated easily, boring topics can be made interesting and values can be made live through stories. Panchatantra is an ancient Indian collection of stories, somewhat similar to Aesop's Fables. The collection is attributed to the 3rd century BCE writer Vishnu Sharma. Legend has it that a strong and scholarly Indian king had three 'dullards' for sons. The king despaired of the princes' inability to learn, when his minister advised him that rather than teach science, politics, diplomacy—all limitless disciplines that take a lifetime to master—formally through texts, the princes be taught the wisdom inherent in them. Vishnu Sharma promised to make the princes wise to the ways of politics and leadership within six months. Conventional ways of teaching them would be ineffective, so Vishnu Sharma used fables to accomplish his purpose. Stories are not just for educating children while entertaining them. Any good piece of literature can give insights into life, as the writer is a seer of life. Rather than study the huge canvas of life, the same can be studied in miniature in a story. Anthony Trollope, one of the most prolific and successful novelists of Victorian England, has created 47 novels with hundreds of characters, each of which is a treatise in human values. The title character in the novel *Dr. Thorne* is a good hearted, selfless country doctor who values people above money. He is blessed with people who love him, and eventually, with unimaginable wealth. Lizzie

Eustace, in *The Eustace Diamonds*, is at the other end of the human spectrum, cunning, calculating and unscrupulous. All her schemes backfire, and she finds herself married to a man who is more than her match in wiliness. In *Ayala's Angel*, Ayala is a poor orphan dependent on her relatives, but with a strong sense of her destiny. She rejects suitor after suitor because of her aspiration for the perfect angel she has envisioned. Common sense, her relatives tell her, requires her to accept any marriage proposal that comes her way, but she clings to her dreams, and sees them come true. In *Can You Forgive Her*, Lady Glencora is forced to marry Plantagenet Palliser, though she loves Burgo Fitzgerald. Palliser sees Glencora is unable to give up Fitzgerald, and gives his wife the freedom to choose her own future, something her relatives had not given her when they forced her to give up her lover. When all circumstances are suited for Glencora to elope with her lover, she chooses to stay back. Palliser, in return, gives up his cherished hope of becoming the Minister of the Exchequer, and takes his wife on a tour of Europe. When he returns with a happy wife and successful marriage, he also finds the post of the Prime Minister of the country waiting for him. Patience, selflessness, integrity, falsehood, individuality, conventionality, and the response of life to these values come out through these and all other great works of literature.

Literature reflects people and society. Sociology studies can be aided and enhanced through a study of literary works. The gradual movement of status and prestige, from land and estate, to trade and money, is seen throughout the literature of the 18th and 19th centuries. The question raised earlier, as to why there was a French Revolution but no English Revolution is answered through a love story by Jane Austen in her *Pride and Prejudice*. The simple romance depicts with profound insight how England avoided revolutionary war between the classes by permitting upward social mobility and marriages between members of the different classes. The story is a simple romance, a wealthy gentleman is attracted to a country girl of humbler means. He sees the intelligence, strength and goodness in her, but is unable to accept the difference in social class. Eventually, his good nature overcomes the sense of social superiority, and he marries her. The same movement is seen among other couples in this story that was set at the time the French Revolution was unfolding in all its brutality across the channel. There the French aristocrat refused to part with his crown, so his head was forcibly cut off. Darcy gave up his pride, accommodated the aspirations of those below and voluntarily erased class barriers, thus saving his head. Darcy's act symbolized the movement prevalent in English society, where class boundaries were gradually erased through the acceptance of trade, dilution of class consciousness, and inter-class friendships and marriages. This resulted in a peaceful social evolution, and spared it a violent revolution. Such ideas and movements in society and peoples can be traced in all books. Society's conception of virtue and vice, and its hold on people are brought out in Nathaniel Hawthorne's *The Scarlet Letter*. The growing opposition to slavery is depicted in Harriet Beecher Stowe's *Uncle Tom's Cabin*. The book is even credited to having influenced the course of the country. When Abraham Lincoln met the writer during the American Civil War, he is reported to have said, '"So you're the little woman who wrote the book that started this great war." The human side of the Industrial Revolution is seen in *David Copperfield* and *Hard Times*.

Though literature does not directly focus on Science, it traces the development of the subject over time. The comic adventure of Phileas Fogg and Jean Passepartout in Jules

Verne's *Around the World in Eighty Days* shows us what an immense accomplishment it was, in 1873, to complete a trip around the world in 80 days, and how far we have come since. Technology happens to be an essential part of plots in writings today. Literature exposes us to new cultures, something much needed in today's shrinking world. It awakens in us a sense of the aesthetic. Knowledge of any subject can be enhanced by a study of literature.

What is true of literature is more generally true of other forms of contextual knowledge including case studies, cinema, history, biography and art which can offer similar benefits to students of economics, politics, law, business, sociology and even the hard sciences. Everything can be taught with reference to one subject, completing the contextualization of knowledge.

7. Educating the Person, not the Subject

A student of English literature was writing his term end paper on Shakespeare. He hurriedly scanned the first question, read only the first three lines of an unidentified passage, 'recognized' them as coming from Hamlet, and wrote for 90 minutes on what the passage expressed, of Hamlet's dominant themes. After completing the exam, he had time to go over the question paper a little more carefully, and found to his consternation that the passage was from King Lear, and not Hamlet. At the bottom of the answer booklet, he scrawled in a hurry, ''The lines come from King Lear. I am sorry for being so careless and writing on the wrong play. I really do know, and could have written about Lear.' The English professor, Dr. Elizabeth Pope of Mills College, Oakland, California returned the booklet with an 'A'. She had added a comment, 'Your closely reasoned, detailed argument very nearly persuaded me that the passage from King Lear would have served very well in Hamlet'!

In her 2002 book *Contextual Teaching and Learning: What It Is and Why It's Here to Stay*, author and education consultant Elaine B. Johnson recounts this incident about her English professor Dr. Pope, who was interested in her students' depth of understanding, more than anything else. She saw that mistaking King Lear for Hamlet was a slip, but she appreciated the student's understanding! While teaching Shakespeare and other great authors and poets, Dr. Pope showed her students how the poets urged all to think about how they perceived others, how others perceived them, made decisions, resisted or succumbed to peer pressure, faced humiliation, handled power, exercised compassion and maintained integrity. She connected the centuries-old works to the modern day and the students' lives. She helped them see meaning in what they learnt. She taught them, not Shakespeare!

Education has to be person-centered. Wholesome medicine treats the patient and not the disease or just one symptom. Similarly, education must be for the person, not one part of him. Enterprise Rent-A-Car, an American car rental company, is one of the top recruiters of entry-level college graduates in the US. It hires college athletes because sportspeople know how to work in teams and multitask. Marie Artim, Vice President of Talent Acquisition at Enterprise, says that there are a lot of transferable skills in athletes that make them effective employees even in a field unrelated to sports. Just as the technology company Google considers technical expertise as the least valuable skill, the car rental company knows that a wholesome personality is needed to excel at work, not just grades or specialized information.

It is not the MBA that prequalifies a CEO. Business Management students are taught project management, strategic management, risk management, human resources management, and so on. The human resource is assigned to one exam in one semester, whereas every part of business management, be it project, strategy, risk or marketing is about people!

A progressive school that is centered around the person rather than subject, course or expertise is New Technology High School in Napa, California. It has re-imagined education and created a model that educates the person as a whole, imparting not only textbook knowledge but life skills. A culture of respect, trust and responsibility is inculcated in the students. There are no bells that ring signalling the end of class periods. Students are trusted to keep track of their own time, just as they would need to do later as adults. They can organize their own projects, or work in groups of their choice. They are included in the decision making process in school. The curriculum is project-based and the teachers lead the activities, and not give lectures to students. One criterion on which students' answer papers are graded is work ethic. Communication is considered important, even while solving Maths problems. Traditionally, students have been encouraged to compete with others and come first. But at the workplace, they need to totally reverse, and work in teams, in mutual cooperation. Somewhere between college and career, the students are required to pick it up. But New Technology High School makes students help each other and see the benefit there is to be derived when competition is replaced by cooperation. The exceptional skill sets and life knowledge that a dynamic CEO possesses can be taught to everyone in this way. Imagine an organization where everyone possesses the skills and capacities of the CEO!

Organization is a concept integral to all disciplines. It is a fundamental principle behind social evolution in every field of life—commercial, economic, social, political, religious, educational, scientific, etc. A family is organized, with different roles and responsibilities to each member. The market, city, government, health care, education—all these are organizations of people, structures and the relationships between them. But the true power of organization is rarely brought forth with sufficient clarity and emphasis in courses. To understand the idea in its entirety, the teacher has to be one who thinks contextually and teaches creatively. There are many teachers, at all levels of education, who use props and technology tools to make the classes more interesting and effective, analogies to explain, biographies to inspire and movies to make ideas clear. Movies can be a very powerful educational tool. A five minute clip from the opening scene of the movie Gladiator brings to life the power of organization. It depicts a fierce assembly of fearless German tribesmen fighting for their very survival against the quiet disciplined orderliness of the Roman military machine and being quickly annihilated by organizational precision more than strength, courage or determination. The Romans have many specialized divisions—infantry, archers, cavalry, the signal bearers. In the background, they are supported by physicians, blacksmiths, cooks, drivers, those who take care of the animals. They even have a man whose assigned duty is to fire the oil, so each archer can light his arrow at once. The Germans have a lot of courage, energy and determination, but cannot match the organization of the Roman army. The Roman side has a clear hierarchy, starting from the king down to the foot soldier. The fighters are grouped into specialized divisions, each performing a different task. The organization, co-ordination and specialization of tasks give the Roman army its power.

Films and documentaries are part of the curriculum followed by some progressive school and teachers. There are resources such as www.teachwithmovies.org that recommend movies and corresponding lesson guides for teachers. The Department of Education in Alberta, Canada includes feature film in the minimum requirements for text study. Many teachers, mostly in Europe and America, use movies in their lesson plans. The concept of class differences is brought out in *Titanic*. *Cast Away* is a tale of isolation and perseverance. *Matrix* is about conformity, self-discovery and the influence of technology. *Chocolat* talks about the longstanding debate of Change vs. Tradition. A 21st century student in Asia or Africa, or even Italy itself, may find it hard to recreate in his mind the Roman streets and palaces while reading Shakespeare's *Julius Caesar*. Watching the movie adaptation of the play makes the story more real. Otherwise, even the thought of a man in a toga would make them wonder how the Romans managed to move around, let alone have a flourishing civilization!

Like movies, biography is another field that serves contextual education by looking at the whole instead of the part. The study of an individual's life can be a great lesson. How their actions altered history and how historical events shaped them, how personalities are formed and how a formed personality acts, are lessons that students of history or psychology need to fully understand the subject, educators need to understand students, politicians need to handle issues, leaders of organizations need to lead, business people need to negotiate—all those who receive an education can benefit from the study of biography. The great men and women can inspire the young and act as role models. Watching the movie *Gandhi*, or reading his biography, one can learn what is it in an individual that made an ordinary man a Mahatma, or great soul.

The biography of Lincoln shows how honest he was, to be called Honest Abe, and how that honesty served him. Lincoln, when a young legislator, ran for the senate. He and two others, Joel Matteson and Lyman Trumbull, were in the fray. Matteson had 44% of the support, Trumbull just 9%. Lincoln, who had 38% of the support knew that Matteson was not a straightforward man. He and Trumbull shared a common vision for the country. So he withdrew from the race. Rather than splitting the votes and allowing Matteson to win, he withdrew, and supported Trumbull. He asked all his supporters to do the same too. Trumbull at first could not believe it was happening. This man was actually giving up his huge advantage, because he wanted the right person, not himself, but a right person in the senate instead of a man of questionable character. So he sacrificed his chances for the greater good. Trumbull won the seat. When Lincoln later contested the elections at the national level, Trumbull was one of his loyal supporters, and Lincoln rose to the post of the US President. It is not so much a moral lesson as an insight into the workings of life. Honesty and political aspiration do not often appear to be the closest of allies, but when they do form an alliance, they take one all the way to the top. Values have been recognized as an essential driver of professional excellence. Biographies bring the principle to life.

Centering on the whole person, the ills in today's education can be eliminated. ADHD, Attention Deficit Hyperactivity Disorder, is a term that is heard increasingly with reference to children today. In the US, some 9% of all children are diagnosed with ADHD, and treated with different kinds of medications. The percentage of children with ADHD in France is less than 0.5%. In the US, child psychiatrists treat ADHD as a biological disorder, and treat the

brain's neural functioning. French child psychiatrists see ADHD as being linked to the child's psycho-social circumstances, and focus on the issues that cause the child stress and underlie the ADHD. They treat the children with different forms of counselling. Hence the difference in numbers in the two countries. Similarly, a comprehensive, person-centered approach in education makes youth complete, and prepares them to face the challenges of the 21st century.

8. Educating the Part in the Context of the Whole

When the President of a country is faced with the largest crisis ever in the nation's economic and banking history, what does he depend on? The opinion of the economists? The advice from the bank presidents? His cabinet colleagues? Does he bank on the economic theories propounded by the elite universities in the country? This is the dilemma Franklin D Roosevelt faced, in 1933. The US banking crisis led to the closure of more than 6000 banks. There was a sense of panic among the people. They began to withdraw their deposits from the remaining banks, which led to an escalation of the crisis. The President put his finger on the issue when he declared on public radio that there is nothing to fear except fear itself. He rejected the monetary principles he had learned in Economics at Harvard and appealed directly to the emotions of the American people. He addressed them on radio and asked them to reject the sense of panic that was destroying the financial system, to exhibit courage and trust in themselves, and pride in their nation, and leave their money in the banks. His appeal halted the panic and paved the way for legislation that ensured the stability of the system for the following seven decades.

Economics touches people's lives directly, but the study of the subject rarely brings out the human and social dimensions. Similarly, industrialization detached from ecology, financial systems divorced from the real economy, and science devoid of moral accountability result in problems. Education of each part must be in the context of the whole. Roosevelt intuitively knew the link between economics and the aspirations and feelings of people. He knew the power of communication, of appealing to the emotions. Banks or the economy do not operate in isolation, they need to be seen in the context of the people. This linking, this kind of seeing the part in the context of the whole, must be integral to education of the future.

Winston Churchill intuitively knew the context when, at the height of World War II, he told his country and the world, 'We shall never surrender'. During the Battle of Britain, the Germans expected Britain to surrender in 6 weeks. But after 3 months, the Germans gave up, though they heavily outnumbered Britain in both aircraft and experienced pilots. They were training four times as many pilots every month as Britain. The advantage seemed to be with Hitler, but he had not taken into account the enormous psychological determination of Britain and the intuitive knowledge of her leader. In one of his most famous addresses to the nation, Churchill rallied the English to make unheard of sacrifices and unrelenting effort to defend their freedom. He spoke out of the deepest conviction and courage of his heart. He was not going to surrender, and he appealed to the depths of the English people. During air raids, he would stand outside on the roof top, shaking his fists at the bombers. His courage, patriotism, sense of honor and self-sacrifice resonated with all the English people. They backed him totally. In one of his other war speeches, he said 'I have nothing to offer but blood, toil, tears

and sweat'. What more can a leader offer, and every one of his countrymen was willing to follow him and offer the same. These statements of Churchill had all his emotions, sentiments and beliefs behind them, and struck a chord with all his people. Against all odds the underequipped and undermanned British air force was victorious in the skies over Britain. In the face of such resistance, Hitler had no choice but to give up. Churchill knew that more than the planes, pilots, armaments and war infrastructure, it was the soldiers' determination backed by the countrymen's support that would win the war.

Whether in war or in peace, knowing the whole context helps one get the right perspective to address the issue. Contextual education helps students get this perspective. There are a number of initiatives many schools and colleges take in this regard. The concept of service learning that some universities offer is one attempt, the trans-disciplinarity that Finland has introduced in its curriculum is another.

Service-learning is an educational approach that combines book learning with real world work. Students are given an opportunity to apply their classroom learning to support or enhance the community as part of their course. Many organizations and universities have incorporated service-learning into the curriculum, to address the contextual, motivational, and multi-disciplinary team needs. Purdue University's Engineering Projects in Community Service program requires its students to form multi-disciplinary groups to meet community needs. Penn State University has a program entitled 'Humanitarian Engineering', in which the emphasis is on relationship building. Long-term collaborative partnerships are formed with local communities so that the outreach programs at the university reach the community.

California-based UnCollege, founded by a young man put off by the disconnect between theory and real world applications, Dale Stephens, offers the 'gap year program'. It is an experiential learning program where students are provided with the resources and relevant contacts to equip themselves for an entrepreneurial career. The London-based IF Project aims to provide free, university level humanities education to youth. University professors and subject experts volunteer to teach, universities and other institutions make available their premises and other resources. The project coordinators also leverage the public lectures, concerts, exhibitions scheduled in London, and use museums, galleries and public spaces as venues for classes. The entire city of London is converted into a large, open air classroom.

Contextualization has been introduced in a more formal, structured way by the government of Finland. Finland has an efficient and equitable education system. The youth are regarded as one of the country's most precious resources. The schools and colleges foster the individual potential of every child. Apart from academics, students are taught handcrafts, cooking, sports, creative pursuits, community skills, developing a good image, and sensitivity to others.

The country has consistently ranked among the top in the Programme for International Student Assessment (PISA), a standardized test given to 15-year olds in 65 nations. In 2013, OECD tested adults from 24 countries in a survey called the PIAAC (Programme for International Assessment of Adult Competencies). Literacy, numeracy and problem solving skills were measured for 16-65 year olds. Finland was either at or near the top on all measures.

Instead of following the principle of "If it ain't broke, don't fix it", Finland has introduced a revolutionary change in its education system.

"Education becomes contextualized when studied within the physical, social and cultural circumstances characterizing real life situations. So, creating the relevant context, education comes to life."

Subject-specific subjects have been replaced by broad topics. Instead of an hour of History, an hour of Maths and so on, upper schools in the country teach 'European Union', in which students will study the subject from the perspective of history, politics, geography, languages, sociology, business, etc. 'Climate Change' will study weather, environment, living sciences, industry, and economy. Teachers lecturing to rows of students is giving place to small groups of students studying together. This 'phenomenon' teaching is benefitting students, according to early data. Student performance has improved in this already excellent educational system.

9. Conclusion

The power of abstraction reduces life knowledge to objective principles. Abstraction may be intelligible to the intellect, but is incomprehensible to the imagination, creativity, emotional intelligence all of which is so important to the full development of personality. In the education of the future, the gap between abstract concept and social relevance must be bridged. Education becomes contextualized when studied within the physical, social and cultural circumstances characterizing real life situations. So, creating the relevant context, education comes to life. It transforms education from a two dimensional image into a three dimensional holograph.

Not every academic discipline lends itself to contextualization, but we can explore how much can be done. The arts and humanities are easier to contextualize, but it may be more difficult with the sciences. When we need experts in every field, would knowledge of other fields help or distract? Does contextualization stand in the way of specialization? These are questions that need to be explored in the education of the future.

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The Double Helix of Learning and Work*

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Editors' Note

The Double Helix of Learning and Work by Orio Giarini and Mircea Malitza is a report to the Club of Rome first published by UNESCO in 2003. It advances fundamental paradigm-changing ideas in the field of education. Drawing inspiration from the double helix structure of DNA, the authors seek to strengthen the relationship between education and employment in order to bring 'The Knowledge Society' within reach. This article is an abridged version of the last chapter being published in *Cadmus*.

Chapter 5
"A Call to Action"

5.1. All the Ingredients are Available

The solution to the problem of Learning and Work is likely to emerge from the existing elements. It might be the following: the modularization of the curriculum with the aim of creating a personal choice system to be constructed by the individual along his or her active life, between the ages of 16 and 76, to consist of alternative sequences of work and learning. At the dawn of the Twenty-First Century, a vast number of experiments, debates, and initiatives are underway and are aimed at devising solutions to the problems of education and work. The problems in question are also being given priority on governmental agendas. International organizations are focusing on them. Both the pressure of public opinion and the rapid pace of technological and economic change are calling out for solutions. The relationship between education and work is being followed, with great concern, by private companies, and it is catalyzing the involvement of civil society. The main issues for reflection are listed in the table below:

Education and Work: The Principal Issues

Education	**Education and work**	**Work**
Curriculum reform	Assessments	Employment
Modularity	Indicators	Active knowledge
Shift to learning	Financing	Non-monetarized work
Optional and choice learning	Education for work	Non-monetized work
Lifelong education and learning	Job-oriented education	Participatory work
Interdisciplinarity	Public and private Knowledge	Inclusion in management
Formal, informal, non-formal	On the job learning	Part-time work
Imparting knowledge	IC Technology	
Anticipatory learning	Adult innovation	
Participatory learning	Recurrent education	
Distance learning		
Open institutions		
Education for all		

This list of themes regarding education and work is about as comprehensive as possible. The evolution of the concepts in question and the degree of their recognition are also important. Who would have guessed that the aspiration of humankind to permanent education would give rise to a concept that would become an official programme (*i.e.,* lifelong education)? In the world of politics, bulky chapters are devoted to such items in the electoral platforms of various parties. National and international meetings are tackling these issues more extensively than ever before.

The relatively complete agenda of lifelong education and the energies dedicated to the analysis of its implications are aided by an additional fortuitous circumstance. The debate is not only theoretical, but also action-oriented. It has gradually embraced each and every component of the solution. All the ingredients are now present. Among the myriad experiments, there are some that asymptotically come close to the solution. The overall picture is still in a state of flux, waiting to be crystallized.

Either of the two parts of the helix have multiple exits and points of entry. Transit takes place within a common assessment system, based on cumulative credits and on a funding framework resulting from co-operation between the public and the private sectors. And yet,

the solution is not there, and the coagulation point remains beyond reach; moreover, further progress is currently slowing down. The saturation of the mixture is leading to dysfunction.

Thus, the stated and acknowledged objectives tend to turn into empty rhetoric. The proponents of the idea sooth their consciences by delivering noble speeches. Experiments do not advance because of a lack of communication. They appear as isolated spots in an indifferent mass, held to ransom by traditional routines. The acquired expertise moves in closed circles, the case, for instance, with modularization in vocational and postgraduate education.

In almost all cases, experiments amount to *ad hoc* additions to the mainstream curriculum (a little bit of genetics in secondary education, more civic culture, visits to or practice in industrial enterprises). Teachers seem to treat these activities with condescension and tolerate them providing they do not interfere with the system of class-teacher one-stream curriculum.

Even when solutions meritoriously address previously neglected problems, they are mostly inefficient, if not downright wrong.

Let us take, for instance, the question of children with special needs. The old terms bearing a connotation of exclusion (*e.g.,* handicapped or disabled) have been abandoned. A step forward was taken at a conference held in Salamanca in 1994. It stated a valid principle; those children have to be integrated into the regular system, considering that normality should be construed as recognition of human diversity, and that children with special needs should not be confined to institutions and marked as unable to live a normal life. Steps toward integration into the regular school system have already been taken, and the teachers have been instructed to extend adequate treatment to all children. Nevertheless, integration within a system with a single curriculum may give rise to greater problems than those encountered in special schools. Discrimination will, in fact, be eradicated only when each pupil is able to have an adequate curriculum adapted to his or her specific situation and needs. In the light of the personal curriculum solution, all children are special, and each one has special needs.

The integration of minorities has been and still is being seriously considered by sociologists and government agencies. To quote a representative of a minority group, “integration is another name for assimilation”. Even so, a personalized itinerary provides solutions such as choices of modules relevant to the community language, history, customs, and beliefs within the general framework of the educational offer.

In that perspective, the issue of non-discrimination finds a natural solution. The idea was tenaciously pursued at the end of the Twentieth Century through official programmes aimed at *Education for All* which simply implemented the provisions of existing international agreements starting with the Universal Declaration of Human Rights. Since the notion of an individual itinerary applies to everybody, it eliminates any source of discrimination. The *Education for All* programme is not limited to the elimination of discrimination from the educational cycle; it also points to the inclusion of all age groups, at least through age 76. In this vision, curricula should be based on modules for all the periods of a person’s life. A possible, but yet unexplored, result could be an extension by twenty years of the productive life span of the adult generations.

The multiplication of optional subjects at all the levels of the educational system can be regarded as an encouraging early result in this process. It reveals the capacity of the educational system to renew itself through cooperation with the community, with parents, and with interested companies. The decision-makers now have to catch up by drafting new laws and introducing systemic modifications into such areas as evaluation, diplomas, and financing schemes. We are witnessing the first signs of flexibility in an effort to come closer to the individual by enabling him or her to exercise his or her essential faculty, that of free choice. Enhanced flexibility is required when it becomes necessary to tackle the more sensitive areas of education.

Many reformist trends around the world have approached the issue of education for work. Special classes were allocated to visits, mostly passive ones, to workplaces in factories and service enterprises, to institutions of public administration, to hospitals, and even to the traffic police. As a result, students became more aware of, and more familiar with, the reality of work. At best, those visits awakened in them a certain interest or vocation. Entertainment and sports have, so far, been more successful in offering attractive heroic models for the young. So have other models of shortcuts to wealth, fame, and prestige, leaving behind the doubtful fascination of work.

A possible experiment could focus on the introduction of occupational modules for children aged 10 to 16, with more advanced levels for students over 16, focusing on such occupations as: electronic engineer, programmer, graphic designer, nurse, salesperson, tourist guide, gardener, farmer, etc. The list is endless, and it coincides with the standard record of professions. Why should recommended hobbies concentrate only on such activities as the breeding of birds or of rabbits? Should a greater degree of free choice not make a young person happy to have earned a professional diploma by the age of 15? Basically, the idea is to gradually assimilate amateurism and hobbies within the curriculum, thus providing a pleasant and attractive introduction to the sphere of work.

Non-formal education and informal education no longer need theoretical recognition, but they remain largely unexplored even though they are attainable with modest means. Where are the "Do-it-yourself" shops which would enable young people to get tremendous satisfaction and pride from having built, from detached parts, their own radio sets, portable sound recorders, home appliances, mosaic-covered tables, computers, etc.? Where are the modules for the organization and equipping of a personal science laboratory (physics, chemistry, natural sciences)? While the schema of modular education is bound to give rise to new industries, such as the module industry, the new concept calls for the establishment of an auxiliary industry producing the wherewithal for informal activities.

It should be noted that all the topics that are being explored by educational research today—formal, informal, and non-formal learning, open and distance learning, recurrent education, optional choice, and modular learning—are increasingly relevant for that area of lifelong education which addresses the adult person.

The promise that learning through experience holds for scientific knowledge is still being mostly ignored. Whereas experiments in the school laboratory under a teacher's

supervision are mandatory, according to the curriculum, the value of exercises in problem solving related to theoretical subjects is played down. In fact, the exercise book is not the auxiliary addendum to the theoretical textbook but rather the other way around. The winners of contests in mathematics, physics, or chemistry will confirm this reality.

However, the most intense and perceptible change of attitude is occurring with the coming generation. Something perceptible and significant has happened, directly linked to education and work, for the structural reform of which the young could be the main asset.

Scholars doing research on the impact of technology on the younger generation (the United States provided a most appropriate field of study) suggested that, following the baby boomers, the people born in the aftermath of the Second World War, the generation of the 1960s and 1970s, have their own particular characteristics. The former, the baby boomers, bear the imprint of television and of its confusing, non-interactive influence. That generation produced radical and revolutionary youth movements. It was followed by the Y (for "Yuppie") generation (also called the "Millennials"), children of the Internet. Children turn their backs on traditional games because of the superior interaction and sheer fun that the new environment of the Web offers them. People of the new generation are displaying unusually strong new propensities: independence, skepticism about adults, a rich imagination, and an incredible innovative power. They love change and, above all, they are entrepreneurial.

Don Tapscott, the author of *Growing Up Digital: The Rise of the Net Generation* (1998), wrote: "For the first time in history, children are more comfortable and literate than their parents about an innovation central to society".

What should be noted is the impatience of these young people with the pace and the protocol of the conventional curriculum. They want to learn faster and better by making use of available technology in a more focused and selective manner than is prescribed in the rigid curriculum. They already are the authors, *avant la lettre*, of personal curricula. They are also impatient to jump-start their involvement in the sphere of work as soon as possible. At a time when senior citizens learn how to use e-mail and to search the World Wide Web from their juniors, young people are no longer attracted to the defiant spirit of the 1970s. They simply wish to find out more about life during that period. The much-discussed "generation gap" is not widening. The contrary seems to be the case.

It is striking to see how much respect these young people have gained in the eyes of their seniors. Adults have started to imitate youth, to dress like them, and to listen to their music. Companies want them for their technical skills and their taste for change. Governments take them along with their delegations to the United Nations. City halls set up youth councils. Political parties increasingly depend on inputs from their youth branches. Students have an active presence in the management committees of secondary schools and universities.

Some might object that this picture is that of corporate America. Yet another young generation is turning to the symbols and myths of the past. From a ludic point of view, it is fair to say that the young play the games that are available to them, even the most sinister ones. By extension, in the new century, the name of the game is the computer, not the

swastika. Despite obvious material obstacles, it is surprising how this trend is also gaining ground in the developing countries.

Let us examine the reasons why this dynamic young generation and the spirit of change that it is stimulating can be placed at the top of the list of present-day favourable factors. The experiments it is engaged in will likely decide the future of lifelong learning intertwined with work and accomplished through a variety of individual itineraries.

5.2. Slowly Getting Ready

An educational system, no matter how decentralized, needs some general guidelines in order to operate properly. These are elaborated at a national level and are expressed in laws and policies. The regulated segment includes the structure of the system, the procedure for awarding diplomas and other attestations, the standards or grades, the funding schemes, and the operational requirements of this vast public sector comprising from one-fourth to one-fifth of the population. The government is therefore the prime agent entitled to take decisions regarding the institutional framework of education and the needed reforms.

"Despite some interesting and promising developments, the inertia of the old structures and policies remains considerable."

The private sector comes next with its practical knowledge of the actual current and future manpower requirements at company level. In fact, training for work is even older than religious education.

In third position comes civil society, represented, in particular, by parents, who have always been involved but have recently become more vocal.

The fourth essential factor is the teaching staff owing to its position in the educational system and the weight of its opinion in the formulation and application of reforms. The importance of teachers, even in numerical terms, should not be overlooked. In any country, there are about 50,000 teachers and auxiliary staff for each 1 million young people enrolled in the educational system. Most of these teachers are represented by powerful trade unions.

Finally, since it is necessary to analyze the relationship between work and education, it is necessary to note the role of the trade unions in the national economy as a whole, especially in the light of their trilateral partnership with employers and government.

The press, television, and the other media are factors that influence the debate on the future of education; however, they can be regarded as part of civil society or as part of the non-governmental sector.

One observes that a strong will for change is obvious in regard to experimental action, and important steps in favour of structural reform have been taken at that level. Such has not been the case with other major agents that are having a crucial impact in key sectors: legislation and financing. Despite some interesting and promising developments, the inertia of the old structures and policies remains considerable.

The question here is that of the institutionalized governance of states and of their parliamentary and executive systems. Central to politics is the power to decide and manage the affairs of state in an orderly manner. Consequently, all structures have to be judiciously organized: public administration, law enforcement, the military, the health system, and public education. The political mind dreams of stability and continuity. The obsession with order becomes a systemic disease that begets bureaucracy, corruption, inertia, and resistance to change. Most national educational systems have retained a certain rigidity. They still emphasize the ideas of order and regulation, and they resist the kind of modernization that is required by contemporary society and economy and made possible by contemporary technology.

"The key to effectiveness can be found only in the capacity of the system itself to absorb change in a continuous flow."

Spasmodic attempts to promote renewal are noticeable in the shaping of the reforms promised by political parties in the run-up to cyclical elections. In fact, the commonly accepted idea of how to go about reform may be fatally flawed. The stages of educational reform should not coincide with the succession of governments. The educational system needs to be regulated by a built-in mechanism of permanent and continuous reform. Considering the pace of change, no formula can be regarded as the ultimate formula. The key to effectiveness can be found only in the capacity of the system itself to absorb change in a continuous flow.

Current educational legislation and practice lack such adaptive mechanisms for their basic components: the cast-in-concrete curriculum, the teacher-class system, and the conditionality of diplomas. Those immobile elements, plus the goal of integration into a homogeneous mass designed to serve and perpetuate an economy and a society that no longer exist, allow only insignificant, ornamental, and symbolic alterations.

Two major processes, globalization and regional integration, are now confronting states with a new agenda. The position of an individual country within the international environment depends on how wisely it manages to play its cards, to find new niches, and to identify and to exploit its competitive advantages. These requirements call for a flexible and alert educational system.

The following story may prove more enlightening. At a conference in Algiers devoted to the new international economic order, a subject that was much debated in the 1970s, a young diplomat approached Lord Ritchie Calder, a well-known Laborite author and specialist in science and technology. Said the young man: "I must ask you about something that bothers me. When the United Kingdom gave up India and the colonial empire, among the arguments you mentioned was the country's ability to find other ways to assert its global interests. After all, Britain had been the cradle of the... industrial revolution through technology, science, and knowledge. And yet the dream shattered once the young brains of the realm started their migration to the US." Lord Calder replied: "The answer is simple. Education did not keep pace with the times. Universities did not understand what was at stake. School prevented us from moving forward".

Today, states are beginning to realize that they cannot ride the waves of globalization with fixed, non-adjustable sails. Another good sign is that no nation seems inclined to suggest that its own system is the best and should be adopted as a model. All existing systems are still quite far from the ideal of flexibility and radical renewal that learned international conferences have been putting forward. Some education systems, which have been famous for their rigidity, such as the Japanese system, are starting to throw off ballast.

The private sector has also been slow to rise to the challenge, but for different reasons. The financial resources of a private bank or company are far greater than those of a ministry.

The business community has two main reasons for its reluctance to get involved in matters traditionally reserved for government action. First, education has been assigned a place on the other side of the barricade, while the government was supposed to abstain from interfering with the economy. The second reason is even more serious. Profit is the motive force of the private sector. It may even acknowledge that education is a profitable exercise. But the problem is that education becomes a profitable investment only over the long term. The natural preference of capital is for short-term gain. At this point, a quotation from Lester Thurow (1996, pp. 283-284) appears to be relevant:

> Consider college education as a hard-nosed capitalist might consider it. Sixteen years of expensive investments must be made before the returns begin. Approximately $65,000 must be invested to acquire a K12 education; depending upon the quality one wishes to buy, $80,000 to $120,000 will be necessary to buy a college education and the sixteen years spent in school will mean forgone earnings of about $68,000. Sixteen years of high-quality education will require a total investment of about $250,000 per child. The risks that this investment will not pay off are enormous.... Capitalists simply don't invest in sectors where they have to commit to a sequence of investments with low returns, high risks, and falling asset values.

There is another serious consideration. Investors always take care to avoid a situation whereby their investments could give competitors a *free* ride, as is the case with public goods. The emergence of corporate universities indicates that the feeling of insecurity about the economic returns on investment in education might have been overcome. But keeping educational investments under corporate control in order to frustrate free riders may still inhibit private investment in education as a public good.

Are these good signs? Yes, if one considers the grants that some companies punctually, though not very frequently, award to universities, or their patronage of certain schools. Also yes, if one considers the significant experience of the technological parks attached to universities, which provide a prolific interface between education and companies, with enhanced chances for the education-work linkage.

Neither the third nor the fourth categories of agents (teachers and unions) that have a bearing on structural measures are in a position to offer sufficient supporting elements for positive action.

Let us start with the *teachers*. They regard themselves, rightly, as the key element of the educational system. But they fear that a new system, while enhancing their guiding function as tutors, might reduce their crucial, well-defined role as masters of their discipline, their exclusive control over the way the curriculum is covered, and their decisive power over evaluation.

"The notion of confining education to instruction and the tacit adherence of teachers to behaviourist principles, with their emphasis on exogenous control and the minimization of the endogenous resources of learning, make teachers feel comfortable in their dominant positions as wardens of the whole process."

Teachers are the ones who award the credits and give the green light to the issuance of diplomas. The mechanism of reward and punishment is also in their hands. A possible dislocation from that entrenched position would naturally meet with opposition. The notion of confining education to instruction and the tacit adherence of teachers to behaviourist principles, with their emphasis on exogenous control and the minimization of the endogenous resources of learning, make teachers feel comfortable in their dominant positions as wardens of the whole process.

But these are not the reasons teachers would normally give for their resistance to innovation. Their objections are packaged as a campaign in defense of quality against the changes that might threaten it. This argument carries weight with parents. They attach importance to quality and good results, authenticated by diplomas and certificates as the safest way to a stable career.

It should, nonetheless, be noted that many teachers have embarked upon experiments meant to broaden the educational horizon. Also, one should not overlook the important trend—embraced by public opinion and reflected in the activities of NGOs—which proclaims its faith in the individual, in his or her autonomy and resourcefulness. The prevailing philosophy and mentality of civil society can be transposed in the area of education through the individual curriculum, the personal itinerary, and the freedom to alternate learning and work during one's lifetime.

Although they are frequently viewed as being a part of civil society, the *trade unions* play a special role in the relationship between learning and work. Traditionally, their priorities were related to jobs and wages and, later, also, to working conditions. Consequently, they looked with some suspicion upon the educational sector because it produced people with diplomas that entitled them to automatically hold better-remunerated positions without having "real" qualifications. But unions tended to support promotion following on-the-job training, adult courses, open education, and other measures developed within the enterprise itself.

Transition to a system based on individual training is a major test for the trade unions. Such a system brings with it not simply enhanced mobility of the type advocated by liberals

in the labour market, but total mobility. The difference is fundamental. The mobility of the market is involuntary in terms of individual choice and interest, while individual mobility is voluntary and dictated by interest.

Let us assume that the unions might give favourable consideration to the new schema, if and when it is accepted by their members. However, a fluctuating mass between the two helixes may eventually deprive the unions of clear and stable support from their membership. The need to protect the rights of those who are simultaneously and recurrently engaged in work and learning will generate new forms of organization, which will require the unions to develop more complex and comprehensive activities.

At present, the agents involved in structural change are not prepared to direct their energies and resources toward a far-reaching transition in the work-education relationship. But those agents are themselves subject to experimentation. Whether they like it or not, they are constantly confronted with the dysfunctions of the traditional systems and the high costs of their maintenance and repair. They begin to realize that a new approach is necessary in order to face the demands of modernity in the Twenty-First Century.

5.3. The Counter-Aging Society: A Life of Sixty Active Years

The best indication of the success of the Industrial Revolution was the increased human life expectancy that came in its wake. It is still rising in most parts of the world.

This phenomenon is frequently described in traditional terms as a sign that society is aging. If the statement merely means that most people today live longer than they would have lived some fifty years ago, then the statement is acceptable. But, in itself, the expression, "aging society", is somewhat inappropriate. It is first necessary to recognize that there has been an increase in the length of the life cycle, which should probably count as one of the greatest achievements of the Twentieth Century. Second, it must be observed that what is really becoming older is the notion of age itself. One only needs to refer to the European literature of the past century in order to learn how people felt at 40. It is also clear that the onset of physical and mental decline has been pushed back. In other words, at 50, 60, or 70, one is much younger today than one would have been at those ages in the not so distant past. Therefore, our societies are, in a sense, getting younger because people are living longer and better. This phenomenon can be observed in most countries around the world.

The failure to understand the situation in these terms can lead to serious errors. On the one hand, we tend to marginalize a growing portion of the population (those over 60) far too early. On the other hand, we quickly run aground in the political debate about how much and how long the younger generation should pay to support the older generations. On both counts, we find ourselves at a dead end!

In order to come up with a rational answer, it is necessary to turn the proposition completely around: Older people are younger today than they used to be in the past because the "value" of human beings is being linked to their productive activities and creative endeavours. The key social and political challenge of the coming decades will be the extent to which modern society

manages to involve people from, say, 16 to 80 years of age in the worldwide process of creating and sustaining the wealth of nations. There are already clear signs that things are beginning to move in that direction, even though the global picture is as yet far from homogeneous (Delsen and Reday-Mulvey, 1996).* It is important to recognize the good news that we live in a counter-aging society, since the change that is occurring in the structure of our planet's population is a momentous one in human history. Our culture, our mindset, and the structures of our societies must now adapt to this new and promising trend. The inescapable significance of the new situation is that every one of us has a potential for staying on as an active participant longer and more effectively than it has ever been the case. Achieving that sort of continued participation must now become the goal of the learning-work tandem and a key instrument of progress and justice for all.

"We still hold to our philosophical prejudices: we are much more what we produce than what we consume."

In this perspective, it will be essential to propose educational programmes for those who are 60 and over with an aim to develop new skills enabling them to embark on new careers based essentially on part- time jobs and/or unremunerated activities. Indeed, a great deal is already happening along these lines.

One must also consider the fact that in many countries, particularly in the developing world, young people account for a very large segment of the population. Those people will eventually grow old within twenty, thirty, or more years. The consequences of an extended life cycle will then become a truly global issue everywhere. China, for instance, has already taken this inevitable problem into consideration at governmental level.

It is first necessary to reconsider and to redefine the notion of work as productive activity in the world of today, but not in the sense of what has been inherited from two centuries of the industrial revolution. Full-time remunerated work of around thirty-five hours per week, at the least, is still considered in most cases as the only measure of the contribution of an individual to productive activity. It is through this process that one establishes most of one's social contacts. It is also at work that individuals find and define their place in society. Official forms one has to fill out on various occasions always ask questions about one's professional career, qualifications, skills, and even sex. The perception of one's personality is very much linked to that sort of factual information. One's entire network of social interaction is heavily dependent upon one's position in the world of (remunerated) work.

The fact that other human activities are hardly ever noticed has led to a perverse situation: somebody who is engaged in valuable non-monetized work—household work or child care at home are the obvious examples—receives much less that his or her due share of social recognition. Evidently, this attitude has adverse effects on personal motivation and self-esteem.

Quite a few other activities are gaining importance in a society in which leisure may sometimes occupy people at least as much as work, even though that representation is not entirely true since much of the so-called leisure time is spent on voluntary work.

* The Geneva Association, a pioneer in this important issue, had already started a research programme on gradual retirement in 1987. It has since organized at least one seminar each year on this issue and has published a series of special studies as well as *The Fourth Pillar Newsletter*.

The increased differentiation of the types of productive work and of the opportunities to perform additional activities as complementary elements of human personality is a rather new development, particularly if seen from the point of view of classical economics. An evaluation of such activities becomes a helpful tool for making judgments about individual contributions to the progress of society in a modern economic system.

We still hold to our philosophical prejudices: we are much more what we produce than what we consume. Even consumption patterns are simply ways to generate an image of ourselves. Most people, we believe, are aware of the fact that their worth is much related to their level of self-esteem and usefulness to society. We definitely stand behind the idea that we consume, and need to consume, in order to produce for ourselves and for society rather than the other way around. In this perspective, the question of work as an element of one's personality gains a whole new dimension.

To identify the current intensity of work in the life cycle we have to examine the participation rates of people in the monetized labour market. This determination is made by the ratio of the active population—i.e., all persons of either sex who ensure the supply of remunerated labour for the production of goods and services regardless of their employment status—to the total number of people in a determined age group. The higher the proportion of the active population in a specific age group, the greater their work intensity. Work intensity is subject to legal regulation, social influences, and individual decisions.

A sharp increase in economic activity occurs at age 15 to 24 as a result of graduation from secondary or tertiary education. Before the age of 15 there is usually, at least in the industrialized countries, only negligible activity in the labour market. This situation changes when mandatory school attendance comes to an end, and individuals can join the work force according to their personal inclinations and needs.

Afterwards, work intensity is more or less stable over a period of several decades. For men, the proportion of economically active people typically exceeds 90 percent, while for women, the rate tends to be considerably lower. Depending on the degree of integration of women in the labour force, the activity level, in various countries, only rarely exceeds 75 percent. During the period of activity, the participation rates of women exhibit a particular but very characteristic drop between the ages of 30 and 39. An obvious explanation for this phenomenon is the preference of women of that age to spend more time on domestic work and/or child-care activities.

At the end of this phase, the proportion of people who are gainfully employed gradually diminishes. At this time, retirement becomes a major factor in the making of personal decisions regarding working time and lucrative activities. More and more people choose to drop out of the labour market and to devote increased time to other activities than remunerated work.

We shall now propose an alternative system for the distribution of work and work intensity that seems better suited to individual needs throughout those different stages of activity.

During the education phase, more part-time work should be integrated into the official tertiary education system. Such an approach would enable young people to gain working

experience while still studying, without necessarily submitting themselves to the stress of taking an unpleasant or uninteresting job in addition to being enrolled in full-time education. At the same time, the solution would relieve them of at least part of their financial worries. The integration of part-time work into the educational system would also foster connections between theory and practice, and it would provide closer links between higher education establishments and the productive sector.

During the second phase, there would be fewer changes in work intensity. That stage, however, should be gradually phased out rather than come to a sudden end. There would be increased possibilities for older people to prepare for retirement by gradually reducing their workloads according to their individual preferences and needs. At the age of 60, they still have twenty years of life ahead of them. Gradual retirement could thus become a beneficial complement to the established three pillars of the social security system. It would also help reduce the pressures on national budgets in aging societies. Voluntary work, which is already, to some extent, being undertaken, might increase in volume. It could become a non-monetized substitute for part of the previously remunerated work since many older people would like to stay active without necessarily asking for monetary compensation.

During all three phases, education, training, and retraining should be part of daily life, albeit differentiated according to age. Constant access to education is necessary in order to enable people to remain in the labour market and to meet the demands of an ever more complex and rapidly changing society.

At this point, it appears appropriate to dispel a common misperception. Conventional corporate wisdom still claims that older workers are a burden to dynamic enterprises trying to keep abreast of a rapidly changing business environment. In fact, a number of serious recent studies demonstrate the generally positive contribution of older workers (see Warr, 1994: 472-480; and The Commonwealth Fund, 1991). They have been found to be experienced, reliable, hardworking, and effective in their jobs. They think before they act, and they seem to be more flexible when faced with new assignments and changing work conditions as compared to their younger colleagues. These very positive characteristics of older workers can, and definitely should, be exploited not only until the age of retirement, 60 to 65 years in most industrialized countries, but for a longer period. Longer life expectancies and improved health conditions make such an extended period of employment possible.

One of the major problems of the employment of older workers stems from the system of remuneration according to seniority. Traditionally, older workers have been more expensive than their younger counterparts who, in fact, have been subsidizing the higher wages of the former. This practice has led to a situation whereby older workers might be earning more than their actual productivity would merit, thus providing employers with an incentive to dismiss them, or with an excuse to shed them first in case of downsizing resulting in redundancies. The situation is even more serious in certain countries in which contributions to pension schemes increase with age, thus making older workers even more expensive.

A movement in favour of performance-based remuneration is underway in certain countries, especially in the Anglo-Saxon world, which is likely to enhance the competitiveness of

older workers. Part-time work could considerably assist the transformation of the system of remuneration, since the switch of older workers, who have reached retirement age, from full-time to part-time employment with additional, if partial, pension benefits would ease some of the financial constraints for both the employer and the employee.

However, the current distribution of income among the older population, those aged 65 and over, still does not reflect any shift towards higher earnings from part-time work.

Gradual retirement, as a complement to the established three pillars of the social security system and an expression of personal choice and individual preference, is closely linked to part-time work. Even in countries like Germany, France, or Japan, where traditional attitudes to part-time work have been predominant for a long time, the situation is beginning to change. The explicit wish of those over 60 to have a broader choice of ways to organize their lives has contributed to increased recognition of the rationality of more flexible work patterns.

So far, experiences with part-time work as the component of a gradual retirement approach are mainly positive (Delson and Reday-Mulvey, 1996). Initial organizational problems can be overcome rather quickly, and the costs of the required administrative measures, planning and sometimes equipment, are compensated through reductions in absenteeism, increased flexibility, improved morale, and productivity growth. Ignorance appears to be one of the more serious obstacles to part-time work or employment of older people, especially when they have passed the official retirement age. People tend to be skeptical whenever there is no experience of part-time work, but when that practice has been developed, it is generally welcomed by supervisors. Younger colleagues can also benefit from the valuable skills of part-time experienced workers who would otherwise not share them when fully retired.

Since the benefits of the part-time work performed by older people generally outweigh the costs, there should be no structural obstacles to the employment of older people. Current practice shows that part-time workers could undertake many more tasks than is now the case. The development of part-time work thus appears to be an ideal way of lengthening working lives and/or of giving them increased flexibility.

There is an element of absolute novelty in the relative length of working periods. The sixty-year active life tends to become generalized. An average active life increases by twenty years. Thus, the facts of demography and the leap from 55 to 75 years in life expectancy eventually come to terms with societal organization. Extended useful lives are no longer the bane of national budgets, and the specter of the "aging society" no longer seems so frightening.

5.4. Funding Schemes

How will the costs of the new system be covered? Will they be higher, as sometimes appears to be the case, or will the possible schema reduce budgetary pressures on public spending? Let us first review the relevant experiences and tendencies.

So far as education is concerned, the most debated initiative is that of the voucher system. The definition is simple: the government makes a payment to a family in the form of a voucher. The family gives the voucher to a school of its choice. Thus, the tuition fees for the

children of this family are covered. The school cashes in the voucher with the Government from the tax-funded budget. The beneficiaries are the family, especially the children, the school, and even the state.

The most important change is that both public and private schools can be chosen because the government subsidizes the schools in proportion to enrollment. Consequently, schools are encouraged to compete with one another. Only the best succeed in bringing in more students and more funding, according to *the funds-follow-the child* principle.

In fact, the voucher scheme is a continuation of the system of loans for compulsory education. It enhances responsibility towards the principle of *Education for All*. Several arguments plead in favour of this new system: *(i) child protection* following from the Education for All principle, but also providing for those suffering from parental neglect; *(ii) internalization of beneficial externalities*, since support for education reduces poverty and encourages economic growth, increases lifetime income, and has constructive social effects. One can argue that the State actually makes a long-term investment in a manner that is quite similar to the theory of human capital and the knowledge economy; *(iii)* The principle of *equal opportunities* is universally acknowledged and constitutionally enshrined. Children should not be deprived of upward mobility through education only because their parents are not wealthy.

In reality, most of the methods used in the voucher system are selective and somewhat biased in favour of the underprivileged categories (single parents or the disabled) and of families with reduced revenues. Other fiscal measures exist by which to attain the same goal as that of the voucher system, such as tax reduction (an education tax rebate); however, vouchers are also designed to help persons who pay lower taxes; *(iv)* The voucher system enhances the pool of available resources by *reducing the waste of intellectual potential*. This factor, however, does not lend itself to precise measurement. We can only guess how much is lost by not allowing individuals to develop to their full potential; *(v)* An application of the voucher system *challenges schools to compete*.

The new system soon encountered many objections and gave rise to heated disputes at theoretical and practical levels. It was said of voucher schemes that *(i)* they were generated by a free market philosophy and thus encouraged the pursuit of selfish material gains and minimized public benefits; *(ii)* they undermined the public educational system by reducing emphasis on quality and orienting young people towards private education; *(iii)* they would cause private schools to be subjected to the same kinds of controls as public schools, thus sapping their independence and specific merits and making them more and more bureaucratic; *(iv)* they would prevent poor families from deriving true benefits, which, rather, would go to the middle class. Segregation would thus deepen (as in the inner cities in the United States), and the educational gap would widen. Other objections pointed to the dangers of higher costs and the misappropriation of budgeted allocations, which are primarily needed by the public schools that are faced with specific problems.

The disputes over the voucher system grew even more acrimonious when the arguments turned political and doctrinal. In the United States, a country in which the debate has produced the largest number of initiatives for the adoption or the rejection of the voucher system,

it turned into a dispute between the Democrats (contra) and the Republicans (pro). Legislative action was initiated in twenty-six states.

The issue has also given rise to constitutional disputes. The United States Supreme Court ruled against the granting of subsidies from public funds to schools run by religious denominations; however, it refused to make a ruling in a parents-versus-state case on the use of vouchers. The NGOs were divided. One of them, People for the American Way, claimed that the voucher programmes weakened public education, that taxpayers' money was spent on explicitly religious instruction, and that the new system obstructed further meaningful efforts to improve the quality of public schools. In exchange, the Children's Scholarship Fund announced an interesting initiative: 45,000 privately funded scholarships for which there were 1.25 million applicants.

It would be a mistake to consider the issue only in light of the highly publicized debate in the United States and therefore to underestimate the scope of similar or related initiatives in other countries.

The application of the new system is not confined to industrialized countries.

It is now time to ask ourselves to what extent the approach was able to provide worthwhile support to the kinds of structural reform that are required for lifelong learning, curriculum itinerary, and the double helix of work and education.

First, the system is based on consumer choice supported by public funding, even though the funds are mainly allocated to maintain the functioning of suppliers. Second and most importantly, its guiding principle is personal advancement, qualification, and fulfillment. The individual decides how to use the available means in those areas that stimulate his or her interest, participation, and satisfaction, while giving him or her access to new opportunities and chances. Third, the system can apply to all age levels. Moreover, the contribution from the state budget becomes an add-on rather than a substitute to one's own earnings when necessary.

Having seen the terms of reference for lifelong education and active participation, let us now briefly examine what happens with the financing of the post-work period. States have a vital interest in providing old-age security. Pension systems are currently subject to serious debate, especially in those countries in which the aging population is on the rise.

The classical system is based on the premise that workers are taxed today in order to pay for the old people of today, *i.e., the pay-as-you-go* plan. The system does not allow for a correlation of the immediately available resources and the obligations already assumed. The working generation takes responsibility for supporting the retired generation. Early retirement has only worsened the situation. The list of shortfalls is so long that the mandatory, publicly managed, tax-financed pillar for redistribution has to be supplemented with two other pillars: a mandatory, privately managed, fully funded pillar for savings and a voluntary pillar for people who want additional resources in their old age.

Such diversification is being implemented in many countries. It reduces the risks for the retired since it introduces several types of management (public and private), of financial

sources (of labour and of capital), and of new investment strategies at domestic and international levels. Since the 1970s, advanced studies have been undertaken by the Geneva-based Association for the Study of Applied Economics and by the Risk Institute concerning gradually phased-in pension schemes and chance enhancement for the after-work period of productive life.

The topic of flexible retirement plans reveals a link to the double helix of work and learning. Such schemes stretch across longer periods of active life (4-10 extra years at one end and 11-16 years at the other). The question of pensions proper will thus shrink in size and be applicable to a smaller category of people (those over 76). The additional decade will be taken care of by means of a different type of security arrangement pertaining to the right to work and lifelong education. Consequently, the contribution of the state budget needs to take into consideration a uniform approach to people aged 16 to 76, one that is related to vouchers rather than to pensions.

Two circumstances make life considerably easier for public budgets: the decreasing number of those who are relying exclusively for their living on the three-pillar pension system and a drastic reduction of the complicated and cumbersome unemployment benefits schemes. The latter will eventually become part of the social security safety net, usually applying to people who have become marginalized or incapacitated. The blurred distinction between the public and the private sectors, already instituted in the field of education, turns into a partnership for the management of the education-work system for the period between ages 16 and 76. The main contribution of the private sector will no longer come from taxes collected into a general budgetary system but from targeted investments in knowledge creation.

Education, unemployment benefits, and pension schemes are all based on taxation accounting for a staggering proportion of GDP. If one adds to that sum the expenses incurred by companies to cover social demands other than wages, the resulting figures become really huge. Hence, the conclusion that the introduction of the double helix concept gives rise to a financing system of “lifelong basic rights” which emphasizes the duty of society to provide individuals with entitlements, that will be much less costly than traditional ones, owing to its unifying vision, common mechanism, and synergetic approach.

Its advantages are much more diverse. More flexible and cost-effective formulae are emerging everywhere. The R/D perspective is a clear case in point.

5.5. Assessment

Each system has its merits. Daily assessments, a system of incentives, and a final grading scale (from 1 to 10, or from 1 to 20, ratings from unsatisfactory to very good, letters from F to A) are used all over the world in primary and secondary education. A cumulative system of credits, without differences in terms of quality, should become predominant in universities.

In order to achieve integration, lifelong education should have its own single financing system, with no differences at the ends or in between. The credit system offers relevant services. A person can gain points without interruption, thus obtaining impressive continuity in

his or her learning activity. In fact, credit accumulation should not stop at the end of one's active life (at age 76), it should continue in third-age universities.

If one considers a credit average of forty points per year of study for those involved in learning or learning for work and assume an additional eight years of college and university through age twenty-four, one will obtain a total of 320 credits. Let us further assume that, after fifty-two years of active life, mostly spent in industry or in small business, or even in front of one's own computer at home, an average of five points can be assigned to those who leave their work environment to return to the Alma mater system of continuous education. Doing so would account for another 200 credits. The equivalent of another five years will be dedicated to on-the-job training, adult learning, or to courses organized by the company (a plausible hypothesis if one takes into account the fact that the updating of knowledge requires at least one year out of five, therefore 10 out of 52).

Here is a possible credit accumulation for a 75-year-old individual: 320 plus the 400 credits obtained through lifelong learning yielding 720 credits.

Another nearly 300 credits are available for those who are more ambitious. According to one's voluntary choice and spontaneous interests (political science for engineers, aesthetics for doctors, hobbies for workers, mysticism for psychologists are examples that can function in any combination), a learned subject might yield as many as 1,000 credits. That total would correspond to 1,000 modular subjects, 1,000 weeks devoted to lifelong learning, or twenty compact learning years. Is this a great deal? Should not the pride of having collected 1,000 credits be as justified as the awe or envy one might feel toward a successful millionaire? Why should the wealth of knowledge mean less?

Those who will be called upon to develop in minute detail the open system that is painted herein with a wide brush will have two major issues to debate and resolve. One pertains to the passage from one helix to another. The traditional system currently responds to a simple demand: the graduates of medical schools become physicians; the graduates of the Polytechnic University become engineers; those graduating from schools of public administration become civil servants; the graduates of vocational schools become workers, etc. As the system becomes less specialized—inversely proportional to the specialization freely chosen by the individual, which provides a wider range of diplomas and qualifications—the sheer number of credits is not sufficient to warrant leaving an educational system in order to enter a work system.

Adequate symbols may indicate the nature of the covered modules: E or L for the basic or generally valid ones (what is sometimes called general culture or *stadium generale*) or EW for those oriented towards an activity in the sphere of work. The latter may contain an indication about the predominant speciality according to a catalogue to be elaborated together with the decision-makers in the field of work. For instance, AERO Eng. designates a profession but also the necessary knowledge to practice it, *i.e.,* aviation engineer. Such a solution will throw more light on the complicated issue of the relevance of diplomas, a subject that today is being attacked from all sides. The supple mechanism of *joints* (entry-exit from one sphere

to another) or well-greased door hinges is one of the main contributions to the harmonious combination and smooth operation of the two major social systems of education and work.

The mixed team of experts who will have to work out the organization charts for these delicate mechanisms will also have to take into account the in-built periodicity of the system. The cycles are so old that they could be maintained as a point of reference. Today they comprise thirteen years (called K through 12): five for basic education and eight for middle and secondary school, sometimes called *gymnasium or lyceum* (four years).

Adaptive mode

In contrast to a selective mode, an adaptive mode of education assumes that the educational environment can support many and varied instructional methods and opportunities for success. Alternate means of learning are adaptive to, and are in some way matched to, knowledge about each individual—his background, talents, and interests, and the nature of his past performance. An individual's styles and abilities are assessed either upon entrance or during the course of learning, and certain educational paths are elected or assigned. Further information is obtained about the learner as learning proceeds, and this, in turn, is related to subsequent alternate learning opportunities. The continual interaction between performance and the subsequent nature of the educational setting is the defining characteristics of an adaptive mode. The success of this adaptive interaction is determined by the extent to which the student experiences a match between his specific abilities and interests and the activities in which he engages. The effect of any election of, or assignment to, an instructional path is evaluated by the changes it brings about in the student's potential for future learning and goal attainment. Measures of individual differences in an adaptive educational mode are valid only to the extent that they help to define alternate paths that result in optimizing immediate learning, as well as long-term success (Robert Glaser, "Future Adaptive Environments for Learning", 1996).

Two possible corrections can be made to the prevailing system. One suggests the introduction of credits at the age of 14, two years before the first possible exit into the active world of work. Between ages 6 and 14, the system should develop what, today, we call general and compulsory education. Some countries even devote ten years to that stage, but eight years seem to be sufficient. The two years between the basic level and high school are the time for opting for immediate employment or for choosing a profession that presupposes longer training. This transfer also takes place in the two final years of high school. In certain countries (*e.g.,* France), those years prepare the passage to tertiary education. In fact, they are more or less like college rather than high school.

All variants are indicative of the primacy of the individual pace, a factor that has been neglected in the traditionally rigid system. Should someone wish to collect his or her 320 credits due between the ages of 16 and 24 one or two years sooner or later on, the choice would be possible. It would be equally irrelevant whether one is awarded one's college

graduation diploma at 24 or at 54. The final title is, however, too deeply rooted for it to be eliminated.

In Latin America, graduation from a university gives one the right to call oneself *licenciado*, a title that is inscribed on one's calling card, on one's door, and on one's letterhead. Such titles or diplomas are not compatible with the suggested new system. Instead, Education and Work training certificates obtained at an early age might prove to be more useful in relation to later switches on the helix of work.

Here we have to take a radical, but not impossible, step. Why should the credit system not apply to the field of work as well, thus introducing W credits? Nowadays, it is still the length of service that matters most for a promotion. Since one's active period also includes one's Learning and Work achievements within a lifelong education system, it would be more logical to express experience by means of Work (W) credits plus Learning and Work (LW) credits. One year of work experience would count as nearly 40 W credits. For the duration of an active life, one would acquire at least 1,600 W credits. The system of promotions and corresponding wages could be very much simplified. Special merits and high performance that today entitle one to a bonus or other rewards could account for extra credits.

What will the life of our friend John, who starts as a fisherman, and eventually becomes the president of a foundation, look like? A simple calculation shows that since the age of 14 he has accumulated: 80 LW credits, 80 W credits, 120 LW credits and 120 W credits, then again, 80 LW credits, followed by 160 W credits and 80 LW credits, plus 200 W credits, and again, 80 LW credits. Beginning at the age of 40, his itinerary earns him 40 LW credits and 200 W credits, followed by another 200 W credits after the switch. After 40 LW credits, another 200 W credits follow. Another switch yields 80 W credits and 40 LW credits. After age 65, there are 80 W, 40 W, and 200 W credits. Now he has entered the period of academic tourism with a total of 560 LW credits and 1,320 W credits, let alone the numerous incursions into the general modules of philosophy, political science, and aesthetics. More interesting than the credits collected are the twelve switches that have offered John a diverse panorama of life and knowledge.

The system of credits brings essential changes to the definition of the indicators used to evaluate and study the evolution of different systems according to country or level. When examining the indicators suggested by relevant international organizations, such as UNESCO (global), the European Union (regional), and OECD (group of industrialized countries), one realizes the enormous amount of work that went into this endeavour, without which statistics and quantitative studies would be inoperable. Of course, the simple count of those who study at different levels as well as those who assist them (the teachers) is mandatory for any operational schema. The classification according to sex and age or to entry and exit from a single system is also necessary. We thus obtain the most widely used indicators for performance, management, examinations, budgets, planning, funding, access, research, employment, and equal opportunity.

Unfortunately, lifelong education is mentioned only once in the survey on Society and Work, with a small and irrelevant number of issues. For the "innovative schemes of

collaboration between higher education and the world of work on a humanitarian basis", states "are likely to undertake a survey". But the recommendations are reduced to a mere enumeration of the formulae involving academics and business people, with a comment on the income that might result.

The most widely used measures lose their relevance in light of the modular schema, lifelong education, and personal itineraries. It is not important how many young people pass from one level to another or how many interrupt the cycle, since this becomes an asset rather than a liability arising from the mobility of the system. Age is also irrelevant, for both young and old people are equally entitled to stay within the mainstream. So are the costs that are calculated only in relation to the budget.

In exchange, a new measure is proposed for the knowledge contained within the system, quantifiable by means of E, LW, and W credits. The LW indicator is conclusive for the effort to gain active knowledge, education for its general formative merits and access to culture, and work for the amount of work-related skills in the mobile and flexible framework of the new schema. The switches from one helix to another measure the mobility within a given society, and they also point to the pursuit of satisfaction and self-fulfillment undertaken by individuals.

5.6. The Network of Experimental Points

Most statements on structural change stop, after a formulation of the best and most noble ideas, at the point of implementation. The nostalgia for action and innovation is mirrored in the frequent use of such terms as new, innovation, adaptation, anticipation, the requirements of reality, and the ideal desiderata. Although novelty appears like a pie growing in a greenhouse, it does not move rapidly enough, nor is it widely known.

The following are some topical issues for the coming years: the emergence of a new kind enterprise, the magnitude of which is given by the new map of knowledge and by the numerous combinable modules according to individual choices, learning spanning over the entire duration of life, the introduction of new technologies, continuous updating of information, and the joining together of learning and work. From the very start, we tend to favour horizontal experiments as opposed to the hierarchical fiat of the hierarchical systems. A pedagogical experiment takes a generation in order to be productive or assessable. Thirty-three years of waiting, *i.e.,* three generations per century, means too much waiting. The pace of knowledge and of economic and social change may reduce the interval to twenty-five years.

The process can begin with the development of current experiments (ten years), followed by changing the funding of macro-systems (legislation, organization, funding) over another decade, and assembling the results in a coherent and operational schema of global scope (another five years). The intervals suggested for the implementation of the Learning and Work schema are not much longer than, say, those required for building a factory or designing the master plan for a city (5 years), nor are they fanciful.

There are no real conceptual difficulties in accomplishing the tasks of the first phase, considering the fact that further action will rely on current experiments. Emphasis is to be

laid on their extension, maturation, acknowledgment, and confrontation. The key word is *network*, rather than a central authority, a global Areopagus, or a flow of vertical top-down instructions. The network is a question of experimental spots.

An outline of its topics emerges from the inventory of current experiments. Here is a tentative list:

- gradual introduction of modularization, especially in the years preceding a predictable exit (vocational and at the ages of 14-16, 16-18; a college exit almost everywhere in higher, postgraduate, adult, and recurrent education);
- opening of all elementary, secondary, and higher schools to persons returning to resume interrupted studies at various ages; adaptation of all methods of evaluation and teaching so as to fit the requirements of lifelong learning;
- multiplication of forms and assimilation of training for work within the general system by means of modules that are equally valuable for the rest of the system (LW);
- more free-choice or optional courses, which will be treated as equal to those required by either the compulsory system or by the demands of the chosen itinerary;
- cultivation of the ability to choose through adequate courses describing various activities and professions; encouraging interest in the development of vocations and aptitudes;
- steps towards the recognition of the forms of learning to be taken from the work sphere into the educational system and followed by their assimilation within lifelong learning;
- retraining the trainers in order for them to move on from master courses to individual or small group tutoring; as teachers are recruited from the general university system, special modular programmes should be introduced for those choosing that profession (for instance, foreign language modules designed to meet distinct needs for translators, researchers, specialists in comparative literature, etc.);
- a new approach to non-formal and informal education, with important resources for specific interests and attractiveness; also, because such courses have many elements that could be included in modules;
- strengthening the basis for source references (well-equipped libraries, data bases) and practical activity (laboratories, workshops, computerized classrooms, etc.);
- intensive use of computers to make modules more attractive and orientational through the use of multimedia techniques;
- development of distance education;
- encouragement of new forms of part-time work and learning;
- establishment of joint councils (involving parents, communities, and the private sector) to provide assistance in the management of educational institutions;

- creation of a favourable atmosphere for innovation through the mass media, special awareness sessions, and meetings (for example, alumni associations);
- enactment of new educational laws and regulations designed to cut red tape and bureaucracy;
- assurance of system maintenance by means of regular bulletins and constantly updated Websites on the Internet;
- support for various professional associations, NGOs, CSOs (civil society organizations), foundations, and private funds that display a particular interest in education and work;
- introduction of specific methods to stimulate participation and anticipation at all levels and to enhance the ability of learners to concentrate, which is currently at risk owing to the informational boom.

We have focused on a particular interval in a person's life that is closest to the concerns of the Learning and Work relationship.

But the formative period of an individual begins much earlier, starting in kindergarten, nursery school, or even earlier. It would be unfair to overlook the interesting experiences in this domain. So would it also be to underestimate the endeavours to capitalize on the acquisitions resulting from advanced knowledge of cerebral functions or other psychological studies. Children display early on a fantastic ability to learn foreign languages (something that has fascinated Noam Chomsky), or to follow the logical steps in assimilating concepts such as space, time, measurement (something that inspired Jean Piaget). Important artificial intelligence centers, such as that at the Massachusetts Institute of Technology, led by Patrick Winston, have created kindergartens in order to study the mechanisms underlying the recognition of formulae. Optional courses have crossed the threshold of elementary education. This huge learning potential that we read in children's eyes, in their clever hands and creative talents, goes down in a descending curve once they enter the rigid and cold environment of formal education. The very fact that such an involution actually happens should be a cause for concern and a perpetual source of inspiration.

The progress of other large systems (the field of work, managerial innovations, entrepreneurial culture, R&D organization) may give rise to new developments of utmost significance for the double helix. It would make a great deal of sense to establish an early partnership with those who are interested in the classification of the sciences and in the global mapping of knowledge. These projects need time to mature and, no matter what happens in the experimental phase, the crop will be reaped later. It will also take at least ten years, and it will depend on the measures that the major decision-makers might choose to enforce at the level of macro-systems. While the classical institutions may have been favoured in this experimental phase, it is also clear that such innovations as the open and corporate universities, spurred on precisely by the inadequacies and narrow-mindedness of those institutions, are likely to lead to further interesting experiments inviting broader generalization.

If we have considered experience and its horizontal movement over the same ten years, it does not mean that measures toward more opening and reform cannot also be initiated from top down by central authorities. That is what the Japanese system is currently undertaking.

Here are some of the more plausible and feasible measures:

- Development of a unitary system, based on the modularization of knowledge, individual itinerary, and lifelong learning by means of adequate legislation allowing for frequent switches between learning and work, with adequate funding provisions from public and private sources.
- Encouraging existing governmental organizations and creating new ones to work together in support of the double helix of education and work with the business community and civil society (trade unions included).
- Complete harmonization of education in the sphere of work with work in the sphere of education to be reflected in correlated evaluations and recurrent, interchangeable, activities.
- Large scale introduction of the tutorial system based on individual guidance, which does not imply abandoning classical specializations (those of mathematician, biologist, social scientist, and humanist). On the contrary, the best sources for the modules on sciences are the specialists themselves, and they will also write the modules. The novelty lies in the time gained for scientific research, with universities and also the secondary schools as reliable pillars.
- The implementation of the Learning and Work concept will trigger great changes in the institutional structures of states.
- The most important innovation will be reform of the funding system for the two social systems of learning and work by means of a common methodology and a single chapter in the state budget taking care of both of them.
- The major educational questions (interdisciplinarity, lifelong education, the combining of social demand with individual fulfillment) are likely to find answers that will turn around the obsessive present agenda to accommodate the changes occurring in the field of labour (employment mobility).
- International organizations will become more active in supervising regional and global generalizations of mature solutions.
- Statistics will be simpler once credits become the measure of one's knowledge through social mobility and the number of switches on the double helix.

The historical trajectory also matters. If the Twenty-First Century continues to be haunted by identity crises and social or ethnic conflicts, if certain inner cities become battle grounds for urban warfare, if peace does not prevail, a rational effort toward radical change through Learning and Work will not be able to flourish and come to fruition.

If, however, conflicts are successfully prevented or peacefully resolved, this schema will be established within a favourable environment. More than that, the co-operation it invites, involving political decision-makers, executive authorities, and the material power of knowledge and money will eventually affect the substance and methods of local and global governance. No soil is more propitious for nurturing new methods of societal management in the era of knowledge.

The individual will benefit most from the effects of the macro-measures to be experienced in the next three decades. His or her dignity will rise as a result of the recognition of his or her statute and role. He or she will make choices that have traditionally been reserved to others. Briefly, he or she will become, more than ever before, the master of his or her own destiny, broadly mirrored in his or her Learning and Work trajectory, bearing the specificity of a personalized fingerprint. It is to be expected that cohesion and partnership, rather than contest and competition, will govern these parallel games. The United Nations will be entitled to say that an important correction has been made to alleviate the drawbacks of globalization. It may sound a bit like *tempo di marchia*, but the Twenty-First Century deserves it.

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Person-Centered Education

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Abstract

Education, together with family and culture, is one of the fundamental building blocks of the social construction of reality. It is more and more evident that we need a paradigm change in the field of education in order to enable people to deal effectively with the mounting challenges facing humanity.

This retooling needs to start with our frames of reference.

We need to create a new paradigm of education in order to enable education to serve people's needs and to have relevance in public service, social responsibility and sustainable governance and development.

Education is one of the main narratives to prepare new generations to be an active and constructive part of the society and is one of the main carriers of values. Values can be implicit or explicit. In Person-Centered Education (PCE), also called student-centered education, values are made explicit to facilitate students to have a critical and proactive role and an effective training to become fully functioning members of the *Polis*. The Person-Centered Approach (PCA) was originated by Dr. Carl Rogers. PCA is a scientifically validated systemic, holistic approach with applications in almost all professions: Psychology, Education, Medicine, Social Work, Management, Intercultural Communication, Conflict Prevention, etc.

"The purpose of Person-Centered Education is to protect and promote a person's innate creative capacities of learning from their experiences, to promote wholeness and integration in the individual by focusing on their personal growth, and develop them into creative and competent members of the society who can contribute effectively to their community."

The central hypothesis of the Person-Centered Approach is that individuals have within themselves vast resources for self-understanding and for changing their self-concepts, basic attitudes and self-directed behavior, and these resources can be tapped if a climate of facilitative psychological conditions is provided. PCA focuses on health, not illness; on

solutions, not on problems. PCA empowers rather than cures and promotes the development of potentialities of individuals, groups and organizations through interpersonal relationships characterized by respect, trust, empathetic understanding and authenticity. It makes people responsible for what they do rather than encouraging dependency.

The purpose of Person-Centered Education is to protect and promote a person's innate creative capacities of learning from their experiences, to promote wholeness and integration in the individual by focusing on their personal growth, and develop them into creative and competent members of the society who can contribute effectively to their community.

A large body of research carried out by David N. Aspy and Flora N. Roebuck and many other colleagues shows that schools, colleges and universities with student-centered education attain higher rates of student retention and better learning.

The student-centered approach requires a willingness from teachers to share their power and have better trust in their students.

At the Person-Centered Approach Institute (IACP), the post graduate courses are organized as a learning community where professors and students intentionally create a facilitative climate of learning and collaboratively strive to achieve common goals. Every day there is an encounter group and students can call a community meeting if they want to address specific problems.

Exams at IACP are very different from traditional practice: the students share their self-evaluation with the group and receive their peers' and the professors' feedback. In addition, each professor and tutor receive feedback from the students. The secretaries and the facilities are also evaluated by the students. Suggestions for improvements are given to each professor, tutor and secretary as well as to each faculty member. The feedback of the students is discussed in a staff meeting after which the course director and the local IACP branch director communicate to the students the changes and improvements that they are willing to make and they implement this with the students' active involvement.

During written exams, questions are distributed and a time duration is set, but at the end of the allotted time the students don't return their answer sheets, but take them home and evaluate their answers by consulting the literature, edit what they have written in the classroom and send the answer sheets to their professors.

Thus, the role of the student-centered teacher is a professional commitment to learning and towards effective, democratic and value-based education, the capacity to share her/his passion about learning, relating to the students with respect, empathy and congruence.

The teacher needs to be capable of being in touch with herself, her students, the members of her community and the world and having the needed skills and attitudes to be a facilitator of learning, an effective mentor promoting student creativity and autonomy and capable of helping students develop their personal and social skills.

The role of the student in Person-Centered Education is learning to take responsibility for their own personal development, with interest in the development of social, personal and problem-solving skills, and for learning to learn, learning from mistakes, willing to contribute to a cooperative and tolerant school ethos and able to learn how to relate to herself/himself and others with respect, empathy and congruence.

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Musings on Economic Theory

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With time "economics" has become more and more specialized and fragmented, and in particular limited to the production of tools as though sociology, psychology, search for values, technology etc. were separate and divorced from it.

Moving from the Industrial Economy to the Service Economy is akin to moving from Newtonian Physics to Quantum Physics.

It was not really the church trying to destroy Galileo and his thoughts, but the basic philosophy of ideas of society at that time. Today, this is represented in various occasions by many economists-priests.

The major problems we face today are due to the lack of an adequate global vision, belief (often implicit) that the future is simply an extrapolation of the present, inadequate "cultural" class when there is a need to deeply integrate economics, morality, sociology, psychology, natural sciences.

Inadequacy of macroeconomics is the root cause of the economic crisis.

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Report on Future Education Symposium

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Abstract

Higher education has continuously evolved in its purpose and methods. As the demands on education have become increasingly complex today, it becomes essential to determine the needs of the future, and evolve a system of education that equips youth to face the challenges that the 21st century will bring, and scale its yet unseen peaks. The following paper draws its inspiration from the recent WAAS-WUC course on 'Future Education' in Dubrovnik, Croatia that sought to explore key issues in teaching and learning, and the means for ushering in a new paradigm in education.

1. The Value of Education

What education has done to improve human life would appear to be, in an age prior to the proliferation of education, a miracle. It has increased human life span, improved health and eradicated diseases. It has delivered us, to a great extent, from superstition and ignorance. It has raised agricultural output to feed over 7 billion people today. It has resulted in the invention of tools and devices that have made life easier. The common man or woman anywhere today has access to what was considered a luxury even to kings a few centuries ago. What was impossible, such as travelling around the world in less than 80 days or speaking to someone beyond shouting distance, has become commonplace. Education has abridged time and conquered space.

According to UNESCO, every extra year of school increases individual earnings by upto 10%, and the national GDP growth by 0.37%.* Girls' education is the most powerful factor affecting the fertility rate and maternal mortality. Each extra year of the mother's schooling reduces the probability of infant mortality by 5%-10%. It even boosts agricultural output by 25%! Education is positively co-related to peace, democracy, human rights and sustainable development.

Our educational system offers the entire knowledge that humanity has collected over centuries, and presents it in a capsule to every generation. The more and better the education, the greater is the benefit for all.

2. The Change we Need

Heitor Gurgulino de Souza, President of WAAS and WUC and Ivo Šlaus, Honorary President of WAAS, pointed out the quantitative and qualitative demands of the future.

* See http://unesdoc.unesco.org/images/0019/001902/190214e.pdf

Global tertiary enrolment has multiplied five-fold since 1975, to about 180 million today. But if the forecast global demand for education is to be met, 4 new universities with 40,000 students each have to be founded every week, over the next 15 years. Nothing short of a revolution, not in constructing the university buildings and administering the enrollment process, but in the very conception of integrating these aspiring students into the education system, is needed. Quantitative expansion is one part, perhaps the easier to define, of the challenge in the future of education.

"The most fundamental change needed is at the conceptual level."

Quality of education is a much researched, much spoken about need. What makes this need most compelling and urgent today is the complexity of the issues that we face. Unemployment, climate change, religious fundamentalism, shortage of essential needs, threat of war—each challenge is multidimensional and interconnected. Garry Jacobs, Chief Executive Officer of WAAS & WUC, pointed out that every one of them is global in scope, defies solution by action at the regional level, and cannot be addressed by sectoral, piecemeal attempts to address it. What is needed is a radical change in economic and social theory, which in turn requires a change in the way we teach them to our youth.

The most fundamental change needed is at the conceptual level. Unless we change our understanding of the knowledge with which we approach our problems, we will not effectively address them. So it is not enough that our policies change. Our conceptions to the whole framework, the theories on which we base our policies need to change. This paradigm change is our best bet for a better future.

Education is central to this process of paradigm change. If the world needs to think freshly about how it can address its problems, that implies that we need to take another look at how we organize our education. It is to initiate the process of change and identification of a new paradigm that WAAS-WUC conducted three trans-disciplinary courses earlier, on the topics of individuality and accomplishment, a trans-disciplinary science of society and effective leadership. The Future Education course was intended to initiate a discussion on the qualitative dimension of the change needed in education in terms of the principles of higher education, how it is practiced, how the paradigm of education can improve and change in future, and thereby impact social thought and political decision making in a way that has not been done before.

The post-graduate certificate course was held from Sept 21-23, 2015 at Inter-University Centre, Dubrovnik, Croatia. The course involved 16 faculty members drawn from the fields of education and educational policy making from organizations in Europe, America and Asia. Apart from WAAS and WUC, The Mother's Service Society, India; Person-Centered Approach Institute, Italy; Dag Hammarskjöld University College of International Relations and Diplomacy, Croatia and Inter-University Centre, Croatia were the partner organizations for the course.

The course was made available live on the internet. Online participants could watch the lectures and participate in the course by raising questions and responding to the discussion

during the course, or afterwards in the online forum.† The course has a permanent dedicated website similar to MOOCs, containing course announcements, recommended reading, video recordings of the lectures, lecture notes, assessment questions and other details related to the course.‡ Apart from this, course details are also permanently available on the WAAS and WUC websites.§

3. Redefining the Purpose

"[I do not] carry such information in my mind since it is readily available in books. ...The value of a college education is not the learning of many facts but the training of the mind to think," said Einstein, one of the greatest scientific minds. Today, any information, useful, trivial or utterly frivolous, is available to anyone with a smartphone and internet connection. So what should we teach, and with what purpose? What is it that is not available in a book or a webpage?

It is expected that 50% of occupations today will no longer exist by 2025.¶ But disappearing occupations do not result in diminishing jobs, they simply mean newer occupations will emerge. So, what future do we prepare students for? We cannot predict anything else about the future except that we can expect much that is new. Courses do need to teach facts, though in the case of some disciplines, information is multiplying exponentially and constantly going out of date. More essential than information are thoughts derived by the correlation of information, ideas that relate & integrate thoughts, and values as principles to guide accomplishment and growth.

The Age of Discovery saw great developments in the shipping industry and invention of instruments that aided navigation. The voyages and overseas conquests are a piece of information. Development in the science of navigation is another. When a student starts to think of the simultaneity of voyages and discoveries, and wonders if one led to another, or both mutually influenced each other, or were themselves part of a larger movement that was influenced by people's aspirations, then thinking is born in him/her. Education that encourages original thought is better than the system that simply imparts different pieces of information. That is like stopping with admiring the different pieces in a jigsaw puzzle.

An education that misses values misses a crucial element. Values—personal, ethical, corporate—contain the essence of all human knowledge of accomplishment. Knowledge without values is like building a large and lovely mansion without a foundation. It is of no use, and may only harm.

During the Great Depression in the 1930s, the US was faced with its biggest economic crisis till date. Banks had collapsed, and people were in a panic. They rushed to withdraw their money from whatever banks remained, ensuring their eventual collapse too. The US President, Franklin D. Roosevelt, found that the economic theories he had learnt at Harvard

† See https://waascourse.appspot.com/future_education/forum

‡ See https://waascourse.appspot.com/future_education/course

§ See http://worldacademy.org and http://wunicon.org

¶ See http://www.cbre.com/

did not serve him. He went on public radio, a new technology then, and spoke to the people open-heartedly. Workers used to rush home from factories saying if the President took the time to speak to them, the least they could do was listen! FDR was able to connect with and reach the people. He reminded them of the greatness of their country and extolled them to believe in themselves and their institutions. He asked them to leave their money in the banks. He imposed banking regulations and introduced economic reforms, but the public emotional appeal he made to his countrymen was a powerful idea. Banking and finance have an existence only inasmuch as they are connected to people. Without people, there is neither money nor economy. Integrating people with the economy, FDR saw that people's aspirations were the lever that moved larger objects. Such relating and integrating of facts and thoughts to form ideas is a skill that our education could equip students with.

"Isolation is impossible in the universe."

Isolation is impossible in the universe, from the level of the particle upwards, to the level of galaxies, and for all living beings from the microorganism to the human being. The current refugee crisis in Europe shows that an issue can have its origins in one part of the world in one century, and its effects seen in another century in any other distant part of the world. Thinking in silos, being concerned with a narrow cause, ignoring the larger picture and imagining that anything can be 'contained' are ideas education has to work on to eliminate in youth. Instilling a planetary identity, as Sesh Velamoor, Executive Director of the Foundation for the Future, described, rather than an identity with the national, state or county border expands the mind and personality. To such an expansive identity, when ethical responsibility is added, we create potential global leaders whom we need so much.

If the challenges of the earlier centuries were puzzling enough, with little pieces that had to be fit together as per a picture, today's challenges are like jigsaw puzzles where the pieces are constantly changing shape while the big picture is also changing! So education today is more educational when the outcomes are uncertain, not when it is about securing a preconceived set of outcomes. Keri Facer, Professor of Educational and Social Futures from the University of Bristol, pointed out that we need a new contract between education and society, one that no longer prepares youth for or against a future we have already imagined. Instead, education needs to create the conditions that will enable students to assume societal leadership and responsibility, confront uncertainty and to participate in the dynamic creation of possibilities.

4. Change of Subject

Looking back at the time spent in college, ask anyone to think of a few things that come to mind. Most likely, it will be the friendships made, the teachers they liked (or disliked), the fun during recess and even in class, the group projects, discussions and debates, the study trips and sports! But what about mathematics, economic theories, literary analysis, chemical equations and anatomical drawings? Those were the ostensible reasons for going to college, and the knowledge and degree obtained are valued and recognized as the reason for one's position professionally and socially. Still, what is cherished most is what appealed to the emotions, what most touched one personally.

True education teaches the person, not the subject. Data, knowledge, theories and subject expertise can be obtained even from a book. There are software and electronic readers with read-aloud text. What elevates the classroom is the personal touch, the relationships that can be forged between the teacher and the student, and among the students. A mechanistic method that is not person-centered throws away this advantage and settles for what can be done with a book or a piece of software.

Teaching is effective not when the teacher is an expert in the subject, not even when he/she knows how to teach. Alberto Zucconi, Secretary General of WUC, stressed that the most effective educator is the person-centered one who has respect, empathic understanding and sincerity. They are mentors who promote student creativity, autonomy and individuality, rather than conformity.

Students often like or dislike a subject because of the teacher who handles it. They choose to pursue a field because the teacher was inspired and passionate about the subject. There are some teachers whose lectures last the entire duration of the class. There are others who make the subject come live. When they read Shakespeare, the students see the drama unfold in the classroom. When they teach Mathematics, they pass on the thrill of solving a problem to the students. Economics becomes a study of real people and situations in their hands. They make History and Geography thrilling journeys through time and space. Electronics and IT move beyond 0s and 1s to show how they can serve people and simplify life. The person-centered approach to education, through such teachers, instills the joy of learning. It creates an environment which cultivates curiosity, trust and self-responsibility. It produces creative, empathic, well-formed individuals with a strong personality and an integrated outlook. Such people are life-long learners, adaptive to new situations and successful in problem solving. Professional success is integrated with personal wholeness, and the person-centered approach to teaching and learning ensures all-round personal development.

American psychologist and educational reformer John Dewey said that schools have too many teachers and too few facilitators. The person-centered approach reverses this, and makes learning more effective by making it participatory. The subject is an occasion. The real subject is the student.

5. From Bologna Onwards

The ancient Chinese proverb “Tell me and I will forget. Show me and I will remember. Involve me and I will understand” gives a wisdom that our classrooms around the world would do well to accept. The Socratic method of teaching by asking questions and initiating dialogue wakened the faculty of thinking. Involvement, rather than passive listening, makes better learning.

However, from the time of the first formal University of Bologna, the lecture has been the primary method for imparting knowledge. Over time, it has been supplemented by discussion, research, project work, internship, service learning, computer and online education, but change in education has not kept pace with change in other fields, or evolved in response to research findings that show the advantage of other methods over the traditional practices

followed for centuries. The lecture in the university began at a time when literacy was considered education, knowledge was limited to a few scholars, there were only a precious few handwritten books, and people had to gather around a scholar and hear him speak, if they needed to learn. Today, education has grown in terms of a number of disciplines and subjects, and the amount of information available in each of them. The printing press liberated the book from the manual labour of writing each copy by hand. Digitization has liberated the book even from paper! The internet makes knowledge more accessible than it has ever been, MOOCs have virtually opened up universities around the world to anyone who would like to take a look inside, without leaving their homes or computers. In such a changed scenario, following the same lecture model would be like the early news readers on television who used to read the news from sheets of paper, much as the news readers on radio had done before. All the visual and multimedia potential of the television went unexploited when it followed an earlier model. Similarly, with all the resources and developments, the university classroom needs to look beyond the lecture model, one that is shown to result in an average student retention rate of just 10%. Using audio, video and demonstration improves retention further. But if at least half of what is taught has to be retained by students, discussion in the classroom is needed. Memory and comprehension are enhanced with increasing interest and participation. Multi-sensory learning, using tactile, visual, auditory, kinesthetic and olfactory channels, improves performance.

Practical work raises student retention even further. But as teachers have known all along, the best method to learn, one that results in an average retention of 90%, is to teach others. Stefan Brunnhuber, Medical Director and Chief Medical Officer, Diakonie Hospital, Germany and Vice-Chairman of the European Institute of Health, showed that inter-personal variables involving peer-tutoring, cooperative peer-learning and the interaction between teacher and student oversteer institutional variables by factor 2. An education system that incorporates teaching, which appears to be diametrically opposite to learning, as a learning method enhances the learning curve best. Inter-personal relationships also boost creativity, an essential attribute required to face a future we cannot yet predict. It equips students with the capacity to ask questions never asked or answered before, and address challenges in ways never done before.

The strong neurobiological link between health and academic performance too merits more attention. Physical exercise has a positive impact on cognitive enhancement. It improves memory, attention span, mathematical skills and overall performance. Adequate rest, yoga, meditation and mind-body medicine improve the brain's executive function. In our fast-paced world, as we try to get more and more work done, we think we are being efficient if we do more than one task at a time. Multitasking is a relatively new word in our vocabulary, but it has firmly taken root. But in truth, multitasking is neurobiologically an illusion. We think we are doing two things more effectively, but we are not doing two things. We are lowering performance. If we are involved in a mental task, and are interrupted every 3 minutes by an SMS, we end up with a functional reduction of IQ by 10 points. The use of Internet and Communication Technology 6-8 hours or more a day, in order to learn, is negatively co-related with the development of executive function of the brain and

lifestyle, and is positively co-related with dissatisfaction. But the reality is, the average global smartphone user looks at it, on an average, 150 times a day. How that affects our collective IQ and productivity does not need Mensa level IQ to estimate.

Just as letting go of the past is necessary in some cases, going back to basics and rediscovering the wisdom that has been known for centuries are essential in some. Wisdom is to know and educate others about when we need to look ahead, and when to turn back.

We do not need more, new disciplines, what we need is a creativity response—a creative change in our education that boosts the creativity of the learner. We have seen a steady rise in the number of disciplines and subjects, and greater and greater fragmentation of knowledge. As we break it up into smaller, more manageable parts, we begin to look at a large beautiful painting from closer and closer, and lose sight of the beauty of the whole, staring at the individual brush strokes that have neither meaning nor beauty when seen in isolation from the rest of the picture. This results in a horizontal divorce between the different categories in education. Divorce of another type is seen in the complete disconnect that many students feel from studies, because they cannot relate to it from their life and experience. As we try to teach the knowledge collected over centuries in a three, four or five year course, we condense it by abstracting knowledge of many life experiences into a series of generalized abstract principles. This divides truth into fragments, all of which together do not recreate the whole. Each aspect is partial and incomplete when isolated from the wider context of which it is a part, and leaves the student asking, 'Why am I learning this stuff?'. They do not see what it signifies, and where it fits in real life.

We take a flower, separate each petal and show it to the students, and expect them to visualize the whole and appreciate it. In other words, we teach them individual subjects, evaluate them, rank them and create competition. But in the real world of work and life, what is needed is cooperation and collaboration. Somewhere between graduation and employment, we expect them to figure that out by themselves. This disillusions students and leaves them unprepared to face the world of work, with its interconnected issues that transcend narrow disciplines.

All issues and challenges that were effectively handled in the past were done so only because those who were in charge saw the issue within its context, not isolated from it. To understand any part, we also need to understand the whole and the relationship of the part to the whole. In the same way, our education acquires meaning and comes to life when we make it contextual. The context abridges the skills gap in graduates, and equips them to seamlessly move into the world of work and real issues.

Olga Melykh, Lecturer, National University of Kyiv-Mohyla Academy and President of the "Young Generation will Change Ukraine" Association, pointed out the comprehensive curricula that equip youth to think contextually. One way of adding context to content is to teach and learn a subject, not in isolation from all other subjects, but with reference to them. Instead of teaching history as a uni-dimensional study of the major epochs and events in chronological order, it could be related to all other subjects and made multi-dimensional.

A study of art and literature can be taken up beginning from history. Examining the evolution of art, the influence of the times and the lives of artists sees art from a historical perspective. Similarly literature can be studied from within history—How and when did writing and its various forms evolve? Do writings reflect the sentiments of the period? Conversely, did writing influence the course of history?

"At the root of the multiple crises confronting humanity today is a crisis of values that must be resolved before there can be any hope of lasting solutions to the problems facing humanity."

How have inventions, beginning from the wheel, shaped history? When, how did science part ways with religion? How have new inventions and theories been received? Is science responsible to society? Do scientists have moral obligations? Science, studied from a historical perspective, is as equally informative as the scientific principles themselves.

When was democracy born? Why does monarchy still exist in some places? How did governments, political system and law evolve? How has society changed since the time of the hunter-gatherer, in what ways is it essentially the same? How has human psychology evolved with evolution in society? What circumstances create dictators, what creates visionaries? How is the personality of great leaders shaped? Sociology, politics, law, psychology—all these can be related to from history. We can study history and detect patterns to understand the present and anticipate the future.

What is illustrated here with history study can be done with other subjects as well. By establishing interconnections between all disciplines and making education contextual, we enable students to see the part in the context of the whole. This ability is essential if we are to find effective, permanent alternatives and solutions.

6. The Value of Values

One of the top technology companies, Google, believes that when it comes to recruiting new employees, technical expertise is the least important criterion! Intellectual humility, sense of responsibility, empathy, and willingness to work in and for the team are more important. Grades determine one's career for the first two years, according to Google's head of People Operations. So the rest of one's career depends on the value one adds to work, and that is determined by one's own values.

Knowledge without values is catastrophic. After the bombings of Hiroshima and Nagasaki, Oppenheimer became the emblem of a new type of technocratic power. He became a household name and appeared on the covers of the magazines *Life* and *Time*. But five years later, during the arms race between the US and USSR, Oppenheimer lobbied for international arms control. He opposed the development of the hydrogen bomb for ethical concerns. With growing concern about the social and ethical responsibility of scientists, Oppenheimer joined

Albert Einstein, Bertrand Russell, Joseph Rotblat and other eminent scientists and academics to establish WAAS in 1960.

When conflicting interests prevail, it is values that one is committed to that set the direction. Values are the quintessence of the knowledge of human accomplishment. They represent a universal ideal of conduct, an idealized goal of perfection. The common element in all instances of progress or accomplishment, in any field, at any level, individual, regional, national or global, is positive values. Just as physical skills are the channels through which physical energy is directed so that it produces results, values play a similar role at the psychological level. The quality of the values and the intensity of our commitment to them determine the level of our accomplishment.

As Winston Nagan, Chairman of the Board of WAAS and Director of WUC emphasized, at the root of the multiple crises confronting humanity today is a crisis of values that must be resolved before there can be any hope of lasting solutions to the problems facing humanity. An education without values is destructive. Civilization offers us knowledge, culture provides values. When knowledge and values are unmatched, we move towards dystopia. As Einstein suggested, new knowledge should be a blessing and not a curse to humankind. Learning and work are effective and productive only when they are based on positive values, and these need to be incorporated in every subject and course.

7. Towards a Bolder Future

We have not yet fully explored the infinite potential there is in human capital. We have disproved predictions that earth will not be able to produce food for all and devised ways to turn desert into farmland, grow plants without soil, and continuously boost agricultural productivity. Food shortage in any part of the world today is not because of shortage of food but due to political and organizational folly. Concern over depleting oil reserves has been removed by the discovery that the sun beams enough solar energy in an hour to satisfy global energy needs for a year.** We have deciphered the structure of the DNA, split the atom, and mastered rocket science. Now we are looking to move out of the earth, to other worlds. We made computers, connected them together, and have created a virtual world with unlimited possibilities. No resource is as resourceful or unlimited as the potential in the human being. The human mind has amazing resources at its command. It has faculties we have not discovered yet, and the potential to evolve and accomplish much more than we have ever done.

With all the focus that education gives to science, on closer examination, we see that much of that focus is on the process of validation of discovery, and not really on the process of discovery itself. An understanding of this process, and of what constitutes intellectual genius will move us closer to discovering the method that develops genius through education.

Today, our mental processes have a strong bias for physical reality. Though we know that if we went only by our senses, we would still be saying that the sun goes around the earth; even in our thinking process, we give primacy to the physical. Reality has many dimensions. Reality is in the material, emotional and conceptual planes. But our scientifically validated,

** See http://environment.nationalgeographic.com/environment/global-warming/solar-power-profile/

rational education places great emphasis only on the material dimensions of reality. Our thinking process in general is conditioned to emphasize on what is physically verifiable and dependent on our senses. Our education often downgrades the reality of the subjective dimension and places great emphasis on being completely objective, even though the subjective reality is what we live in to a powerful extent. Ignoring the subjective dimension robs us of a rich knowledge we could discover otherwise.

"Comprehending the challenges in present and future education, identifying the changes needed, and determining a course of action are easy when compared to the task of translating the action plan into action."

Thinking is a critical faculty that education needs to develop. Thinking itself can be of many types. One is the analytical, where we take one part of the whole, concentrate on it, gain extensive knowledge and specialize in the part alone. Another is synthetic thinking, where we try to see the big picture. We put all the parts together, and find the commonality in all. We combine a number of disciplines and subjects, and make up an education course in this way. The third type of thinking, integrated thinking, sees the oneness among the parts at a fundamental level, it recognizes the essentiality in all. It reconciles apparent contradictions as complementary dimensions of a wider reality—truths completing truths—to reveal the underlying transdisciplinary principles. If our education can shift from analytical, to synthetic, to integrated thinking, we evolve collectively to function at a yet undiscovered plane of thinking, working and creating.

The unrealized is not necessarily unrealizable. Many a thing that is possible today was unimagined, or science fiction in the past. But we have an inherent bias to believe in the reality of what exists today, and downplay the reality of what has not yet materialized, even if it is inevitable, simply because it is not intelligible to our senses. The determinative power of anticipation and aspiration are not taken into account in our understanding of any development in science or the humanities. A holistic education not only imparts facts, it reveals the great powers of the mind, develops the personality and individuality, and makes students discoverers of unthought realities.

All knowledge is based on a conceptual framework. Problems are not solved when we insist on working within the existing paradigm or the intellectual framework. We are constantly learning new paradigms, but we do so unconsciously. We move to new paradigms without knowing we are doing it. In our classes, if we can teach the knowledge we are teaching, and make conscious the progress that we have made, and the process by which we shift from one paradigm to another, we will create not just knowledge but the capacity to create new paradigms, and to come out of the box.

The natural progression in the educational paradigm is a gradual shift from 'Learning to Know' to 'Learning to Do' to 'Learning to Be' to 'Learning to Live Together', as described

by Stephen Yong-Seung Park, Dean at the Office of International Affairs and Professor of Human Resource Management, Kyung Hee University, South Korea. At a fundamental level, education must prepare us to strive for Truth, self-development and self-knowledge. The focus on the external that teaches one how to make a living must be balanced by a focus on how to make a life, an idea that Pierre Antoine Barraillé, President of Praneo, put forward.

In order to meet the increasing demands on quality and quantity of education, and to effectively handle the challenges we face today, our educational model along with all the involved people (teachers and students), pedagogy (of research and teaching) and organizations, should transform into a more conscious, person-centered, value-based, holistic system.

Comprehending the challenges in present and future education, identifying the changes needed, and determining a course of action are easy when compared to the task of translating the action plan into action. Change almost always meets with inertia and resistance from long time practitioners who believe in the superiority of their practice. To shake the beliefs of an old, established organization is more difficult than to move its physical structure from its foundation. Even when there is clear knowledge of what needs to be done, existing forces in society prevent or impede the execution of the knowledge from a hundred ulterior motives. Vested interests with limited vision are hostile to change that threatens the status quo. Even when change is implemented, the policy has to be tailored specially for each country, region or university. What suits one may not work elsewhere.

The challenges to be overcome in order to revolutionize education are enormous, as Zlatko Lagumdžija, Former Prime Minister and Minister of Foreign Affairs of Bosnia and Herzegovina, and Tibor Tóth, Ambassador, Executive Secretary Emeritus, Comprehensive Nuclear-Test-Ban Treaty Organization PC, said. But the stakes are high enough, and they are rising perpetually. Education is our best hope for the future. We need to translate the thoughts and ideas generated from the WAAS-WUC course on Future Education into a working reality. We could make a start with one or a few progressive universities and countries, as suggested by Erich Hoedl, Vice-President of the European Academy for Sciences and Arts. As the saying goes, nothing succeeds like success, and others around the world will follow. Many a revolution had a modest beginning.

We do not know exactly what the future will look like. A phrase from Indian philosophy talks about knowing that which all is known. Translating that into the educational context, we can teach students that knowing which, they can handle all. Alongside teaching them the facts, we can train them to handle complexity and make them capable of being adaptive and constantly reassessing the future. So no matter what the future turns out to be, our youth will be well formed individuals equipped to face it. Better still, they will invent the future.

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Viable Solutions for seemingly Intractable Problems

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Abstract

Life is filled with seemingly intractable problems. But life wisdom affirms that if there is a problem, there must be a solution. Or better yet, the solution to the problem lies within the problem itself. Problems have their roots in disharmony. Disharmony arises when a part separates itself from the whole and acts independently of the wider reality of which it is a part, as financial markets have separated themselves from the real economy and economy has detached itself from social and ecological consequences. Insistence on out-moded approaches under new conditions generates intractable problems, as when the framework of a heterogeneous nation-state is employed for the dominance of a single ethnic or religious group. Knowledge and culture are the supreme values of a society and core element of its capacity for accomplishment and development, yet both tend to be exclusively possessed by elites for their own benefit, rather than freely distributed to maximize their impact on society as a whole. Society evolves by the transformation of ignorance into knowledge. Life evolves by organization. The linking and integration of social organizations spur development. Mind itself is an organization and powerful force for development. Energy makes organization more efficient. Any problem can be solved by raising the effectiveness of energy by converting it into skill or capacity and transforming it into power through organization. What one person sees as a problem is an opportunity for another with wider vision. The difference in perception accounts for the difference in levels of accomplishment. So, those with the right perspective see opportunities where others see insolvable problems. Current problems are the result of irrationality, refusal to benefit from past experience and insistence on repeating past errors. Modern science, which was born to fight the superstition of religion, has become a source of superstition. Fully availing of the latest advances for the widest benefit of humanity is a simple and effective principle for solving apparently intractable problems. Problems exist at various levels; what works on one level may not work for the other. Solutions are possible for any problem because man is always free to draw on solutions from a higher plane.

Life is filled with problems. Rare are the few wise people who look at problems as disguised opportunities. The Adwaithic philosophy of India looks at life as something illusory and consequently feels problems are illusory too. When work refuses to progress and stagnates we feel there is a problem. European settlers seeking freedom immigrated to America and found there an unrestricted atmosphere free of social restrictions and mental superstitions. They came to feel that *if there is a problem there must be a solution.* In the 1860s the citizens of Chicago realized that they had built their nascent city on low lying areas

subject to flooding and decided to raise it. In one notable incident they were able to raise a four-story hotel five feet above the ground when the hotel was functioning. A century later their descendants sent a man to the moon and safely back again. Such achievements are not possible without a glimpse of the infinity in life.

> *"The creation of 70,000 nuclear weapons by the superpowers in pursuit of increasing levels of national security and the perpetuation of the veto power by the P5 at the UN are some inexplicable instances of thought divorced from logic and rationality."*

Life is arranged in such a way that what is considered a problem to one person is not a problem for another. Spiritual philosophy has declared that "*all problems of life are problems of harmony*." Ironically, marriage which is sought after by men and women as a means to increase their happiness becomes a source of disharmony and unhappiness for many. One loses harmony when mind is divorced from the body or from external reality, or when thought is divorced from logic or rationality. For example, the science of Economics is part of the larger society and is meant to operate for the welfare of society. But over the years it has become disconnected from the rest of society and functions independently and to some extent detrimentally. Economics advocates growth for growth's sake even when it results in widening levels of inequality and ecological damage. Financial markets in pursuit of short term speculative profits function in a manner that is increasingly divorced from the real economy that undermines real economic development, human welfare and social stability. The creation of 70,000 nuclear weapons by the superpowers in pursuit of increasing levels of national security and the perpetuation of the veto power by the P5 at the UN are some inexplicable instances of thought divorced from logic and rationality.

Life has moved away from its primitive origins and has become civilized and sophisticated. Still the inherent tendency of man is not to change. He insistently seeks to handle new problems in the old ways that created them as if nothing had changed, like the Boxers who, convinced of their invulnerability, faced modern armies with primitive weapons. Such an approach unnecessarily prolongs problems or converts them into situations that defy solution. Insistence on out-moded approaches makes the problem even more intractable.

A modern state is a political entity founded for political reasons and intended to accommodate heterogeneous populations. When religion is made the primary basis for its inception, its very birth is likely to be attended with social strife and prolonged military conflict. The problem results from the initial conception and defies solution without correcting the original premise.

Marx predicted a violent working class revolution. Industrialized England seemed the logical place for it to surface. The world became alarmed and tried to prevent it as far as possible. Instead, the response came from agrarian Russia which was still in the grips of serfdom and did not meet any of the conditions Marx had envisioned for launching a

proletarian revolution. Though the call was for freeing the proletariat from his fetters and turning him into a free individual, the way the revolution was implemented in the Soviet Union exchanged one form of serfdom for another, leading to the very liquidation of the individual. The natural solution would have been to remove the fetters of serfdom and allow the people to develop naturally in an atmosphere of freedom rather than trying to develop them violently.

Society has developed knowledge and culture into supreme values. They represent the highest achievements of civilization and their gradual extension to the entire society is the assured path for continued social progress. It is the responsibility of those who have acquired these treasures to extend them to others. But the tendency of elites—the aristocracies of class, caste, wealth, military and political power—is to retain these values exclusively for themselves. When the part refuses to raise the whole society to a higher level, what follows is a violent reaction that leads to beheading a few thousand individuals or a general decline of the whole society. Though the immediate source of trouble may be removed, as it was in revolutionary France in 1789 and revolutionary Egypt a few years ago, the society which has lost its old leadership typically resorts to restoring the lost social order and monopoly on power under a new label. Thus, communism supplanted Czarism in Russia and plutocracy supplanted monarchy in the West.

Life is characterized by many important principles: One is that *one moves down in order to rise to a greater height*. Division and conflict are endemic characteristics of life based on the tendency of mind to view reality in terms of mutually exclusive opposites and contradictions. Life progresses through mild struggle that takes on the appearance of strife. *Life validates desire which aims at delight*. Society evolves by the transformation of ignorance into knowledge.

One of the most instructive of these principles is that *Life evolves by organisation.* There used to be times when history was described as the history of kings. Later it changed into the history of people. Studying life as the history of organization will show how at each stage humanity has resolved its problems by greater organization. Organizations are formed from the interrelationship of systems. Systems come into being by the organization of acts into chains of activities. When two organizations merge, they become all the more powerful, as in the merging of transport and communication to create the modern air transport industry or the merging of education and printing. Thus, the principle for solving problems is to raise the effectiveness of energy by converting it into skill or capacity and transforming it into power through organization. The Bengal Famine of 1943 resulted from a breakdown in the organization of food distribution. A military general became the Viceroy and solved that problem by improving the organization.

Generally, it can be said that Europe where logical mind is developed does not face the same type of problems that confront Asia where logical mind is less developed but spiritual mind is more developed. Mind itself is an organization and therefore problems created by superstitions will be absent where mind prevails. Though railways are present in both places, the mental value of punctuality that is appreciated in Europe ensures that trains come on

time, while the same is not true of India where punctuality is not valued. Deficiency in a host of other related values explains the difference between a developed country and a developing one. USA saw the value of delivering letters overnight and developed FedEx, which became a multi-billion dollar corporation and founded a whole new industry.

"Modern science was born to fight the superstition of religion. Now we find that it has generated its own superstition."

It can be said that *the efficiency of a nation is decided by the energy of the population*. The energy is generated by freedom, education, individuality and initiative, etc. Where a village youth perceives a problem, the same problem may be perceived as an opportunity by an urban youth. *This is true of nations, populations and organizations*. This difference in perception can account for the difference between an upper-middle class and a lower-middle class family. The former sees the situation as a great opportunity, while the latter sees the same situation as an intractable problem. *What matters is one's mental equipment and attitude with respect to the circumstances.*

In the last 70 years or so the world has been largely free of hot wars and since 1991 of Cold War as well. As a result, the fighting energies of war have been converted into productive energies geared towards prosperity. Almost simultaneously, the world witnessed the rapid development of higher types of organizations, for air travel, global communications, international financial transactions etc. The advent of Visa, credit card and the internet organized the energies of global society and infinitely multiplied the world's wealth. But what has been the response of society? It has created job less growth, tax evasion, rampant speculation, unseemly accumulation of wealth and widening inequalities. Disconnecting money from the economy, it turned a surplus of productive wealth into a destructive force. It converted opportunities into seemingly insoluble problems. The opportunities were great occasions to lift emotional man to the level of mental man who can lead a life of leisure and culture. Therefore, *those who have the right view are able to see viable solutions to these situations*. The essence of what has been said above is that Man is the center of his life. It is up to him to choose to lead a heavenly life or choose to lead a life of problems, which unfortunately he seems to prefer.

A state should be political in origin and not based on religion. A theocratic state will have all its energies diverted to support fundamental beliefs as a result of which it will degenerate into poverty, violence and superstitions and many other things. The one meaningful solution to this problem would be to abolish the religious basis on which the state is founded.

Theoretically, *current problems are no different from problems in the past. They come mainly due to disharmony, irrationality, refusal to learn from past experience and insistence on repeating past errors*. When an attempt is made to solve problems of a higher plane through methods of a lower plane, the problems only get more complicated. One common experience is that the man who tries to eradicate evil very often succumbs to it. *Modern science was born to fight the superstition of religion. Now we find that it has generated its own superstition.* Its respect for the social status of a scientist only reinforces such superstition. It regards

every university professor of Philosophy as a real philosopher, making a mockery of the term. *The capacity to develop a total blindness to events is a crude primitive mental attitude*. A truly scientific attitude is to not ignore any event however singular or inconsistent with currently prevailing theory.

"There are no insoluble problems in the world."

The Greek state has developed a financial crisis and the Greek people are asking for a better alternative. They vehemently oppose the proposal to solve the problem through greater austerity measures. The IMF and a growing number of international experts support the view that further austerity will only aggravate the problem and result in a further default. Yet the Eurozone insists on imposing a solution which is sure to fail.

Since the end of World War II the world has demonstrated its capacity to raise production 30 or 50 times. *Global per capita income has increased 84 fold since 1800*. This multiplication is not confined to income generation alone. Similar progress has occurred in every field. Wealth created by the general progress of society belongs to the society, not to any particular individual. Equality was long ago recognized as an essential principle in politics, where democratic values now rule. The same equality is valid for economy as well, without which true political equality is unattainable. Indeed, economic equality is the precursor to political equality. *Only when both of these prevail at the same time does social equality become real.* Beyond that lies psychological equality which comes from inner growth and education. While monarchical regimes came to an end with the arrival of democracy, *economic equality can come only when prosperity is equally shared by all in the society*. While each man must earn his income by work, technological progress is something owned by society at large. Technical progress is not the property of corporations. *Guaranteed employment ensures economic democracy*. Speculation is ruinous for economic health and must be banned while the right to employment must be made compulsory. There should be no restriction to extending educational benefits to lower income groups.

When problems arise, they can be solved by resorting to first principles. Surely the world cannot be oblivious to its past successes. It is folly to keep repeating past errors. Twenty-five years ago Yugoslavia suffered from run-away inflation and a top World Bank economist was consulted for a solution. He had a certain solution and was made head of Yugoslav Central Bank. He implemented it and brought down hyperinflation to single digits in ten days. His method was to activate the local economy. Greece can multiply its wealth by even fifty times if it wants. The local people are right to demand that the austerity measures be scrapped. The USSR was dismantled from the inside. A sincere appreciation of the situation led to her demise. A long history of clever diplomacy has led to her public life becoming hypocritical and something of a sham. Similarly, science is fostering its own superstitions. There are no insoluble problems in the world.

A simple and effective principle for solving apparently intractable problems is to fully avail of the latest advances for the widest benefit of humanity. When there is severe food scarcity, it is possible to respond to it in a way that benefits the farmer who produces the

crops. India's Green Revolution can best be understood from this perspective. The principle applied was to utilize the latest advances fully for the benefit of farmers. The advances were new agricultural production technology based on hybrid varieties of wheat and rice and introduction of a national organization for procurement and marketing of surplus production. The benefits were to ensure a higher profit to the farmer even in times of surplus production by introduction of a minimum floor price. Today the threat of nuclear weapons still remains very real and great. Now we have the internet, which did not exist until after the end of the Cold War. The damaging effects of radiation are now well documented and we now have a system by which the real facts about those dangers can be widely disseminated to inform the general public everywhere. If done, public opinion would make it very difficult even to store nuclear weapons anywhere. This is a viable simple solution for a problem of great magnitude.

The world of finance has been in a great upheaval since 2008 and wrought great suffering on countless millions. There ought to be a solution. The solution is to produce much more wealth and distribute it equitably. It is not like there is only one way to multiply wealth. Nothing prevents us from using all available methods. An organization called "GameChangers 500" is promoting the value of B-corps, 'for-benefit' corporations, which are now legally permissible in 23 states of USA. GameChangers 500 has introduced a new measurement system to assess the commitment of companies to socially beneficial goals such as ecological conservation, full employment, education and community development. They cite studies to show that *corporations promoting socially beneficial objectives actually outperform other corporations in terms of growth and profitability and are more successful in attracting and retaining loyal employees and customers than those which pursue profit as their one and only goal.* Their success is based on the principle of self-giving. Underlying it is another principle, the more one gives, the more one will receive.

These principles are true and applicable to all subtle forces. As wealth is a subtle force, it too responds to this approach. People in Germany and Netherlands seem to believe that helping Greece out of their financial crisis will be at their expense. Therefore, they oppose any bailout. But the method we are advocating is to create more wealth inside the Greek national economy. This is an initiative that will make all the countries richer and eliminate opposition. A former UNESCO chief regretted that on a daily basis some $3000 billion is being wasted on arms purchases at a time when millions of people are dying of hunger. All sane voices would say that those funds should go to feeding the poor. But the fact is that *all poor nations can create more wealth than they need*. This they can achieve through a policy of self-help which will hurt no one.

All nations without exception have passed through a phase of corruption on their way to prosperity. Prosperity is a physical value which is achieved by hard work. But integrity is a mental value which requires centuries to develop and it comes out of cultural restraint. *Corruption has been prevalent in all developing countries for several decades.* The more a leader tries to eradicate it, the greater is its growth. Here we have to understand the truth about corruption as a phenomenon of social development. *When thus viewed, the regret vanishes*. Anand Dairy in India was well-known for its corrupt ways before V. Kurien took

charge in 1949. Within a short time he converted Anand into the most efficient cooperative in the country. In 1965 Kurien was appointed head of the National Dairy Development Board and he extended the Anand model throughout India to usher in the White Revolution. Corruption in England, other European countries and USA was eliminated in a century by a natural process that *occurred unconsciously by the growth of these societies*. Rising levels of education, the self-respect which education engenders, and greater organization of the whole society gradually eliminated corruption. Today it can be abolished much more quickly by incorruptible leadership. What took a century in the course of the 17th, 18th or 19th century may be accomplished in a few years in the 21st century. Why it should be so can also be explained. Even corrupt societies have certain pockets that are free of corruption. We can start with that as the basis and begin working from there. The process will be greatly facilitated if procedures are made transparent. Transparency eliminates corruption. A question may be asked about what to do with countries that lack honest leadership. It is possible to create a small core of honest leadership, as was done in India during the last decade. *When corruption saturated the body politic, it produced its very opposite as a natural consequence.*

A truth of human nature is that man enjoys confusion and chaos and the intensity generated in coping with the problems. In philosophy this is referred to as the taste of ignorance. This was understandable so long as only a small portion of humanity was educated. But now when the majority of the world's population is literate, social evolution can move from ignorance to knowledge. It is worthwhile examining the history of humanity over the past thousand years to understand how in each century humanity improved its ways and to *beneficially apply that knowledge to life in the 21st century.* We will discover that no longer need we rely primarily on physical means where social, psychological and mental methods are now possible, more rapid and more effective. Any approach that is not based on rationality should be discounted.

Problems and solutions exist in a scale from physical and vital to mental and spiritual. *Solutions based on the same plane will work. Solutions from a higher plane will be far more effective*. Solutions drawn from a lower plane will not solve any problem; they will only aggravate the problem. US President Franklin Roosevelt stopped the panic that had closed 6000 American banks in 1933 by appealing psychologically to the American people, when all economic solutions had failed. Churchill led Britain's successful defense against the Nazi invasion by appealing to the patriotism, pride and love of freedom of the English people when the rest of Europe had surrendered to Germany's military might. *Solutions are possible for any problem because man is always free to draw on solutions from a higher plane.*

Morris Goodman was critically injured in a plane crash and was completely paralyzed by multiple fractures of his cervical vertebrae so that he could neither move, breathe, nor even speak. Physicians said he would not survive a week. Goodman indicated his intention to survive and recovery by blinking his eyelashes in response to questions posed. Within a year he walked out of the hospital on his own strength. In another well-documented case, an editor of *Life* went into shock after receiving a penicillin injection and his vital signs indicated imminent death. He later reported feeling the cells of his body dying one after another. When the sensation of disintegration reached his heart, he made a conscious decision not to die and

the process began to reverse. To the amazement of the attending physicians, he recovered and was able to narrate his experiences to the press.

> *"The behavior of Greece needs to generate political authority commensurate with the monetary power that thus emerges. Should this occur, Greece can once again become a leader of the world."*

The problem of famine and the challenge of increasing food production are physical, but they were addressed by C. Subramaniam, India's Food Minister, at social, psychological, organizational and mental levels. He instituted organizational arrangements to ensure dissemination and demonstration of new technologies, purchasing and distribution of food surpluses, education and training of farmers and extension staff, and revamping of agricultural research. Psychologically he appealed to the vital interest of farmers, providing them with incentives to maximize output. Moreover, he appealed to the individuality of the farmers, saying the nation's honor demanded that the country become self-sufficient in food production. Green Revolution succeeded in doubling India's food production within a decade, because it was based on a psychological solution instead of a physical one.

A similar situation exists in the field of education in India and many other countries, where the methodology is still largely physical. The process relies on age-old methods of repetition, rote memorization that predate the printing press and much less on the exercise of mental understanding. It still relies on the physical delivery of lectures to passive students which also predates the wide availability of books and today's instantaneous access to information. Experimentation with on-line educational methods has amply demonstrated the superior speed and quality of learning that can be achieved by a shift in method from passive learning through lectures to active classroom interactions between students and teachers. The encyclopedia of information now easily accessible over the internet has relieved the necessity of burdening memory with the exponentially expanding body of information, freeing up mental energy for higher forms of activity and vastly enhancing the quality and effectiveness of education. Education can now evolve reliance of physical methods based on memorization to mental methods of higher understanding.

FDR solved the US banking crisis by resorting to first principles. Churchill solved the problem of defending Britain against Nazi Germany by appealing to the patriotic sentiments of the people, which was a psychological approach. *India used the spiritual principle of non-violence instead of an armed uprising to win freedom from the British through a peaceful transfer of power by the House of Commons.* Solutions can be found to seemingly intractable problems by applying the latest tools and principles and acting from the highest plane.

Generally, problems do not assail a person who marches in step with the world that is evolving. Problems come to those who refuse to march along and, even more, to those who insist on reversing the march. Arresting the march is a fertile breeding ground for fresh

problems. Reversing the march makes those problems intractable. If we stop the reversal and take a look around, we find solutions to what appeared to be intractable problems.

Thought was born in Greece and spread all over the world from there. Now she is in big trouble. She has been asked to accept austerities but has refused to do so and made her intentions known through a referendum. The fact of the matter is that Greece does not need Europe but Europe needs Greece. It can make a very good contribution to the wealth of the EU and motivate other economies to pull the EU out of the present crisis. The behavior of Greece needs to generate political authority commensurate with the monetary power that thus emerges. Should this occur, Greece can once again become a leader of the world.

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The Greek Financial Crisis:
Theoretical Implications

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Abstract

The world we live in is a product of the way we think. Our conception of reality determines what we see and what we achieve. The Greek crisis is not simply a case of high public debt, economic mismanagement or weak political will in Greece or the Eurozone. It is underpinned by economic premises, constructs and resulting practices that promote exactly the type of dilemma Greece faces today. Without addressing these conceptual issues, no lasting solution is possible. Rather it can be expected to repeat and spread to other countries and regions. This article is based on views presented by participants in a WAAS webinar examining the Greek financial crisis in the light of economic theory and practice. Wherever there are unmet social needs and underutilized social resources, such as high levels of unemployment, the potential exists to stimulate economic activity, enhance human welfare and promote resilience and sustainable entrepreneurship. Both conditions prevail in Greece today, but neither current nor anticipated policies are likely to result in near term benefits to the Greek people and the local economy nor for Europe and the world economy. It supports the view that a permanent and effective win-win solution can be found to the Greek crisis, compatible with the financial stability of the country and the welfare of its citizens within the framework of the Eurozone, but that such a solution will require a rethinking of fundamental theoretical issues and adoption of innovative policy instruments beyond those presently being contemplated.

For the past five years, the Greek financial crisis has loomed as a recurring threat to the integrity and future of the Eurozone, as a dire reminder of what might occur in other Eurozone countries, and as a powerful and persistent downward drag on employment, real incomes, public services and human welfare in Greece. Whatever the final outcome of the recent measures to prevent default and keep Greece within the Eurozone, none of the plans now on the table offer a permanent solution to the Greek problem, to the long-term viability of the Eurozone, and to the prospects for other successful currency unions in future. At best the current settlement will alleviate immediate pressure on the Greek financial system, while severely aggravating efforts to reignite the Greek economy, create jobs, raise incomes, and expand the Eurozone in future.

A real and permanent solution relevant specifically to Greece and in general to the Eurozone requires a deeper examination of fundamental premises on which the current international economy and European banking system are founded. It must include inquiry into the role and responsibilities of commercial banks, central banks and national governments in promoting both financial stability and human welfare. It must also consider the relationship between the prevailing financial system and the underlying social forces and productive potentials, which alone can ensure a continuous rise in living standards, job growth and economic welfare for people.

The World Academy of Art & Science is engaged in an in-depth inquiry into economic theory, institutions and public policies in order to evolve more effective theoretical and practical solutions to the challenges confronted by Greece and other nations. Following the highly successful XII International Economics Colloquium at the University of Florida this May, WAAS and World University Consortium constituted the NET (New Economic Theory) Working Group to engage a wide range of scholars, policy-makers and partner institutions in examination of the fundamental premises on which current economic theory is based, the urgent need for a new theoretical formulation, and identification of core principles and perspectives of NET. The project team presently includes nineteen institutional partners and more than forty individual scholars.

Our research supports the view that a permanent and effective win-win solution can be found to the Greek crisis, compatible with the financial stability of the country and the welfare of its citizens within the framework of the Eurozone, but that such a solution will require a rethinking of fundamental theoretical issues and adoption of innovative policy instruments beyond those presently being contemplated. Fresh thinking and innovative action are urgently required. On September 15, 2015, WAAS conducted a webinar exploring the theoretical and practical implications of the Greek Financial Crisis. The objective of the webinar was to examine the Greek Crisis for insights into fundamental deficiencies in current economic theory, to identify principles on which a more stable, resilient and equitable international financial system can be founded, and to explore potential solutions to the Greek crisis and related problems based on a wider political, economic and social perspective of European and global society in the 21st century.

The Greek crisis is not simply a case of high public debt, economic mismanagement or weak political will in Greece or the Eurozone. It is underpinned by economic premises, constructs and resulting practices that promote exactly the type of dilemma Greece faces today. Without addressing these conceptual issues, no lasting solution is possible. Rather they can be expected to repeat and spread. Indeed, many developing countries have experienced similar crises in recent decades after the same economic principles were applied via the IMF/ World Bank structural adjustment programmes. One objective of the webinar was to identify and examine the theoretical premises that impede or obstruct effective solutions to the problem in Greece and similar problems elsewhere and formulate more valid theoretical perspectives.

Wherever there are unmet social needs and underutilized social resources, such as high levels of unemployment, the potential exists to stimulate economic activity, enhance human

welfare and promote resilience and sustainable entrepreneurship. Both conditions prevail in Greece today, but neither current nor anticipated policies are likely to result in near term benefits to the Greek people and the local economy nor for Europe and the world economy. Therefore, the webinar also sought to identify key issues that need to be addressed in order to activate the economy by mobilizing the unemployed and other underutilized social resources to alleviate the downward momentum and hardship imposed on the Greek people.

1. An Inquiry into the Greek Crisis

The keynote address was delivered by Hungarian Economist Zoltan Pogatsa, author of *The Political Economy of the Greek Crisis,* who presented compelling evidence to debunk many of the common misconceptions regarding the real cause of the Greek crisis. His analysis shows that contrary to the view put forth by lenders, the Greeks are not lazy, prone to indebtedness, more corrupt or more heavily dependent on government subsidies than other European countries. On the contrary, the average Greek worked 30% more hours than his German counterpart and household debt in Greece from 2007-2009 was 20% lower than the European average. Greece scored comparably to South Korea, Czech Republic and Slovakia on transparency and significantly better than Poland. Social spending was considerably below the Eurozone average as a percent of GDP prior to 2008.

Pogatsa traces the roots of the debt crisis back three decades to the time when Greece entered the EU. From 1960 to 1980 the Greek economy grew considerably faster than the EU average. According to entry conditions, Greece was compelled to open up its vulnerable economy to European manufacturers and to give up essential tax revenues in exchange for massive subsidies to its small farmers whom it was very difficult to tax. Deceptive accounting practices by earlier governments with the aid of leading international investment banks disguised the debt problem for two decades leading up to 2008. The public debt problem arose not because of excessive wages or high expenditure on the welfare state, but due to the government's incapacity to collect sufficient taxes from a largely agrarian economy. Therefore, austerity programs designed to weaken labor and cut welfare expenses could never hope to solve the problem.

Pogatsa concludes by pointing out inherent weaknesses in the Eurozone, which is not an optimal currency area. Marked differences in economic cycles between its northern and southern members make it impossible to adapt a uniform economic policy suited to the needs of all its members at any given time. The inability of Greece to allow its own currency to depreciate relative to the rest of Europe prevented wages from reaching competitive levels after the 2008 crisis. Its inability to erect tariff barriers to protect its highly vulnerable, but very large small business sector, resulted in a massive hollowing out of domestic industry and increasing dependence on imported goods.

The remedy adopted by the European Bank, IMF and lending banks consisted of massive interest payments to bail out the four biggest banks, without penalty for their reckless lending. At the same time it nearly doubled Greece's debt to GDP level. The demand for new taxes will only further suppress the growth of the Greek economy and severely undermine social

welfare. It will further weaken the negotiating position of collective bargaining on wages, which is practiced by 12 EU member states.

Dimitrios Kyriakou, Chief Economist, European Commission's Institute for Prospective Technological Studies, described the Greek crisis as a perfect storm. Greece was lured into the crisis by the promise of rising levels of prosperity through liberalization. Entry into the Eurozone meant sacrificing the exchange rate instrument and monetary policy instrument. From a very low debt level until the mid-1970s, it resulted in rising levels of debt in the 1980s when it reached 68% of GDP. Four years later it crossed 100%.

Recent experience with bubble-driven growth raises serious doubts about the sustainability of ever-higher indebtedness driving decreasing rates of growth. Sluggish growth combined with rising inequality calls into question the role of financial markets as well as the validity of the traditional trade-off between equality and growth. We have reached a point where the two need to move in tandem. The trap which Greece fell into was easy borrowing and cheap credit coupled with a Greenspanesque belief in a brave new Goldilocks economy, where hard landings were a thing of the past, and where, as a consequence, heavy borrowing was condoned, if not outright encouraged. The agreement reached includes tough fiscal measures, along the lines of the previous IMF-inspired loan packages since 2010. However this one includes two potential countervailing elements, which may justify a modicum of optimism, provided they are upheld in practice: a large investment package from EU sources and a debt restructuring deal over the next few months. Finally, it is noteworthy that the negotiations for this new loan package were carried out at the highest political level with the other Eurozone member states within the context of the Euro Group (composed of Eurozone countries finance ministers), and summits of heads of governments. Of course, the IMF, European Central Bank, European Commission, European Stability Mechanism played a key role in implementation issues.

Aldo Martinez, Professor at St. Peter's University and former Vice President of Market Surveillance at the New York Stock Exchange, emphasized that current international efforts seek only to address the symptoms rather than the real source of the problem in Greece. He argued that the Greek economy has lost its national autonomy and has become subject to the dictates of international financial forces. He also concluded that the strong dealings with Greece, which is a very small economy, may be intended as an example to other countries that consider rebelling against the dictates of the unbridled application of prevailing neoliberal economic dogma. Governments and financial institutions should be careful to ensure that the prescribed medication dosage addresses the cause of the illness to restore health without killing the patient in the process.

Hazel Henderson, founder of Ethical Markets, called for a concerted effort to downsize the unbridled financial markets that are skimming off all the rewards of labor productivity into the capital and banking sector. She referred to the implications of the adoption by the UN of the Sustainable Development Goals that call explicitly for a "transformed world". By recognizing the need for what the SDG documents refers to the "people-prosperity-planet-peace-partnership" approach, the SDGs are effectively a rallying call to develop a new economic theory that does not prioritize prosperity over people, planet and peace.

As Robert Hoffman stressed, the Greek crisis represents an egregious failure of conventional economic theory and the prescriptions of austerity, deregulation, and the sell-off of state-owned assets. The sell-off of state-owned assets will lead to flows of income to oligarchs and international financial institutions to the detriment of the well-being of Greek citizens. As was the case with the crisis of 2007-08, macro-economic theory, with its focus on equilibrium and flows of purchasing power, was blind to financial bubbles associated with asset stocks and prices. Because of membership in the Eurozone and the policies of the European Central Bank, the instrument of quantitative easing available to the US government (though misused in that case) was not available to the Greek government. The current crisis is the practical outcome of a bankrupt theory applied in a manner that is fatal to the patient. We need a new paradigmatic framework of thinking in transdisciplinary terms about the economy, which means treating people as an integral component of the earth system. The Greek crisis represents in a profound way the bankruptcy of a particular paradigm.

"The Greek crisis represents in a profound way the bankruptcy of a particular paradigm."

2. Theoretical Perspectives

The webinar illustrated and reinforced several fundamental perspectives that have emerged from the work of the New Economic Theory Project thus far:

1. *Resurgence of Neo-liberalism following the End of the Cold War:* The present crisis in Greece and the global recessionary trends that have spread to China, Brazil and other nations cannot be viewed in isolation. They are only the most recent consequences of a fundamental shift in economic theory and policy that gained dominance following the end of the Cold War, but originating in the rise of the neo-conservative movement in the USA during 1970s inspired by the theories of Hayek and Friedman. The orthodoxy of extreme free-market liberalism prevalent in the 1920s and largely displaced by the rise of public intervention in the economy during and following the New Deal gained a new lease of life during the period of rapid globalization that followed the Fall of the Berlin Wall, the founding of the WTO and the global spread of the Internet. The dismantling of tariff barriers facilitated a tripling of world trade in current dollar terms from 1990 to 2008. During the same period daily financial transactions multiplied more than six-fold. In the absence of effective international regulation, a virtual Wild West of global finance emerged. Under the pressure of increasing international competition, financial institutions in the USA, Europe and elsewhere lobbied for the dismantling of domestic regulatory constraints which had effectively insulated commercial banks from the speculative financial markets for seven decades. Unconstrained global financial markets coupled with computerized trading led in turn to growing instability, precipitating the Argentine crisis of 1989, the structural collapse of most African economies during the 1990s, the East Asian financial crisis in 1998 and the much broader global crisis in 2008. Effectively addressing the problem at the national level necessitates urgent efforts to stringently regulate the rapid movement of short term, speculative investments at the international level.

2. *Divorce of Financial Markets from the Real Economy:* A recurring theme of the Academy's work resurfaced during the webinar. Financial markets, which originally evolved as a means to pool the resources needed for large industrial investments and commercial enterprises in previous centuries, have now become a world apart and are increasingly divorced from the real economy they are, in theory, intended to serve. Public policies designed to attract and retain high-frequency speculative funds have been a major source of instability, undermining the environment for medium and longer term investments in real productive assets and inflating nominal GDP, while contributing only nominally or negatively to human welfare. Financial markets must be reoriented and incentivized to serve the real economy and society. Re-embedding the market within society is the single-most important policy measure needed to revive growth of employment, reduce inequality and promote ecologically sound investments.

"Society is the true source of wealth creation, not the liquid flows of finance that get reported via the news bulletins of the world."

3. *Austerity and Wealth Creation:* The Greek crisis is only the most recent in a long list of compelling instances that demonstrate the poverty of current theory and the destructive impact of austerity programs. The only difference in this case is that even many key players within the Eurozone, the IMF and leading economists internationally are predicting that the latest round of austerity measures will prove as flawed and ineffective as the earlier ones. And yet they have not come with an alternative, because this would mean breaking from their own conceptual assumptions about the nature of the economy. The source of the problem lies not merely in the policy itself, but more deeply in the theoretical framework on which it is based. Society is the true source of wealth creation, not the liquid flows of finance that get reported via the news bulletins of the world. Creative relationships and organized interactions between people for invention, production, distribution and consumption generate real wealth and enhance human welfare. Austerity programs have the opposite effect of squeezing and stifling productive initiatives and reducing the entire economy and society to equilibrium at a lower level. Economics has become divorced from the society. Economic theory is divorced from the wider theory of society of which it is a subset.

4. *Development, Self-reliance and Political Will:* The rapid expansion of the EU and Eurozone has revived the mentality of dependence generated in Europe by the Marshall Plan after World War II and throughout the developing world during the heydays of foreign aid dependent development strategies prevalent during the lost development decades of the 20th century. Development is a human process. Real development is self-development. Foreign lending and investment can play a positive role when they come in response to domestic aspirations and commitment, never when they try to act as a substitute. The promise of instantaneous benefit has been an irresistible lure for the recent expansion of the EU and one of the reasons for the Ukraine crisis. Pogatsa documents the original entry of Greece into the European Economic Community came

at a time when it had the fastest growing economy in Europe. Kyriakou suggested that this was probably more strongly motivated by a desire for political integration than economic benefits. But the recent negotiations with the ECB were dominated by the aid mentality of both donors and recipient. The refusal of the government and people of Greece to go begging was an encouraging sign that Greece was recovering the sense of self-reliance and self-respect it demonstrated before joining the European Community. That and that alone can turn around the country. Anything less is doomed to failure.

The Eurozone prospered for a decade after its establishment by generating trust and confidence among smaller economies and facilitating more efficient large scale exchange and cooperation. It now suffers from the lack of political commitment to the welfare of its own members. The petty accusations and infighting have undermined precious social capital in the region. Restoring that trust, confidence and cooperative spirit should be the highest priority. The current crisis should be mobilized to develop the political will needed to assume responsibility for promoting the welfare of all members of the currency union, combined with a determination of each member country to exhaust the potentials for its own self-development. It is true that the Greek crisis can only be resolved by international cooperation. It is equally true that the starting point must be commitment to self-reliance at the national level. The two are complementary rather than contradictory elements of a solution.

5. *Economy, Governance and Society are inseparable:* Social aspiration and social capacity generate the potential for wealth creation and human welfare. Political institutions and political will generate the power for collective action. Economy provides the instrumentation to make them effective. It is time to restore the Political term to Political Economy and add the Social dimension without which neither the one nor the other can accomplish anything. A solution to the Greek crisis is plausible, possible and achievable. But it must begin with a change of thinking and a rejection of the outmoded ideas and policies which have failed in the past and offer no hope for the future.

6. *Towards greater resource efficiency and sustainability:* It is now widely recognized, as expressed now in the SDGs, that we live in a carbon- and resource-constrained world. This means that economic growth as we know it can no longer assume the unlimited availability of natural resources (especially metals, fossils), ecosystem services (such as soils, water, fisheries, bees/pollination) and carbon space. As the New Climate Economy Report of 2015 made clear, a fundamental structural transformation of the global economy is required. Even mainstream bodies like the OECD and World Economic Forum have echoed this view. What we mean by economic growth will need to be completely redefined. Austerity is regarded as a non-solution for Greece without a ready alternative because the pursuit of economic growth in an infinite world remains the yardstick for measuring progress. If GDP is replaced with a well-being indicator, the result will be policies that simultaneously protect the resources people depend on for their well-being and which prioritize human needs rather than speculative investments and shareholder profits. Resolving the Greek crisis by replacing austerity economics with another theory

of growth that ignores planetary boundaries will run into the same problems, especially given that Greece is not a resource-rich economy. African economies went through what Greece is going through now, but Chinese demand for African resources became the driver of growth, thus saving African economies from the Greek syndrome. Now that this demand is dropping, the fundamental structural weakness of African economies will be exposed. Ultimately, a new economics of well-being will have to be post-extractivist, resource efficient and sustainable.

"Unless an alternative economic theory is proposed as the basis for viable pragmatic policy alternatives, resistance may be heroic but it will remain quixotic."

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3. Conclusion

The Greek Crisis is more than just another national economic crisis, following those that have come before in Latin America, Africa and Asia and since 2008 globally. It has, in effect, become a symbol of the failure of a particular economic theory and policy prescription. Its irresolvability on terms dictated by the ECB and IMF starkly exposes the bankruptcy of these policy frameworks. It also exposes how disrespectful of democratic autonomy the major debt holders of this world can really be. Today's extractive institutions are the powerful lenders of gigantic amounts of debt to those who everyone knows cannot possibly repay their loans. The result is increasing concentration of power in the hands of an unaccountable few with devastating consequences for the majority of the world's population. How the Greeks resist occupation of their lives by these powerful institutions will set an example for the rest of the world. However, resisting will not be enough. Unless an alternative economic theory is proposed as the basis for viable pragmatic policy alternatives, resistance may be heroic but it will remain quixotic. Those who have opposed neo-liberalism for so long now need to collaborate to ensure they have more to say than merely rejection of what clearly does not work. Another world *is* possible, but only if we do the hard work rather than assume it will emerge spontaneously from the ashes of the old.

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New Humanism and Sustainable Development

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Abstract

The call for a new humanism in the 21st century roots in the conviction that the moral, intellectual and political foundations of globalization and international cooperation have to be rethought. Whilst the historic humanism was set out to resolve tensions between tradition and modernity and to reconcile individual rights with newly emerging duties of citizenship, the new humanism approach goes beyond the level of the nation state in seeking to unite the process of globalization with its complex and sometimes contradictory manifestations. The new humanism therefore advocates the social inclusion of every human being at all levels of society and underlines the transformative power of education, sciences, culture and communications. Therefore, humanism today needs to be perceived as a collective effort that holds governments, civil society, the private sector and human individuals equally responsible to realize its values and to design creatively and implement a humanist approach to a sustainable society, based on economic, social and environmental development. New humanism describes the only way forward for a world that accounts for the diversity of identities and the heterogeneity of interests and which is based on inclusive, democratic, and, indeed, humanist values.

Humanism did evolve into the grand movement of human spiritual and creative liberation, which enabled an unparalleled acceleration of prosperity and transformation of civilizations. In line with humanist ethics, the material growth was understood as a collective good, which was to serve all participants of a community and meant to enable the socio-economic progress of society. The exact definition of humanism has historically fluctuated in accordance with successive and diverse strands of intellectual thought. The underlying concept rests on the universal ideas of human emancipation, independence and social justice. Humanism can hence be understood as a moral inspiration for critical reflection and positive action, aiming to establish a society based on peace, justice, democracy and human rights.

The moral foundations implied by humanism have universal claim and encompass all periods and times of human development. The realization of such humanist values is not a given, but a continuous task; it is not static or predetermined, but dynamic in nature, constantly striving to adapt to changing societal conditions. Today's unprecedented and unpredictable global problems put to test the progress of human civilization and the very core of the humanist idea.

All these aspects constitute a crucial turning point, which demands a profound restart of reflection on purely neoliberal approaches to development. Scholars as well as practitioners have started to examine the negative influences of globalization, neoliberalism, and of

the attempts to reproduce the industrial countries' development experiences in countries trying to find their own strategy to and their particular form of development. It has been in this context that the concepts of sustainability and of a new humanism have penetrated the international discourse, pushing for a critical reflection and inclusive reorientation of developmental policies.

Thus the need for an inclusive, sustainable development concept has never been so critical. Sustainable development with its three pillars—economic, social, and environmental—has come to become the central plank of the post-2015 sustainable development agenda to be adopted in September 2015 by the UN summit. Arguably, at the heart of this agenda lies the notion of a new humanism.

1. Humanism: The New Relevance of an Old Modus Vivendi

"The fellowship between man and man which has been the principle of development, social and moral […], is the ideal of goodness entirely human".[1] This citation of the Victorian novelist Mary Ann Evans, known under the male pseudonym George Eliot, reflects an early definition of a concept that marks one of mankind's most influential philosophical strands of thought and a crucial turning point within the history and the development of human civilization: the concept of humanism. As an intellectual and ethical stance, humanism stresses the significance and the normative value of human beings both with respect to the individual as well as to the community and overall society. As such, the concept of humanism involves a critical reflection of the constitution of society and of the manner social interactions between human beings proceed. Regarding the concept's origins within the framework of the era of Enlightenment, humanism was cast as a moral rationale to address fundamental questions relating to humanity and human nature, which sought to facilitate mankind's progress in science, knowledge and technology. Rooted in the notion of a free and resourceful human existence, humanism evolved into the grand movement of human spiritual and creative liberation, which enabled an unparalleled acceleration of prosperity and transformation of civilizations. In line with humanist ethics, the material growth was understood as a collective good, which was to serve all participants of a community and meant to enable the socio-economic progress of society. Thus, although the exact definition of humanism has historically fluctuated in accordance with successive and diverse strands of intellectual thought, the underlying concept rests on the universal ideas of human emancipation, independence and social justice. To put it in Spinoza's words, humanism proposes a free and fruitful society, in which not conflict, but peace presents the prevalent status quo, describing not only "an absence of war" but "a virtue, a state of mind, a disposition for benevolence, confidence [and] justice".* Humanism can hence be understood as a moral inspiration for critical reflection and positive action, aiming to establish a society based on peace, justice, democracy and human rights.

The moral foundations implied by humanism have universal claim and encompass all periods and times of human development. However, the realization of such humanist values is not a given, but a continuous task; it is not static or predetermined, but dynamic in

* See http://plato.stanford.edu/entries/spinoza/

nature, constantly striving to adapt to changing societal conditions. In the light of a rapidly progressing globalization, the contemporary world faces a myriad of unprecedented and unpredictable challenges, risking the well-being of millions of people who desire to live their lives in safety, dignity, self-determination and happiness. Global problems like climate change, environmental degradation, shortages of natural resources, the pollution of the ocean and the loss of biodiversity, growing social inequalities and lack of inclusion, economic uncertainty, shrinking cultural diversity and disappearing languages, social upheaval and new forms of conflict and war put to test the progress of human civilization and the very core of the humanist idea. As an intrinsic part of an increasingly interconnected world, these challenges mirror the somewhat paradoxical and ambivalent nature of the process of globalization and the one-dimensional way it has been structured and conducted thus far by political leaders and economic elites. Hence, in order to implement the societal vision of humanism in today's socio-political and economic systems, one has to adjust and tailor the humanist claim to the present circumstances of today's interconnected world. As UNESCO Director-General, Irina Bokova, postulated in her speech on the occasion of the award ceremony for the Honorary Diploma in European and International Politics in Milan 2010, "[b]eing humanist today means adapting the strength of an age-old message to the contours of the modern world. By definition, this work is an ongoing effort that knows no end". It is an effort that essentially lies at the heart of UNESCO's mandate, an effort which is dialectical, steeped in dialogue and open-ended, which is innovative, inclusive and holistic. It is the quest for a *New Humanism*.

> *"Rising social unrest, social movements and civil wars draw attention to the narrowness and the limitations of prevalent one-sided development models."*

2. The Globalizing World − Oscillating between Unprecedented Opportunities and Drawbacks

The phenomenon of globalization, defined as the global interweaving of economic, financial, social, political and cultural spheres, has brought about unprecedented opportunities for countries, regions and the global community, private businesses and individuals. Arguably, globalization has created tremendous material prosperity and wealth and has lifted many developing countries from the thralls of absolute poverty. As envisaged by the neoliberal approach, the world's developed countries have gained mammoth profits through the deregulation of markets and unconstrained flows of capital, goods and labor. Being at the top of the league of countries benefitting significantly from globalization, today's industrial countries have sought to transform the international trade environment from a rules-based system to one dominated by self-regulating approaches. In this framework, economic development practices have mostly been inspired by the theories of neoliberalism,

the modernization theory, the dependency theory or the institutional theory of development, the Marxist theory of development, the developmental state theory based on East Asian development models or post-modernism theory. Most of those theories—regardless of how different their substance and political implications may be—stem from scholars and writers residing in developed countries as they were the first to experience and witness a rapid economic development according to the neoliberal pattern. On the international level, this led to the application of an equally one-sided approach to development largely embraced by the Bretton Woods institutions, the United Nations and its special agencies—all committed to a liberal market economy and their perceived benefits. The neoliberal credo thus became institutionalized and accepted as the universal development model.

"The U.S. subprime mortgage crisis of 2008, which ushered in a financial crisis across the entire developed world, served a harsh reminder that a predominantly growth-oriented approach to globalization was about to run its course."

The generation of wealth and power in the process was accompanied also by costs and sacrifices at levels hitherto unimagined. As the political theorist David Harvey elaborates in his book *A Brief History of Neoliberalism*, "[t]he theoretical utopianism of the neoliberal argument has […] primarily worked as a system of justification and legitimation for whatever needed to be done to achieve this goal", irrespective of its political, social and environmental cost. Increasingly, an economic and social divide opened up and deepened, not only between different regions of the world, but also within individual countries themselves. This has exacerbated social inequalities and injustice, thereby jeopardising social inclusion and the evolution of a peaceful and sustainable society and international system.

3. The Critical Turn – Moving from a Purely Growth-oriented Approach to True Development

Slowly, but truly, the global community has begun to comprehend this downside of globalization and started to grasp its causes, implications and repercussions, which put the successful building of a world society and the effective preservation of our planet at stake. In addition to a growing global uncertainty in economic terms, the world faces more and more natural catastrophes with tremendous socioeconomic consequences for millions of individuals and whole regions. It can no longer hide from a swelling ecological and environmental destruction, resulting from a growth-only strategic orientation of development efforts at large. In an equally drastic way, rising social unrest, social movements and civil wars draw attention to the narrowness and the limitations of prevalent one-sided development models. All these aspects constitute a crucial turning point, which demands a profound restart of reflection on purely neoliberal approaches to development. As a consequence and in contrast to the predominantly neoliberal discourse of development theory and policy,

NGOs and social movements have emphasized more and more the relevance and the role of civil society and have put forward a more comprehensive understanding of development as a participatory process, involving social equality and equity as motors for a more inclusive economic growth. In similar lines, scholars as well as practitioners have started to examine the negative influences of globalization, neoliberalism, and of the blind attempts to reproduce the industrial countries' development experiences in countries trying to find their own strategy and their particular form of development. It has been in this context that the concepts of sustainability and of a New Humanism have penetrated the international discourse, pushing for a critical reflection and inclusive reorientation of developmental policies.

"The socio-economic defects inherent in the neoliberal market model have been transferred to the world's developing and transitioning states."

In this connection, the U.S. subprime mortgage crisis of 2008, which ushered in a financial crisis across the entire developed world, served as a harsh reminder that a predominantly growth-oriented approach to globalization was about to run its course. It not only led the financial crisis to a stagnation of economic development in both the United States and the European Union, but it also had a highly negative impact on those regions' long-term prospects in the political and social realms. The socio-economic defects inherent in the neoliberal market model have been transferred to the world's developing and transitioning states.

"In order to support a continuous and resilient economic growth, the world has to distance itself from a short-sided and unstable form of neoliberal economics."

In many developing countries, an economic standstill provoked political instability and social upheaval. In addition, countries undergoing an economic transition were faced with the problem of a "middle income trap". Such a phenomenon describes a situation, where transitioning countries like Brazil, South Africa or Malaysia that have attained a certain level of economic and social development, are beginning to lose their competitive edge with respect to production and export of manufactured goods, in light of rising wages and costs. As they are at the same time not yet capable of keeping pace with the more developed industrial economies, these countries are at a risk of getting stuck at what the World Bank describes as the so-called "middle-income range".* Among other aspects, they consequently have to deal with stagnating growth, poor investment opportunities, inadequate diversification of industries and critical social conditions. Another problematic aspect of a purely growth-driven development strategy can be followed by the examples of China and India. Both developing countries have been highly regarded as effective models for successful and rapid economic advancement. However, their economic accomplishments have partly been

* See http://documents.worldbank.org/curated/en/2013/09/18220959/middle-income-traps-conceptual-empirical-survey

achieved at the expense of ecological and cultural life. Environmental deterioration, exploitation of natural and human resources, a rapidly progressing climate change, menaces to cultural diversity, increasing social inequality and so forth are testimony of the unsustainable nature and the negative consequences of a narrow-minded approach to economic development. And, contrasting the general intuition, a purely neoliberal approach to growth has even started to undermine its own economic premises: After almost 30 years of having obtained an annual growth rate of ten percent or more, China's economy seems to have phased out, settling at first at an annual rate of seven+ per cent,[2] before settling in 2015 at the level of 7 per cent as the "new normal". Therefore, in order to support a continuous and resilient economic growth, the world has to distance itself from a short-sided and unstable form of neoliberal economics. The call for a sustainable, equal and participatory economic development has gained momentum.

"What unites humanity is stronger than its differences."

4. The Quest for Sustainable Development and Growth

The question as to what would constitute sustainable development and sustainable economic growth soon began to dominate the international debate. No longer was globalization an exclusively economic web of linkages, but its paradigm had mutated into an all-encompassing phenomenon, comprising almost every sphere of life—from politics and technology through to education, science, communications, media and culture. These trends did not only proceed at the macro-level, but also at the micro-cosmos of societal living. The transnational flow of capital, labour, technology, people and information seemed to supersede all obstacles and appeared to overcome both political and cultural boundaries. All such transnational flows and interactions entailed a confluence of various cultural elements and components, ranging from material goods of consumption over symbolic meanings to sets of ideas and values. Hence, the recognition of culture as a key dimension of globalization and as an enabler and driver of sustainable development. It also brings to bear culture's potential to bolster economic and social resilience, reduce poverty, and foster sustainable development, especially in the urban environment. Culture, the arts and creativity are at the core of the emerging creative economy in all countries, generating income, creating decent jobs and improving livelihoods.

The fact of intercultural and inter-ethnical exchanges increasingly gains importance in both the political and the social realms of society, putting aside the notion of pure and demarcated cultures as an artificial illusion. A dangerous illusion indeed, which finds its strongest formulation in Samuel Huntington's over-simplified and somewhat banal thesis of a clash of cultures and civilizations. According to Huntington, the increasing intensity of inter-cultural contact will inevitably lead to profound cultural conflicts, social turmoil and the destabilization of whole regions. UNESCO has strongly opposed such a theory and instead upheld human civilization as a historical development characterized by constant exchange and mutual enrichment between different cultural groups. The idea of cultural fluidity and hybridity, inter alia put forward by scholars such as Homi Bhabha, Stuart Hall or Mikhail Bakhtin, has thus always played a vital part in the history of mankind. Within the context

of a progressing globalization, such intercultural processes now experience an unprecedented acceleration and intensification. Although UNESCO clearly believes in the essentially humanist nature of cultural diversity and in the inspiring potential of intercultural discourses, one nonetheless needs to be aware that such processes need to be consciously strengthened in order to counter possible cultural stereotyping, prejudices, and intercultural misunderstandings. People must be committed to the safeguarding and promotion of cultural and natural heritage in all their forms and to draw on the bridge-building capacities of culture in reconciliation processes among communities and countries. Only when people from all around the world and from all levels of society enter into an inclusive and equal dialogue, can they sharpen their conscience with regard to the potential of a world based on peace, democracy, justice, mutual respect and human rights. It is vital to understand that what unites humanity is stronger than its differences.

"Only if we follow a holistic approach to human development, will we be able to create a sustainable and indeed a humanist global society."

Thus, in the light of today's unprecedented and unpredictable challenges, the need for an inclusive, sustainable development concept, which comprises not only the economic, but also social, cultural and environmental dimensions, has never been so critical. Only if we follow a holistic approach to human development, will we be able to create a sustainable and indeed a humanist global society.

"The notion of new humanism entails a holistic approach to human progress focusing on both the search for the full realization and emancipation of the individual as well as of his or her feeling of belonging to a single human community, superseding differences of origin, ethnicity, culture, religion or gender."

5. New Humanism as the Central Component of the New Sustainable Development Agenda

In the light of the above, the past 70 years of global development theory and policy have begun to be reviewed and rethought. Establishing political and normative frameworks towards an authentic sustainable development, which roots in peace, democracy and the genuine rapprochement of cultures, is intrinsically linked to human development, education and poverty alleviation. Sustainable development with its three pillars—economic, social, and environmental—as highlighted by the Rio+20 UN Conference* in June 2012 and by the Sustainable Development Goals designed to become an integral part of the post-2015 development agenda,† now represents the central plank in the ongoing negotiations among

* See http://www.un.org/en/sustainablefuture/

† See http://www.un.org/en/ecosoc/about/mdg.shtml

governments to yield the post-2015 sustainable development agenda. Arguably, at the political and normative heart of all these efforts lies the notion of a new humanism.

The notion of new humanism entails a holistic approach to human progress focusing on both the search for the full realization and emancipation of the individual as well as of his or her feeling of belonging to a single human community, superseding differences of origin, ethnicity, culture, religion or gender. A concrete implementation of such ideals can only be achieved through a strong and sincere commitment to international cooperation and multilateralism, which cannot be attained without reintroducing humanism as an inclusive feature. Therefore, new humanism's societal vision is essentially based on the promotion of education for all, of a democratic participation of all and an economic development including and benefitting all. In order to achieve a more just, equal and prosperous society, international politics has to concentrate on widening and deepening collective efforts in the fields of education, science, culture and access to information.

5.1. First Pillar – Social Development

First, it is a significant achievement that the UN Millennium Development Goals (MDGs)* or Education For All (EFA)† initiatives have been translated into real and concrete measures and progress. Today, more people are educated than ever before in the history of human civilization and millions of people have as a result been enabled to lift themselves out of poverty, pursuing a life in greater freedom and self-determination. Moreover, a growing number of countries are now consciously and firmly fighting against discrimination in education, be it against women or ethnic and cultural minorities. The international community must hence ensure that every human being has access to quality education, to the benefits of science and to the capacity of participating in the sociocultural life of his or her community, at both the local and global scales. Gender equality constitutes a crucial component of new humanism and of sustainable development. Within the context of globalization, new technological innovations have established a global public sphere previously unknown. Thereby, they offer new forms and tools for creating participatory knowledge societies. Vast online libraries like the World Library of Science,‡ Open Data access§ and online learning opportunities like MOOCs (Massive Open Online Courses)¶ reshape prevalent systems of education and, by even reaching marginalized and excluded populations, establish new forward-looking prospects of what education for all can mean.

The international flow of knowledge, creativity and experiences feeds itself back into defining and upholding new humanism as a synergy of peoples' minds, aspirations and ideas. New actors stemming from civil society, especially in the form of social youth movements, invent and represent new concepts of solidarity, cultural resistance and social action. In the new digital age, today's youth can as never before build on an almost unlimited fundus of human thought, raising hopes of a new humanism to be adjusted to the challenges of our

* See http://www.un.org/millenniumgoals/

† See http://www.unesco.org/new/en/education/themes/leading-the-international-agenda/education-for-all/the-efa-movement/

‡ See http://www.unesco.org/new/fileadmin/MULTIMEDIA/HQ/CI/CI/pdf/wsis/WSIS_Forum_2012/C7%202.world%20library%20wsis%20presentation.pdf

§ See http://www.unesco.org/new/en/communication-and-information/access-to-knowledge/open-access-to-scientific-information/

¶ See http://iite.unesco.org/publications/3214722/

times. Thus, new humanism signifies not only a goal of human cooperation, but also marks a strategy, seeking to enable people to create their own future. In this connection, education serves as a multiplier as it empowers people in all spheres of life, thereby enabling them to partake in the creation of knowledge, community development and cultural life. Education evokes intercultural dialogue, mutual understanding and enrichment and thus serves as a basis for establishing a global culture of humanism. Today, no single country has the solutions to all global challenges. No culture holds a universal monopoly. New humanism is therefore specifically not a mere culture for the social and intellectual elites, but it is inherently participatory and inclusive, reflecting a universal resource for all individuals and communities to follow their own approach to progress and development. Hence, education as one of the three pillars of sustainable development is highly interconnected with the idea and the realization of a new humanist approach.

> *"Along with an increase in access to education, there needs to be a change of mentality, which overcomes selfish, egoistic and indeed unsustainable approaches of consumption and instead focuses on the preservation of our planet and the well-being of the overarching global society."*

5.2. Second Pillar – Environmental Development

New humanism is also linked to the second pillar of sustainable development, the environmental dimension. By promoting quality education for all, new humanism lays the basis for technological innovation, creativity and knowledge creation that is equipped to tackle today's daunting environmental challenges. Therefore, the normative principles underpinning the post-2015 sustainable development agenda need to be "crisis-sensitive and actively contribute to the global public good".* Support to future-oriented learning and research helps to deepen the cooperation between science and political decision-makers in finding sustainable solutions to environmental deterioration. However, reducing the pollution of the oceans, stopping climate change and protecting global biodiversity require more than firm global education efforts and a substantial promotion of science and research. Along with an increase in access to education, there needs to be a change of mentality, which overcomes selfish, egoistic and indeed unsustainable approaches of consumption and instead focuses on the preservation of our planet and the well-being of the overarching global society. Following a sustainable lifestyle is of elementary importance for overcoming poverty and protecting the world's natural resources as a basis for all forms of life. The increasingly dramatic extent of today's environmental challenges puts to test human society and requires a strong revival of the humanist ideals. New humanism thus reflects a strategy of sustainable development, shaping new ways of thinking and acting and striving towards the building of societies, which are able to adapt to change and challenges.

* See https://en.unesco.org/post2015/sites/post2015/files/UNESCOPrinciplesonEducationforDevelopmentBeyond2015.pdf

5.3. Third Pillar – Economic Sustainability

In the hierarchy of human necessities, material and economic needs are fundamental. However, an individual's longing for equality, human dignity, education and knowledge, identity, participation, and access to cultural and religious life cannot simply be obtained through economic development alone. Social inequalities in non-economic areas risk to aggravate and deepen inequalities in the economic field as well. Nonetheless, a sustainable and equitable economic development remains crucial for establishing a prosperous, peaceful and just society. We cannot rely on the self-managing qualities of an unleashed and purely growth-oriented liberal market approach, but have to recognize today's new socio-economic discrepancies. These new realities urgently call for revisiting socio-economic policies and for extended global collaboration in the social, environmental and economic realms. New humanism reflects such a call for action and helps shape today's economic reality into a more responsible direction. With respect to the field of economics, a humanist anticipation of a better world implies a more equal, more just and more socially-oriented distribution of growth and wealth. Today, we not only face increasing economic gaps between different countries and regions of the world, but we also have to deal with deep domestic ruptures of socio-economic inequality.

"A humanist anticipation of a better world implies a more equal, more just and more socially-oriented distribution of growth and wealth."

An important tool for an adaptation of economic policies is the concept of Social Protection Floors. Social Protection Floors aim at assisting an economic development which is more equitable in its distribution and more comprehensive in its reach. A Social Protection Floor puts forward a firm and resilient basis for economic growth and promotes a comprehensive societal insurance against exclusion, poverty and the repercussions of economic and financial crises. The implementation of Social Protection Floors is crucial to ensure that the benefits of growth accrue to all. They encourage countries to define a universal set of standards of social service coverage. The concept of a Social Protection Floor is flexible and can be adjusted to specific country contexts. It encourages a more coordinated and comprehensive formulation and an implementation of labor and social policies. The overarching goal of such floors is to induce governments to tackle extreme socio-economic inequalities and to provide for measurements like the promotion of women's rights and women's economic equality, apply fair and equal tax burdens, equitable access to healthcare.* A global coalition of UN specialized agencies, international NGOs, development banks, public-private partnerships and civil society organizations has been formed to assist countries in the creation and expansion of national Social Protection Floors.

It is precisely the collaborative and participatory nature of the Social Protection Floor concept that reflects the fundamental values and implications of a new humanism. First, in recognizing economic development not as a stand-alone goal, but as an objective that needs to be embedded in a strong and solid social framework, the conceptualization of Social

* See http://www.ilo.org/secsoc/areas-of-work/policy-development-and-applied-research/social-protection-floor/lang--en/index.htm

Protection Floors represents a comprehensive and interdisciplinary approach to sustainable development. Second, the particular rights and measurements comprised by the establishment of Social Protection Floors are specifically aimed at mitigating socio-economic discrepancies and articulate an inclusive and participatory approach to economic and political decision-making. Economic marginalization is highly interlinked with corresponding cultural, symbolical and socio-political forms of exclusion. Seen through the lens of a new humanist vision, it is therefore exactly the cooperative approach of the Social Protection Floors, which makes them a sustainable instrument for pursuing a more inclusive, democratic and diversified development.

6. Conclusion: New Humanism − The Way Forward

The call for a new humanism in the 21st century roots in the conviction that the moral, intellectual and political foundations of globalization and international cooperation have to be rethought. Whilst the historic humanism was set out to resolve tensions between tradition and modernity and to reconcile individual rights with newly emerging duties of citizenship, the new humanism approach goes beyond the level of the nation state in seeking to unite the process of globalization with its complex and sometimes contradictory manifestations. As Irina Bokova postulated in her installation speech as UNESCO Director-General (November 2009), the new humanism constitutes "a universal vision, open to the entire human community and embracing each and every continent […] it is to give fresh impetus to solidarity, to bring people together and awaken their conscience". The new humanism approach therefore advocates the social inclusion of every human being at all levels of society and underlines the transformative power of education, sciences, culture and communications. Therefore, humanism today needs to be perceived as a collective effort that holds governments, civil society, the private sector and human individuals equally responsible to realize its values and to design creatively and implement a humanist approach to a sustainable society, based on economic, social and environmental development. This "conscience of humanity", to put it in the visionary words of Jawaharlal Nehru, reflects UNESCO's normative principles and political mandate and indicates the way forward to multilateral strategies for sustainable development, "releasing a political energy that can deliver us right to the heart of contemporary thinking about cosmopolitan democracy".[3] In fact, new humanism describes the only way forward, if we want to live in a world that accounts for the diversity of identities and the heterogeneity of interests and which is based on inclusive, democratic, and, indeed, humanist values.

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The Politics of the Solar Age: 1975-2015

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Abstract

A global transition is manifesting in sustainable technologies, policies and investment tools. We are moving beyond the Industrial Era. Crises in energy, water, food and ecosystem services are being met with many forms of renewable energy; United Nations, NGOs, World Bank and other global programs; and with creative investment opportunities such as green bonds. Paradigm shifts in science, academia, governance, leadership, finance, business, social norms, media, communications and network structures as well as the role of Earth-observing satellites have led to a greater focus on earth systems science. Stress is a basic tool of evolution, and breakdowns drive breakthroughs. While mainstream media operates on the commercial formula of "if it bleeds it leads," growing consciousness is accelerating the green transition to more equitable, peaceful, sustainable, knowledge-rich societies. This article explores key drivers of this transformation and the standards being developed to guide us into the Solar Age.

The global transition to sustainability is fundamentally based on the current transition from the fossil-fueled Industrial Era to the low-carbon, knowledge-richer, more inclusive economies, "green" technologies and infrastructure now underway worldwide as Ethical Markets tracks. I published *The Politics of the Solar Age* in 1981, outlining the struggle observed as a science policy advisor from 1975 through 1980* as incumbent industries in fossilized sectors fought to retain their tax advantages, subsidies and legislated rent-taking. I witnessed how the many viable technologies in solar, wind, geothermal, ocean systems as well as organic, low-till and halophyte agriculture were suppressed by money in political processes, lobbying, regulatory capture and cognitive capture of compliant commercial media. I reviewed these political processes in the USA, Brazil and worldwide in *Mapping the Global Transition to the Solar Age*.†

2015 is the year when all the issues of global sustainability are now mainstream and becoming key agendas in the politics of most of the 193 United Nations (UN) member countries. The global transition from fossil fuels and nuclear power to efficient use of renewable energy and materials is now accelerating, as we expected when Ethical Markets launched our Green Transition Scoreboard® (GTS) in 2009.

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* From 1975-1980, the author served on the Technology Assessment Advisory Council to Congress and the US Office of Technology Assessment (OTA); the National Science Foundation's Research Applied to National Needs (RANN) and the Committee on Public Engineering Policy (COPEP) of the National Academy of Engineering of NAS.

† Hazel Henderson, *Mapping the Global Transition to the Solar Age*. ICAEW and Tomorrow's Company, 2014. Available for free download at http://www.ethicalmarkets.com/wp-content/uploads/2014/02/tecpln12453-solarage-web.pdf Foreword by Dennis Bushnell, NASA Chief Scientist, Langley, Virginia, co-published by the Institute of Chartered Accountants of England and Wales and Tomorrow's Company (London, 2014)

Anticipating the disappointments of the UN Climate Summit in Copenhagen, we identified the trends in private sector investing in all the new companies and technologies in solar, wind, efficiency, storage as well as geothermal, wave power and research in the $1.2 trillion total worldwide in 2009. We projected that if the pace of at least $1 trillion annually continues until 2020, the world's economies would shift into the more sustainable, cleaner, knowledge-rich technologies of the next era as described in the aforementioned *Mapping the Global Transition to the Solar Age*. This transition is well underway as evidenced by numerous reports from Financing the Transition, Long Finance;[1] Fiscal Policies and the Green Economy Transition;* and Greening China's Financial System.[2] Even the fall in oil prices is not derailing the transition to renewable energy and efficiency, especially in developing countries where solar is growing and oil accounts for only 1.5% of electricity generation in the key markets where solar is growing.[3] These trends can address the needs of the 1.3 billion people lacking electricity, particularly when combined with information technologies like mobile phones and virtual financial services.[4] Even the natural gas from shale in the USA can no longer change the direction of the transition to renewables, while its current role usurping coal in electric utilities' fuel mixes is leading to new risks and vulnerabilities.[5]

So far, the drivers of this global transition have been the 1) growing risks of fossil fuels and nuclear energy, unaccounted rising costs of resource-degradation, waste, pollution and health impacts (still "externalized" from company and government accounts); 2) pressure on water supplies, collapsing fish stocks, spreading desertification and loss of forests and biodiversity; and 3) the growing recognition of the benefits of the green transition to sustainability in public health and safety, environmental quality, more equitable decentralized technologies—all of which are available and when scaled could provide unlimited sustainable energy for all countries.† *Better Growth Better Climate*, the Synthesis Report of the Global Commission on the Economy and Climate, a global consortium of eight research institutes, documents that this green transition will also provide opportunities for jobs and boost sustainable global development.‡

Since 2009, the rising awareness of these new global possibilities grew worldwide among the grass roots, in academia and at last reached politicians and traditional financial centers. These crises of unsustainability humanity faces were seen more clearly as caused by limited perception of planetary processes and our place in its living biosphere. As we humans began accepting our role in these crises, including climate change, many became empowered to take responsibility to act in this new Age of the Anthropocene. Scarcities of water, arable land and forests which had fueled "resource grabbing" by multinationals and government sovereign wealth funds increasingly meet with local resistance. A report by *The Guardian* demonstrated the failure of such privatization models.[6]

* "Fiscal Policies and the Green Economy Transition: Generating Knowledge – Creating Impact," OECD Green Growth Knowledge Platform Third Annual Conference Report, Ca' Foscari University of Venice, The Energy and Resources Institute, United Nations Environment Programme, the Government of Switzerland, the Government of the Netherlands http://www.greengrowthknowledge.org/sites/default/files/Conference_report_design2.pdf.

† See for example the Green Transition Scoreboard® reports from 2012 and 2013.

‡ Better Growth Better Climate, Global Commission on the Economy and Climate, World Resources Institute, EDRI, Tsinghua University, Climate Policy Initiative, Global Green Growth Institute, Stockholm Environment Institute, CRIER, LSE Cities, September 2014.

1. Countries "grabbing" land outside their borders[7]

The tipping point was in 2012 where 50,000 civic leaders met with leaders of 193 UN member countries and many enlightened businesses and investor groups at the UN Summit Rio+20 in Rio de Janeiro, Brazil.* Our GTS was presented at this summit in many venues with our 2012 total at $3.3 trillion. Corporations and institutional investors signed The Natural Capital Declaration and Roadmap which has since then added hundreds of organizations.† Pension funds, particularly in Europe, joined the transition.[8]

The alarming weather events and natural disasters of 2013 and 2014 finally brought widespread recognition of anthropogenic climate change and the growing debate about mitigation and inevitable adaptation to rising sea levels and security risks. Global Insights on ESG in Alternative Investing were provided by Mercer and LGT Capital Partners. Many pension fund managers who formerly cited financial risks in divesting from fossil fuels now cite the risks of "stranded assets."

Thus, defensive, rearview mirror responses gave way to more proactive approaches. Forward-looking financial groups promoted the wide range of new investments and the need to shift portfolios from fossil fuels and "stranded assets" to market reforms, including carbon taxes and writing down "proven reserves" which clearly could not be exploited without increasing global warming beyond 2˚C. While solar PV and thermal CSP, wind and efficiency became increasingly attractive and prices, particularly of solar PV, continue to fall, even *The Economist* acknowledged the new circumstances in their special report "Let There Be Light". All this was made even more attractive by the drop in oil prices below $50 a barrel by January 2015, allowing governments to withdraw costly subsidies to consumers. Unfortunately, subsidies to producers have largely stayed in place. However, London's FTSE launched its ex-Fossil Fuels Index series, and the UN's $53 billion Joint Staff Pension Fund has seeded two low-carbon exchange-traded funds (ETFs).[9] As carbon assets are downgraded in portfolios, we recommend that these be repriced as "*in situ* chemical feedstocks reserves" to soften the blow.

Looking ahead, this acceleration of the green transition is powered by fundamental shifts in human perspectives leading to paradigm shifts in science, academia, governance, leadership, finance, business, social norms, media, communications and network structures. The role of space and Earth-observing satellites led to a greater focus on exploration of earth systems science.‡ The computerized digital revolution and social networking underlie all these shifts as efficiency in energy, manufacturing, urban redesign, transport, healthcare, finance and many other sectors of post-industrial societies are digitized and dis-intermediated. Harvard physicist Mara Prentiss links efficiency advances and renewable energy to show how the USA can be 100% powered by these cleaner, healthier systems in *Energy Revolution* (2015).[10]

While we are seeing ourselves anew as one confused, troubled human family, trying to adjust to each other's differing experiences, beliefs and cultural practices, we are also

* Report of the United Nations Conference on Sustainable Development, UNCSD, Rio de Janeiro, Brazil, June 2012. Available at http://www.uncsd2012.org/

† The Natural Capital Declaration and Roadmap, UNEP and GCP, 2014.

‡ NASA at http://science.nasa.gov/earth-science/ and EthicalMarkets.com at http://www.ethicalmarkets.com/category/earth-systems-science/

acknowledging the globalization and technologies we have created which we must now address and manage if we are to survive. As we deal with the resulting conflicts, inequality, social fragmentation and mindless violence, humans are learning and survival strategies are emerging. We recall that stress has been a basic tool of evolution in all species, including our own.

Breakdowns drive breakthroughs. There is much good news, submerged in mainstream media, still operating on the old commercial formula: violence, sex, scandal as weapons of mass distraction—"if it bleeds, it leads." In *The Better Angels of Our Nature* (2011), Harvard psychologist Steven Pinker tells the more hopeful story based on millennial historical trends including the feminization of societies, "gentle commerce", expanding reason and sympathy and social order. Charles Johnston, MD, sees these trends as leading toward cultural maturity in *Hope and the Future* (2014). Even in the face of rising sectarian conflicts in the Mid-East, similar reports from *Business Week* and *New Scientist* document how humans are "changing the juice we use to run our civilization" and "witnessing a complete transformation of the world."[11,12] Even US populations are beginning to see climate change as a threat and surveys now show bipartisan support for government regulation of greenhouse gases and majorities now favor solar energy.*, †

Key drivers in 2015 accelerating the green transition to more equitable, peaceful, sustainable societies are knowledge-intensive, paradigm shifts—new source codes now steering social, political, financial, corporate and academic decisions and changes:

- Beyond quantitative economic models to qualitative growth, systems approaches to human development, wellbeing and happiness
- Beyond short-term gain to long-term sustainability
- Beyond competition to collaboration and cooperation

These more inclusive systemic paradigms are re-shaping:

- Markets and commons in new global agreements
- MOOCs revolutionizing academic-based learning[13]
- Beyond scarcity economics to abundance and embracing earth systems science
- Beyond mining the Earth for energy to harvesting the Sun's free photons—that safely sited nuclear power 93 million miles from Earth

These new source codes are now pervading our organizations, new strands of cultural DNA deep in our operational hard drives, leading to new strategies, assumptions and decisions:

- Accounting and internalizing all social and environmental costs into public and private balance sheets (beyond GDP and "externalizing," toward full-spectrum, truthful accountability and circular economies).[14]

* Polling the American Public on Climate Change, Environment and Energy Study Institute, April 2015.

† U.S. Homeowners on Clean Energy: A National Survey, SolarCity, Clean Edge and Zogby Analytics, March 2015.

- Transforming finance beyond short-term, money-based fossilized asset allocation still mispricing energy and risk[15] to long-term value creation standards based on use of six forms of capital: human, intellectual, financial, social, built and natural (IIRC, SASB, GRI and Ethical Markets' Principles of Ethical Biomimicry Finance®).*
- Market-based reforms—pollution taxes (including carbon);[16] democratizing financial services; reforming electronic markets and trading;[17] crowdfunding,† cellular phone banking, revival of public banks, time banking, credit unions, cooperatives, worker-owned companies, hybrid social enterprises and the rise of shareconomies and the circular economy.[18]
- Focus on inequality, technology-based unemployment and the globalized power-law race-to-the-bottom; new forms of distribution of purchasing power, aggregate demand, guaranteeing minimum basic security, incomes, contingent cash transfers.[19, 20]
- Focusing on technological threats—artificial intelligence (AI), cybercrime and terrorism, synthetic biology, geo-engineering, nanotechnologies, space race for helium-3 and other minerals, gene driving;[21] beyond the unsustainable animal protein diets to plant protein, more insect-based foods for energy and resource efficiency and human health.
- Designing and financing urbanization, efficient infrastructure,[22] focusing more on "infostructure" (broadband, expanding internet access, online education, tele-democracy),‡ public goods and services, mobility, food, cultural and environmental amenities.
- Beyond fresh water intensive glycophyte agriculture to salt-loving halophyte-plant foods, fiber and fuels (based on four underutilized, abundant resources: 40% desert lands, 97% seawater, 10,000 halophyte varieties and free photons).[23]

These broadened approaches to sustainability are tracked in our GTS under our section: Life Systems, including technologies protecting nature, human wellbeing, food, water, education and quality of life. We continue to cover green infrastructure finance by green bonds[24] and purposes to which such funds are applied. Long-term sustainability requires redesign of major infrastructure from past eras—now no longer fit for purpose: from national electricity grids, urban infrastructure, obsolete dams, crumbling bridges, over-investments in roads and private vehicles versus rail, public transit, bike lanes and pedestrian malls to the massive global fossil fuels apparatus and trade facilities for shipping material goods in our increasingly digitized 21st century Information Age. All these system-wide transitions toward efficiency, information and communications technologies (ICT) are now digitizing many sectors of economies worldwide.

* IIRC at http://integratedreporting.org/; SASB at http://www.sasb.org/; GRI at www.globalreporting.org; Principles of Ethical Biomimicry Finance at www.ethicalbiomimicryfinance.com

† For more information see http://www.ethicalmarkets.com/category/crowd-funding/

‡ See for example, Hazel Henderson, Global Infrastructure Fund Conference, Tokyo, Japan, 1998.

2. System-wide Transitions

Systemic awareness of vital interconnections is now crucial, such as between energy, water, food and other tightly coupled systems of agriculture, forestry, ecosystem services, financial speculation and climatic changes (all monitored daily by 120 Earth-observing satellites of many countries cooperating through GEO and the International Space Station). For example, the Inter-American Development Bank is financing smart transportation solutions through new public-private partnerships.* Even California's drought is producing new approaches such as generating the electricity to run water and waste water system with solar energy.[25]

The Global Infrastructure Basel conference has revealed its first selection of sustainable infrastructure between $5 and $400 million on May 27, 2015, allowing investors to connect with partners and opportunities including wind farms in Vietnam and Senegal, energy and water-saving projects in China, Tanzania; public transit projects in Accra, Mexico City and Fortaleza, Brazil.†

The rapid digitization of legacy industries, manufacturing, retail, traditional banking toward mobile-payments systems like Kenya's M-PESA, crowdfunding sites like Kickstarter and crypto-currencies like Bitcoin are now spreading to healthcare, legal services and the new "shareconomy" hybrids like Uber, airbnb, Couchsurfer and employment sites like Elance and TaskRabbit. While these new ICT services help consumers' budgets and provide casual work for struggling people in developed economies, they can also exacerbate inequality in countries applying austerity, cuts to public services, pensions and healthcare. In addition, electricity-gulping, inefficient server farms are at last being addressed by a consortium of IT industry leaders formed in 2007 in their Green Grid initiative[26] and a Power Usage Effectiveness (PUE) effort with EPA's Energy Star program.[27]

The International Telecommunications Union (ITU) has tracked these trends in ICT and how different countries provide infostructure: internet, broadband, fiber-optic cables, WiFi, phone services and how communications networks are provided and under what standards. For example, Scandinavian countries rank highest in providing standard access to this ICT infostructure while Finland defines such access as a human right. The World Economic Forum (WEF) in Davos, Switzerland, since 2001, has produced its Global Information Technology Report comparing progress in ICT across 143 countries because "ICTs have become key enablers of business and employment creation and of productivity growth." While "ICTs have significant potential for supporting inclusive grow… paradoxically, ICTs have opened up new digital divides."[28] This is seen both within and between countries, largely due to different standards and politics. ICTs can exacerbate inequality of access, condemning many rural and poor communities to structural poverty and unemployment.

In the USA, for example, access to internet and broadband falls behind many countries, where small cities can be stranded without minimum broadband speed for their

* Public-private partnerships offer smart transportation solutions for Latin America and the Caribbean, Economist Intelligence Unit, Inter-American Development Bank and the Multilateral Investment Fund, April 15, 2015.

† First Infrastructure Projects Announced, Global Infrastructure Basel, April 15, 2015.

small businesses and job creation. Left to the private market, large telecom and cable companies have duopoly or monopoly power and simply will not provide access. The Financial Times reported on how these policies deny service to millions of consumers and small businesses, and which US neighborhoods, small cities and rural areas do not have broadband connections.[29] The WEF report ranks the USA 7th behind Singapore, Finland, Sweden, Netherlands, Norway and Switzerland for networked readiness; 14th in access standards behind New Zealand, Britain, Canada and the United Arab Emirates (UAE); 12th on infostructure and affordability and only 10th on business usage.[30]

According to the US Federal Communications Commission, "High-speed Internet access has become fundamental to modern life. Broadband connectivity can overcome geographic isolation and put a world of information and economic opportunity at the fingertips of citizens… Forty-one percent of America's rural schools couldn't get a high-speed connection if they tried… Connectivity is only available at an unreasonably high price." Yet, the Connect America Fund will invest $20 billion in broadband through 2020, paid by small fees on consumer bills.[31] Google, Facebook and new entrants into providing internet and broadband connectivity to all humanity are gearing up with new technologies. Google is developing globe-girdling balloons; Facebook has launched its internet.org and will provide access to basic services in tandem with several governments in Africa and hopes to develop solar-powered drones. OneWeb, a Florida-based start-up, aims to provide fast connectivity to all with swarms of cheap, low-flying satellites.[32] However, these innovations are unproven and years away. This huge underlying transition enabling smarter energy, water, cities, online education, waste recycling and more inclusive green growth is tracked in our GTS, currently totaling over $876 billion.

This array of deeper issues is now emerging in thousands of top-level, global scientific conferences and is the subject of at least three major UN summits in 2015: 1) Financing for Development in Addis Ababa, Ethiopia, July 2015; 2) the UN General Assembly, New York, September 2015, to debate and ratify the new Sustainable Development Goals (SDGs) which build on the Millennium Development Goals (MDGs) which succeeded in advancing education, women's and all human rights and reducing poverty; and 3) the Climate Change Summit in Paris, France, December 2015. The SDGs, launched in 2012 at Rio+20 placed all human goals within the framework of ecological sustainability and inclusive, equitable, low-carbon green economies in member countries and supported open working groups (OWG) in all these countries. A global Stakeholder Forum was initiated to review the goals. Its report on achieving a better balance between economic, social and environmental dimensions produced deeper research and clarification in a systems-based synthesis (OWG Outcome Document).[33] An inter-governmental negotiating session at the UN, New York, January 19-21, 2015, conducted a "stocktaking" in preparation for adoption of the final SDGs at the September General Assembly.[34]

The report, "Sustainable Development Goals and Integration," Stakeholder Forum 2015, by Amy Cutter, et al.,[35] identified cross-cutting issues and where some goals could be focused and integrated with others, for example, how **Goal 7**: "Ensure access to affordable, reliable, sustainable and modern energy for all" was related to **Goal 12**: "Sustainable consumption

and production patterns" (closely followed in our GTS). All the SDGs are related and may be further integrated into a smaller group as advocated by some economists and politicians. However, we agree with those who take a systems view beyond economics and money-based measures, such as Secretary-General Ban Ki-moon, Bill and Melinda Gates and others.[36] We have reported on **Goal 2**: "Promote sustainable agriculture"; **Goal 6**: "Ensure availability and sustainable management of water and sanitation"; **Goal 8**: "Promote inclusive and sustainable economic growth, full productive employment and decent work for all"; **Goal 9**: "Build resilient infrastructure, promote inclusive, sustainable industrialization and foster innovation"; **Goal 11**: "Make cities and human settlements inclusive, safe, resilient and sustainable"; **Goal 14**: "Conserve and sustainably use the oceans, seas, marine resources for sustainable development"; **Goal 15**: "Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, halt and reverse land degradation and halt biodiversity loss".

> *"We recognize that people are at the center of development and, in this regard, we strive for a world that is just, equitable and inclusive, and we commit to work together to promote sustained and inclusive economic growth, social development and environmental protection and thereby to benefit all."*
>
> *– The Future We Want*

Ethical Markets supports all these and the other SDGs which relate to gender equity, human rights and social justice which are fully embraced in our Transforming Finance initiative and TV series, our Principles of Ethical Biomimicry Finance® and our EthicMark® Awards raising the ethical bar for advertising, our Quality of Life Indicators and the Caring Economy Indicators of our partner the Center for Partnership Studies.* We have promoted such goals since the launch of the Earth Charter and its 16 Principles of Human Responsibility at the 1992 Earth Summit in Rio de Janeiro which I have supported ever since.† Our coverage continues with daily updates on investments in quality-of-life access to basic needs, including water, healthier agriculture and food, as well as infostructure: internet access, broadband, electronic education and political participation.

3. United Nations Sustainable Development Goals

The UN Secretary General Ban Ki-moon's report "The Road to Dignity by 2030: Ending Poverty, Transforming All Lives and Protecting the Planet" synthesizes the widespread deliberations of the 193 country members of the United Nations in RIO+20, in Rio de

* Transforming Finance at http://www.ethicalmarkets.com/category/transforming-finance/; Ethical Markets TV Series at http://ethicalmtv.wpengine.com/?s=transforming+finance&submit-2=go; Ethical Biomimicry Finance at www.ethicalbiomimicryfinance.com; EthicMark Awards at www.ethicmark.org; Ethical Markets Quality of Life Indicators at www.ethicalmarketsqualityoflife.com; Caring Economy Indicators at http://caringeconomy.org/newindicators/

† The Earth Charter, Earth Charter International, San Jose, Costa Rica. http://www.earthcharterinaction.org/content/

Janeiro, Brazil in 2012, with the over 50,000 civic, business and investor groups, including us, also participating.[37] The global consultations since then led to these new SDGs to expand on the Millennium Development Goals' progress since 2000. The Rio Outcome document *The Future We Want* summary states, "We recognize that people are at the center of development and, in this regard, we strive for a world that is just, equitable and inclusive, and we commit to work together to promote sustained and inclusive economic growth, social development and environmental protection and thereby to benefit all."

"The stresses now occurring globally are largely due to limited perspectives, ancient ideologies and defunct economic models."

Secretary General Ban Ki-Moon masterfully synthesizes all these global debates and agreements into "A Universal Call to Action to Transform Our World Beyond 2015". It contains many of the proposals and new paradigm approaches, new metrics beyond GDP, new Principles and Standards for guiding ethical businesses and investors, cooperatives, NGOs, auditors, accountants and financial firms which we have produced and advocated, both in my books and papers since the 1970s, and those of our company Ethical Markets Media (USA and Brazil), a Certified B Corporation since our founding in 2004.

Thus, we intend to continue fully supporting these unfolding transformative processes, including the United Nations Environment Programme (UNEP) Inquiry on Design of a Sustainable Financial System and its 3rd Report "Pathways To Scale",[38] to which we contributed and posted, and continue reporting on them in our Daily Headlines, as well as our Green Transition Scoreboard®, our Ethical Money Directory, our Quality of Life Indicators, our Principles of Ethical Biomimicry Finance®, our TV series "Transforming Finance" distributed worldwide by www.films.com to colleges and libraries (free at www.ethicalmarkets.tv) and our EthicMark® Awards for Advertising that Uplifts the Human Spirit and our Future Potentials, now accepting nominations for our 10th annual Awards at www.ethicmark.org, as well as our MOOC: the Ethical Markets Exploratorium, free to students, lifelong learners and global citizen activists.

We believe that 2015 can be a year where these transformations are truly launched in academia, public, private and civic sectors worldwide, because the stresses now occurring globally are largely due to limited perspectives, ancient ideologies and defunct economic models. These transitions show that stress is evolution's tool and that breakdowns do drive breakthroughs! We favor the "cap and dividend" policies as more equitable and carbon taxes as preferable to carbon trading.[39]

2015 will see the December Climate Change Summit to be held in Paris, France, focus on hammering out a set of agreements succeeding the earlier Kyoto Protocols (on which I commented in "From Rigged Carbon Markets to Investing in Green Growth", 2011).[40] Hopes lie in the US Obama administration's agreements with India's Prime Minister Narendra Modi and their compact with China's President Xi Jinping to reduce emissions and shift to more renewable energy use. The GTS focuses on this key shift from fossil fuels, carbon emissions and their huge subsidies to inclusive, knowledge-richer, green economies. As we show in this

latest GTS report, private investments are still leading in financing this global transition with our new total at $6.22 trillion. Fossil-free portfolios now outperform those with coal, gas and oil, while MSCI, a well-known financial provider is launching a family of fossil-free indexes.[41]

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How to Finance our Sustainable Development Goals (SDGs): Socioecological Quantitative Easing (QE) as a Parallel Currency to Make the World a Better Place

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Abstract

This paper tries to find an answer to the question of how to finance the Sustainable Development Goals (SDGs) that the world has just decided to implement. I argue that besides the existing wealth of proposals, mainly along the lines of better governance and co-financing strategies, we need a complementary approach: parallel Quantitative Easing (QE) for SDGs only. Reverse pricing effects, drying out shadow economies and the impact of such a QE-SDG on the current liquidity trap and the debt trap are explained.

1. Introduction

In September 2015, the world agreed upon a map for mankind's future up to 2030. The Sustainable Development Goals (SDGs) formulated in this map with 17 targets will replace the Millennium Goals.* This consensus was reached through the UN's largest consultation and review process in history. Hundreds of surveys, expert groups, panels and hearings took place, and millions of citizens were engaged in population-based questionnaires contributing to this agenda. With the SDGs, the world has provided itself with a map charting its course for the next few years with the aim of living in a more just, more sustainable, more wealthy and more stable world. However, this commitment does not come cheap. For example, an additional 30 billion USD annually is required to finance the climate pathway over the next 15 years.† The transition towards a more cyclical economy would cost Europe some 100 billion USD over the same period. The overall costs of the SDGs are estimated at around 4-5 trillion USD per year in public spending, investments and direct aid. According to the United Nations Conference on Trade and Development (UNCTAD), there is an annual investment gap of at least 2.5 to 4 trillion USD.‡ Despite this global UN consensus, there is less clarity on how to finance this agenda towards greater "dignity, prosperity, justice, partnership, planet and people" (Ban Ki-moon 2015). However, if we fail to discuss where the money will come from, the SDGs are basically dead at birth. In short: where will the money come from to make this huge global shift?

* UN, Global Sustainable Development Report, 2015 edition

† Ellen Mac Arthur Foundation, Growth within: A Circular Economy Vision for a Competitive Europe, 2015

‡ UNCTAD, 2014, Developing countries face $2.5 trillion annual investment gap in key sustainable development sectors, UNCTAD report estimates, 24 June 2014

2. The Fiscal and Monetary Dilemma

From a fiscal and monetary perspective, the world faces a multi-layer dilemma in coping with these challenges. First, increasing public debt is reducing states' and governments' willingness to further finance social and ecological issues.* Second, the liquidity trap prevents central banks from further stimulating the economy through Quantitative Easing (QE). At an interest rate close to or below zero the Central Banks empirically failed to provide and increase credits to the private sector.† Third, a shadow economy equaling the official world GDP in volume is in fact stabilising world economy. But, crime, human trafficking, drugs, guns, illegal financial transactions—all part of the shadow economy—are pulling the society in the opposite direction to the SDGs.[1] Fourth, an increase in income and wealth disparity‡ is preventing the world economy from generating a massive demand stimulus and keeping global savings above investments. The higher the income gap, the lower the middle class and therefore the lower the mass demand.§

> *"What is required is additional liquidity at a high scale, at full speed, and soundly targeted towards SDGs in a smart way that is different from what has been done in the past."*

Conventional strategies for financing the SDGs consist of a host of proposals, including regulatory agendas (offshore and off-sheet), different taxation schemes (progressive income tax; inheritance tax; financial stability contribution), and co-financing protocols (e.g. Global Marshall Plan Initiative), all designed to improve global governance.¶ None of the proposals is wrong. Yet, despite the intellectual scrutiny and practical heterogeneity, they all have one aspect in common: they all imply that the required liquidity will be created through the standard protocol of Quantitative Easing (QE) stewarded by central banks (CBs), where the commercial banking system eventually creates 95% of the credits loaned to the real economy.** Meaning, all the proposals consider a monetary monoculture to solve real problems. If we consider the most optimistic scenario in which the world is growing at the rate of 2% per annum over the next few years and we dedicate 1% of world GDP to SDGs, we end up with roughly 750 billion USD a year.†† Following the UN statement, financing the SDGs

* Global debt has increased by one third since 2008, totalling over 250 trillion USD, compared to world GDP; Geneva report 2014, Leveraging? What Leveraging, 16, ICMBS

† In fact, empirically the amount of QE increased by factor 4-5 with regard to the year of financial crisis 2008; the credit to private sector however stayed the same. Richard Koo, The Escape from Balance Sheet Recession and the QE Trap. John Wiley & Sons, 2014

‡ Cf. Stiglitz, Josef (2012) ;Thomas Piketty (2014); Sir Anthony Atkinson (2015)

§ E.g.: Summers, Larry (2013): Speech at the IMF fourteenth annual research conference in honor of Stanley Fischer

¶ Radermacher, Franz J. (2011)

** IMF (2012) Jaromir Benes and Michael Kumhof, The Chicago Plan Revisited (IMF Working paper 12/202 (August 2012); Werner, Richard A., 2014 "Can banks individually create money out of nothing?—The theories and the empirical evidence." International Review of Financial Analysis 36 (2014) 1–19

†† Agenda 21 cost around 600 billion USD annually worldwide, and the industrialised countries were supposed to contribute 100 billion USD annually, which is equivalent to 0.7% of the GDP of the rich countries at that time. The idea was to extract this amount of money from the "Peace Dividend" of disarmament after the end of the Cold War and redirect it into ecological and social projects. In actuality, most of those dividends went into tax reductions within the rich countries. See: United Nations. 1992. Agenda 21 available at: https://sustainabledevelopment.un.org/content/documents/Agenda21.pdf

however require an investment and aid strategy almost 6 to 8 times higher and we have to achieve these goals much faster than assumed.* Apparently, the conventional approach is one scale too small and one gear too low. However, withdrawing 6-7% (4-5 trillion USD) of world GDP (70 trillion USD) every year—even if done in a smooth and subtle way—from the market economy and steering it towards the SDGs would create the largest economic recession the world has seen in modern times.

We have to think of a different mechanism, both in terms of scale and speed. Clearly we are not only running out of time, we are also running out of capital to finance our common future. What is required is additional liquidity at a high scale, at full speed, and soundly targeted towards SDGs in a smart way that is different from what has been done in the past.

3. A Different View: Complementary Quantitative Easing

We could look at the matter from a different angle. Currently we are demanding economic growth in the first place in order to redistribute parts of it to co-finance SDGs, which take the second place. This is not wrong, but is relatively inefficient. If we take the 4-5 trillion USD as the rough figure required to "make the world a better place", we have to do it differently: if the major monetary players and regulators (IMF, WB, CBs, UN, governments)† launch an annual 4-5 trillion USD QE that is linked directly to the SDGs,‡ the whole situation changes. Let us call it a complementary QE (QE^{COM}) or a QE^{SDG}§, created solely to reach the SDG targets the world has just signed up for. However, a different design and purpose than the conventional mechanism (QE^{CON}) is required. This comprises at least 5 features (see graph below) and runs *in parallel* to the QE^{CON}:

1. QE^{SDG} is 100% electronic. There will be no cash available. This makes it trackable and recordable and limits access to the shadow economy for money laundering and tax fraud. Governments decide to accept this form of liquidity to pay taxes.

2. The QE^{SDG} has a "demurrage fee" in place. This means essentially that its negative interest rate encourages users to invest in SDGs. With a demurrage fee, there will be no hoarding, but investing.¶

3. The QE^{SDG} is bounded: in contrast to the QE^{CON} mechanism, the purpose of the QE^{COM} is investments in SDGs only. This restriction of the investment portfolio avoids the liquidity trap. Bounded liquidity is injected into the real economy directly and consequently steers society towards greater sustainability.

* Cf.: https://www.ecb.europa.eu/press/pr/date/2015/html/pr150122_1.en.html

† If governments are allowed to issue these "notes", the design would be similar to that of the Chicago Plan (see IMF 2012). It is important to understand that the only real power and leverage that governments have in the monetary domain is the capacity to specify the kind of currency or currencies they accept in payment of fees and taxes.

‡ This amount of money reflects roughly the M0 quantity that central banks are issuing worldwide in order to stimulate the conventional economic sector. The same amount of liquidity, within the different design described above, is necessary to provide sustainable wealth for 80% of the world population.

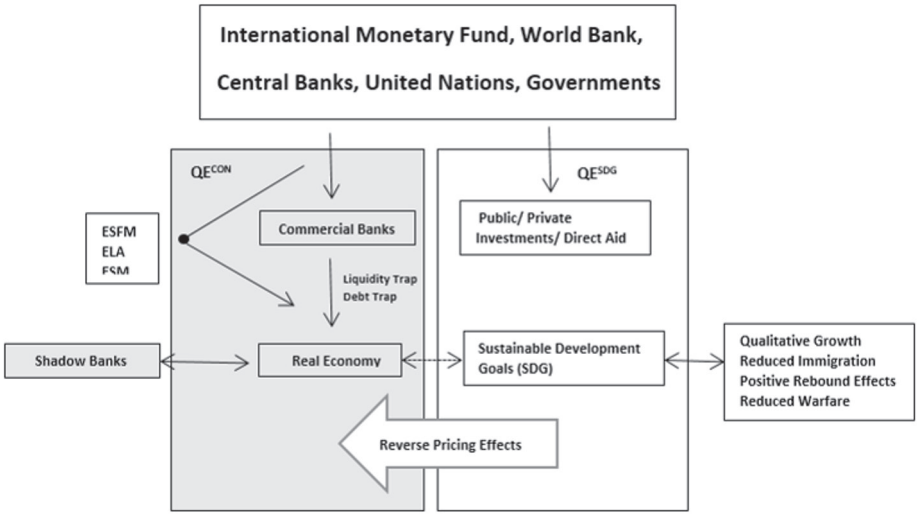
§ Werner, Richard A. (2012): How to end the European crisis—at no further cost and without the need for political changes. Southampton, GB, University of Southampton, 12pp. (Centre for Banking, Finance and Sustainable Development Policy Discussion Paper, 2-12).

¶ However, a negative interest rate has two impacts: first, it can encourage inefficient and hazardous investments that would have never been made under a positive interest rate. Second, it can stimulate long-term socioeconomic investments. The question is: bad or long term? Taking a design in which the QE^{CON} has a long-lasting perspective and is targeted towards SDGs, any investment in this field will do good or better, even if efficiency is partly reduced.

4. A "banned list" guarantees that the money is only spent on issues that are healthy, fair and sustainable. While it is difficult to identify a list of positives, it is much easier to come to a consensus on a negative list. This would, for example, exclude drugs, guns, prostitution, human trafficking and so on from expenditure.
5. The QE^{SDG} has a limited convertibility with the conventional money system of, for example, a 10-15% exchange rate. This will encourage clients, companies and states to reinvest into the SDGs or to convert money with a loss.

"We are psychologically trapped by the idea that there can be just one monetary system, providing a single, specific form of liquidity for all purposes, pretending that the power of allocative distribution is most efficient."

Figure 1: To meet the SDGs, the world requires a parallel, complementary QE (QE^{SDG}); QE^{con}: Conventional Quantitative Easing; enhanced qualitative growth, reduced entropic sector through "inverse pricing" and consecutively drying out the shadow economy



4. Consequences and Challenges

We are psychologically trapped by the idea that there can be just one monetary system, providing a single, specific form of liquidity for all purposes, pretending that the power of allocative distribution is most efficient. Historically, this is an exception, not the rule.* The

* There is historical evidence that multiple and parallel currencies have worked throughout the centuries, providing local and regional liquidity on one side and currencies for international trade on the other. See Margit Kennedy & Bernard Lietaer. (2005)

challenges the world is facing and the SDGs humankind has imposed itself on require a different view: a parallel currency system. Such a complementary, parallel liquidity boost would have at least the following impact:

"A parallel currency system would make our world more resilient."

1. *Ending the liquidity trap:* In a globally deflationary situation of 4-5 trillion USD, a QE^{SDG} offers additional liquidity in an intelligent design. Instead of providing liquidity through the standard protocol, which failed to provide credits to the private sector, bounded direct investments* in green and social projects (including a demurrage fee) can ensure that the liquidity hits the real market.
2. *Reducing the debt trap:* Most countries are overindebted with little or no leverage funding additional ecological or social projects. The additional liquidity ensuing from QE^{SDG} will trigger green and social investments most countries are short of.
3. *Drying out shadow-economy activities:* There is less need for people to make an income through drugs, crime, and human trafficking. Regional wars on resources and forced immigration will be reduced and employment in the 'green sector' would reduce attractiveness of unemployed youth joining terrorist movements.
4. *Growth:* Our conventional growth process, measured in units per GDP, will change. Long-term investments in socio-ecological projects and an increase in labour intensity are two of the most prominent impacts of a QE^{SDG}, shifting our growth paths towards a more green, balanced and healthy planet.†

There are indeed two further challenges. First, additional bounded liquidity will reduce the efficiency of any economic transaction, as there are two pathways for processing economic activities instead of one. Systems theory has shown, however, that forms of parallel processing will render systems more resilient, shock-proof, greener, safer, fairer and richer, despite the loss of efficiency.[2] This is known in engineering (power grid), air plane safety measures, agriculture (monocultures versus higher diversity) as well as in the human immune system. This is true for the monetary system, too. In short: there is a net gain to be derived from a parallel system to stabilize the overall system. Taking into account the number of debt (186), state banking (96) and currency crises (180) since 1975,[3] a parallel currency system would make our world more resilient.

Second, we have the hazard of inflation, and indeed, a 4-5 trillion USD additional stimulus will create an inflationary pressure on price levels. However, any dollar spent through this "green" mechanism will reduce costs in the conventional economy in the so-called entropic

* With the Emergency Liquidity Assistance (ELA)-Mechanism, the ECB has several years' experience in injecting additional liquidity into the market (https://www.ecb.europa.eu/press/pr/date/2015/html/pr150628.en.html). ECB would indeed become, in collaboration with UN, IMF and WB a green investment bank.

† A positive "rebound effect" will accelerate the SDGs, moving the world in the right direction.

sector.* This "reverse pricing" effect will reduce the price level in sectors nobody really wants: crime, forced immigration, human trafficking, ecological disaster management, unemployment, poverty are just some examples, as human activities are getting invested in a greener and more socially just world.

5. Final Remarks

If we start looking at the world from an SDG perspective, we can see that it is vastly deflationary, meaning there is by far not enough available liquidity to finance these unmet needs. In numbers, about 4-5 trillion USD is lacking every year to make the world a better place. However, the conventional way of creating that liquidity is restricted due to the liquidity trap and the debt trap, providing little to no future additional leverage. An additional but different design of liquidity is required, running in parallel to cope with the SDGs.

The advantage of a QE^{SDG} is that it would work on different scales: locally or regionally as well as globally. The stimulus thus created could be adjusted and scaled up according to the investment plan and unmet needs. We could start with local and regional projects identified as SDGs and scale up.

With a QE^{SDG}, we can begin to rethink the relationship between society and the money system. Money will eventually serve people and not the other way round.

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* The entropic sector includes investments we are forced to be engaged in, but nobody really wants: Crime protection, end of pipe technologies avoiding global warming instead of green technology to begin with, unemployment fees instead of having a real job, costs for cure due to the exposure to unhealthy environment etc. See Nefiodow. A. Leo: Der sechste Kondratieff. Wege zur Produktivität und Vollbeschäftigung im Zeitalter der Information. Sankt Augustin, 2006

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Changing the Dominant Paradigm in Economics:
How to understand & confront critical aspects of Economic Globalization

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Abstract

This article addresses the discussion proposed by the World Academy of Art & Science (WAAS) about the need to build a new paradigm to confront the challenges of the global society and to move across to a New Society discussing specific problems related to economic globalization and proposing changes. The ways in which economic orthodoxy and heterodoxy analyze the role of the State and the question of sustainability of development and the problems of environmental sustainability depend on their different views or theoretical arguments about the role of the market. The article contrasts the mainstream economics arguments to support the free market context of globalization with Post-Keynesian and Marxist's skeptical or critical views. Finally, it proposes some strategies to face the critical aspects analyzed making suggestions to move to another dominant economic paradigm.

1. Introduction

This article seeks to address the discussion proposed by WAAS about the need to build a new paradigm to confront the challenges of the global society (Jacobs, 2014) and to transit to a New Society (Šlaus, 2014), discussing specific problems related to economic globalization and proposing changes.

In order to circumscribe the contribution of this article, it is necessary, first, to define what economic globalization means, highlighting the critical aspects to be discussed, while recognizing the benefits and challenges of globalization itself. Globalization is generally seen as a way of bringing countries and peoples closer through connecting networks. Thus, what is most readily seen are the benefits of cultural exchanges, webs of discussion and collaboration and, consequently, the gains that collective action can provide. Those are undeniably positive achievements of what is usually called globalization.

Economic globalization, however, needs to be well defined and understood in order to really grasp its consequences. In economic terms, the meaning of globalization also relates to close connections, but these connections are established **by market forces, as it is always the case in capitalism, because capitalism is a commodity type of economy,** as stressed by Marx. But while for the orthodoxy free market forces are the best regulator of the

* The author is grateful for the comments of Alfredo Saad-Filho, Joanílio Teixeira and Andrea Cabello and acknowledges the financial support of CNPq.

economy (leading to more stability, efficiency and equality), for the heterodoxy the system of regulation by free market prices, leads to increased instability and greater inequality. This creates a role for the State, challenging the idea of 'market efficiency' and opening the space for the consideration of alternative ways of regulating the economy and building the material conditions to change the society. This is the first goal of this article.

The ways in which the orthodoxy and the heterodoxy analyze the question of sustainability of development and the problems of environmental sustainability also depend on those views or theoretical arguments about the role of the market. The second goal of this article is to examine those arguments contrasting mainstream economics with Post-Keynesian and Marxist views.

The first section stresses the mainstream arguments for economic globalization. In the second and third sections, respectively, the heterodox arguments of Post-Keynesian and Marxist economists are outlined, explaining their skepticism or even negative positions concerning the market. The fourth section discusses some strategies to face up critical aspects of economic globalization and proposes heterodox alternatives. This leads to the suggestion to move to another economic paradigm, in order to increase equality and universal interest creating a more sustainable world in both human and social terms. The conclusion shows how these proposals can also contribute to a more sustainable environment.

2. The Mainstream and the Defense of Economic Globalization

Mainstream economics is characterized by the belief in the regulating role of the market. The idea is that freedom for private initiative is necessary to guarantee the equilibrium of supply and demand of both goods and factors of production, price stability and a harmonious evolution of the economy. That is why the philosophy that sustains mainstream economic theories is called neoliberalism. The idea of liberty here is not the idea of human freedom in general; instead, it relates to the freedom of the **market, or for the private behavior implicit in supply and demand**. As globalization implies the opening of different markets, deepening and spreading prices behavior, it can be seen as neoliberalism in practice.

The neoliberal idea of development is, hence, one of letting different markets express individual interests. Money, in this conception, is a pure veil, neutral, and it cannot stimulate the economy in a permanent way. From this point of view development is based on individual preferences and technologies applied into the production of different goods and services. If the government issues money trying to stimulate production and employment, the final result, in the shorter or longer run, is only inflation. Furthermore, the government can decide to invest, instead of waiting for market decisions. But in so doing it will necessarily become indebted, since the government does not produce. According to the mainstream, this path will increase the interest rate which, in turn, reduces private investment. Thus, government investment is neutralized by the decline of private investment, with no net gain. This is the crowding-out effect of private investment by public sector investment (Blanchard, 2008).

The government is viewed as being needed only to manage or address certain externalities (Laffont, 2008), which means costs or benefits that affect some people, even

if they do not choose to incur in them. For example, the pollution generated by a factory that affects the surrounding environment and the health of nearby residents is an example of negative *externality***.**

Even though it admits these possibilities as adequate grounds for government intervention, mainstream economics prefers not to count on them, because the role of the State is viewed with suspicion or mistrust. Underlying this perspective there is the idea that if the government chooses to support some sector or economic policy it is frequently argued that it can also stimulate "rent seeking behavior". This is associated with benefits that the government grants to specific sectors or economic agents prioritized by economic policy. Rent-seeking means spending resources on political lobbying aiming to increase one's share of existing wealth without creating new wealth, which happens if the government has the power to interfere in the economy. This expenditure of wealth is seen as harmful, because it does not involve an increase in production. According to this view the effects of rent-seeking are thus reduced by economic efficiency through poor allocation of resources, reduction of wealth creation, the loss of government revenue, and general national decline (Krueger, 1974).

Once the orthodoxy, or mainstream economics, believes in the regulating role of the market, it sees instability and other economic problems as the result of factors exogenous to the market itself. In contrast, market forces can help to resolve or compensate those problems. If, for instance, there is a drought, a natural phenomenon, therefore exogenous to the market, causing the shortage of a commodity, imports can resolve the problem and this will be more efficient if the market is free than if it is regulated.

Among the exogenous factors that can cause instability there is one that is particularly important for mainstream economics and that reinforces its belief on market power: it is government intervention in the economy. As we have already discussed, the orthodox conception of neutral money, having no permanent or long-lasting effect over the real economy, makes government intervention issuing money or getting into debt an inflationary or inefficient way of doing so. When the market is free internationally, the power of national governments is reduced, leading mainstream economics to expect greater stability in a globalized economy. The government behavior, for example, of issuing money with electoral objectives is seen as being neutralized by capital flight to the rest of the world, if there is free movement of capital. That is, the mere threat of capital flight can discipline governments and prevent inflationary policies.

In relation to convergence, the mainstream argues that if movements of capital are free around the world, capital tends to leave the developed countries, where there are fewer opportunities for investment and where rates of profit and interest are lower, and go to less developed countries, where more abundant opportunities of investment guarantee higher rates of profit and interest. In so doing, investment tends to increase in these developing countries, guaranteeing them a higher growth rate and, consequently, a reduction in the income gap between countries. The same reasoning is applied to justify the equalization of wages between rich and poor countries, reducing income inequality.*

* For an updated Post-Keynesian critique on mainstream economic contributions see Palley (2011).

It is the belief in market efficiency that justifies the propositions of the economic mainstream to resolve the problems imposed onto the environment by economic growth. The idea is to discourage environmental damage by increasing the cost to the capitalists causing it. This leads to proposals of fines, fees and taxes to compensate the damage incurred, and the possibility of buying carbon credit, leaving to the market the decision of how much to destroy the environment.

It is important to observe, before going to other paradigms in economics, that this orthodox free market-oriented position is grounded on certain assumptions, in particular those of the absence of a lasting impact of money over the real production (neutral money) and of an inherent inefficiency of the State. These assumptions are rejected by the Post-Keynesian and Marxist paradigms, which open the space to defend a positive economic role for the State. These approaches also raise important reasons for skepticism concerning the role of the market, which explains some of their critiques of economic globalization.

3. Post-Keynesian Economics, Skepticism of Globalization and the Need for Re-regulation

Post-Keynesian economics develops its ideas following the critiques to the economic mainstream made by Keynes in the latter phase of his academic activities. For Keynes, what was absent from the elegant economic theory of the orthodoxy was uncertainty, which is different from risk,* and that permeates economic decisions, particularly those involving a long period of time (Keynes, 1937). Uncertainty is due to the facts that the future is unknown and that decisions are made in an atomistic or decentralized way. Consequently, no one can anticipate even probabilistically what will be the net result of those types of decisions.

Under these conditions, it is both usual and rational that agents should search for a way to protect themselves against uncertainty. It becomes normal to hoard or hold money, since money is the most liquid asset, and it gives flexibility in uncertain times. In this vein people can trade money for anything, without incurring capital losses due to exchanges made in a hurry. Keynes called this behavior **liquidity preference**. The problem with this type of behavior is that it leads to the reduction of consumption or, what is worse, to the inhibition of the investment, decreasing aggregate income and employment.

For Keynes, the investment decision is the most important decision in the economy, because it can increase or reduce the level of employment and the income generation in a multiplied way. This happens because when an investment decision is concluded, it implies payments to a number of people, which once added up, constitutes an income generation higher than the value of the investment itself. In turn, the investment decision depends upon the comparison between the investment expected profitability (marginal efficiency of capital), and the rate of interest, which is a proxy for the investment cost.

According to Keynes, the two key determinants of the investment decision depend substantially on uncertainty. The gain of the investors, or marginal efficiency of capital,

* In contrast with risk, uncertainty cannot be estimated using probabilities.

cannot be calculated in advance. It is the result of feelings about the current state and the future development of the economy, which are inevitably permeated by uncertainty, filtered by feelings of optimism or pessimism. In turn, the rate of interest is determined by the supply of money, which depends on the liquidity preference of the banks, and the demand for money, which derives from the liquidity preference of the economic agents. Thus, for Keynes, investment in a capitalist economy is always volatile, and both income and employment are inherently unstable.

That is why, for the Post-Keynesians, the role of the State is always important, with the government stimulating the private propensity to invest or itself investing when private decisions are not made.* The government can reduce the interest rates, to stimulate capitalist decisions to invest, and it can itself invest if the entrepreneurs remain reluctant to do so. This occurs because the government is not a profit-seeker, and therefore it does not need to compare the profitability of investment with the interest rate at the moment of the investment decision. The consequence of the increase in investment is an increase of income and employment, which will improve the entrepreneur's expectations about the demand for his or her own products and, consequently, raise the expected profitability of enterprise, improving their next decisions to invest. In doing this, the government can minimize domestic economic instability and stimulate growth and employment creation. As it liberalizes market forces, globalization reduces the scope for the government to act. For example, if the government reduces interest rates, domestic capital can move overseas searching for higher gains, which might neutralize the ability of the government to stimulate the economy.

If the government can lower interest rates through monetary policy, making more investment projects potentially profitable, this shows not only an economic role of the State, but also that money can stimulate the growth of production, employment and income. Money can thus affect the development of the real economy, and it is not, in this sense, neutral.

However, monetary policy cannot by itself guarantee higher levels of investment because the expected return or marginal efficiency of capital depends upon optimistic or pessimistic expectations of profitability, since uncertainty, differently from risk, is not the object of calculus, as we have already seen. This means that, even with low interest rates, investment decisions may not take place if the marginal efficiency of capital is even lower. Therefore, monetary policy cannot always guarantee that investment will follow, which justifies the use of fiscal policy. The latter means that the government can spend and finance its spending through taxes and debt. The obvious reason for this possibility is that government spending does not rely on individual decisions, and it does not have profit as a goal. Thus there is space for the government to spend on consumables and to invest with the ultimate goal of stimulating the economy. In this vein, the government can create income and employment, which, in turn, leads to an increase of the optimism of the entrepreneurs, stimulating new private investment decisions. In this way fiscal policy can improve economic activity. In other words, there is crowding-in and not crowding-out of the private investment by public investment.

* For a didactic explanation of the differences between neoclassical and Post-Keynesian views on the role of the government, see Davidson (1991).

Even if government activity is financed by public debt, Post-Keynesians do not think that it is a problem, because the increase of income and employment can raise sufficient tax collection to repay the new loans to the state. Consequently, government spending is not always inflationary, because it can expand production capacity and production itself. Then the supply of goods and services will tend to increase and prices to decrease, instead of increasing as is expected by economic orthodoxy.

Here we see some reasons why Post-Keynesians are critical of the free market system in general and globalization specifically. For the Post-Keynesians, they create more instability and inequality among economies. The higher instability can be understood with an example of the problems posed to the role of governments. If, for example, the government has to intervene to secure an exchange rate compatible with domestic growth objectives, this can be achieved only by controlling the inflows and outflows of capital. This is very difficult because the size of these capital movements is often higher than the GNP of several countries. In the past, this was obtained by legal regulations or legal prohibitions against entry or exit, which is incompatible with a free market economy.

"Money itself is a social relation. Money's social power to validate private labors justifies the possibility of its hoarding, mainly when there are difficulties to sell and to purchase, because it is a warranty of absolute purchase power."

Regarding the greater inequality expected as a consequence of globalization, this happens because uncertainty is higher in less developed countries, as a result of their lower incomes and higher dependence on foreign trade. Hence, there tends to be a higher liquidity preference in these countries, which inhibits investment. Furthermore, in those countries the financial markets are normally not very developed, meaning that there are fewer alternatives available in terms of where to place the money (Dow, 1993; Amado, 1997). Under these circumstances, money tends to escape towards developed country financial markets, meaning that resources leak from less developed to more developed countries. This inhibits once again investment in the former, and expands the development gap between the two types of countries, which is the opposite of what the mainstream would expect.

In terms of sustainable development, it is necessary to say that in the Post-Keynesian view, the stimulus to growth and development, as we have seen, must come from demand growth, which improves the environment for investment and consumption. However, this also can create incentives for perverse behaviors in terms of the environment, requiring alternative government policies to regulate and conduct the way those expenditures will be made. In conclusion, although Post-Keynesian economics supports an active regulating role of the State, more than that is necessary. It is imperative to change the logic of the market and competition, as we will discuss in the following sections.

4. Marxists, the Role of the State and the Critique of the Market

For Marx and Marxist political economists the State has an essential economic role in capitalism. But, differently from Keynes's and the Post-Keynesian view, the State does not always resolve the problems of accumulation, because they are the consequence of the logic of capitalism.

In capitalism, since it is a commodity production type of society, everybody has to buy in order to live, and thus it is necessary to sell. The commodities are produced in private processes, but they must satisfy a social need, by being sold. Money in the purchases and sales transforms the private labor contained in the commodities in labor recognized as socially necessary. In this sense it operates a social division of the labor in the society, because the distribution of all private labor is done through this process of purchases and sales of commodities. This role of money is seen as socially validating the private labors of society, and it is an essential way of organizing the social life. The sale of the commodities produced allows their owners to live in this type of society, because now they can buy whichever goods and services they need in order to live there.

"The State can neither control society as a whole, nor the monetary dynamic, because money is a relation that involves the entire society, while the State is only part of it, despite its high hierarchic position."

This role gives money a fundamental social power. The capitalists sell their output in order to realize their profits, and the workers sell their labor-power to receive wages and buy what they need in order to live. In this sense**, money itself is a social relation**. Money's social power to validate private labors justifies the possibility of its hoarding, mainly when there are difficulties to sell and to purchase, because it is a warranty of absolute purchase power. The mere possibility of hoarding is sufficient to see that money can affect the economy in a lasting way, not being **neutral**. But Marx also shows this non-neutrality when he speaks about the role of credit, increasing the rhythm, potential and the scale of production. Credit can anticipate the purchase of means of production, and allow capitalists to hire the workers before they have accumulated sufficient profit to finance it. This can lead to an increase in employment, production, profits and capital accumulation.

The monetary role of the State is a result of the private as well as social character of labor in capitalism, and the social role of money in the division of labor. The monetary role of the State ensures that the social validation of the labors is not left at the mercy of private interests. This public role is, however, limited in relation to the social character of money. The State can intervene in the monetary dynamic because of its public character, which is superior to the private character of the producers in the social hierarchy of our societies. But the State can neither control society as a whole, nor the monetary dynamic, because money

is a relation that involves the entire society, while the State is only part of it, despite its high hierarchic position (Brunhoff, 1982).

Furthermore, the Marxist idea of the State is the object of controversy. On the one hand, there are authors who believe that the State represents the interests of capital as a whole (Miliband, 1973) and in so doing cannot benefit workers. On the other hand, there is another group that thinks about the State as having relative autonomy in relation to the two fundamental classes, capitalists and workers, even though it is a class State in the sense of fighting for the success of capitalism (Poulantzas, 1971). This relative autonomy from classes is seen as a way of justifying economic policies that can benefit the workers, even if the ultimate goal is to protect the capitalist system. Among these types of economic policies are those aiming to increase employment and wages. This gives rise to the support of some Marxists to public policies that improve growth and distribution, guaranteeing more employment and higher wages—so a better situation for the workers in the capital-labor relation.*

The critique of capitalism by Marx and the Marxists is well known, because of the origin of profit. Profit is based on the exploitation of the workers. The workers sell their labor power as a commodity, receive what this commodity is worthy of, but this is less than the entire value created by their labor (Marx, 1971). A part of the product of labor goes to the capitalists as profit, despite being produced by the workers. The profit motive, based on this type of exploitation, shapes the logic and the evolution of capitalism.

4.1. Marxist criticism of the Role of Money in Capitalism

Marx's criticism of the role of money in capitalism is less well known, which allows us to continue the examination of the role of markets in capitalism. As explained above, in a world of commodities as is the case in capitalism, everyone is necessarily both a buyer and a seller. Selling and buying are always needed. In these processes private labor is socially validated only at the moment of being converted into money and money has, in so doing, an enormous social power in our societies. Marx was a critic of this, since he did not accept that something as important as people's lives, or the way people distribute their production or satisfy their needs, or even the definition of what to produce and in what proportion, could be at the mercy of a thing called money. It is this criticism of money or the role of the market that justifies the critique of the Marxists against globalization, which increases the role of money as it expands the role of the market.

This critique is reinforced by the consequences expected from globalization: more instability and greater inequality. The higher instability is justified, for instance, from a financial point of view, showing that when the credit markets of the world as a whole are linked this stimulates the development of what Marx called fictitious capital. Its consequences are financial crises whose results we now see very clearly.†

For Marx, some forms of capital are called fictitious because they lose the relationship with the labor that creates value. This occurs because the value of that capital is the outcome

* For good analyses of the controversies about the role of the State among Marxists, see Clarke (1991).

† For a description of the current crisis using Post-Keynesian and Marxist arguments see Mollo (2011 and 2013).

of a mere calculus of capitalization of regular revenues, instead of being evaluated by the labor cost of production. Fictitious capital develops with the development of the credit system. Two examples can help to understand this process: the public debt and the value of stocks. In the first case, the money transferred to the State through the purchase of certificates of public debt no longer exists, because the money has already been spent, and cannot consequently create new value, but the interest payments on the accumulated debt must still be made. In the second case, the increase or decrease in stock prices loses any connection with the value of the companies that originated them. The fictitious capital has its value determined by purchases and sales of these assets in the financial markets, in a speculative way, and the money does not return to production in order to buy labor power and means of production, which is the only way to create profit. So its value is merely speculative.

"The quest to maximize profit, capitalism's objective, leads to a general stimulus to buy. This explains the importance of possessing in capitalism, which stimulates consumerism."

The increase in value of the assets constituting fictitious capital depends on the demand and supply for them. Hence, it depends on the resources coming from production, as they are purchased through the expenditure of profits and wages. The process of globalization has linked the credit market of the entire world, giving rise to a lot of money circulating in a small number of highly concentrated financial markets in the developed countries, increasing the prices of financial assets. But real production and thus wages and the profits have either fallen or increased in a much smaller proportion. When the prices of the financial assets started falling, given the decline of demand for them, this stimulated the generalized sale of titles and the deflationary spiral that triggered the current crisis.

In what concerns inequality, it is necessary to think that when the goal is profit, as is the case in capitalism, it is essential to increase surplus value, meaning to reduce costs, particularly labor costs. To do so, it is necessary to improve the technology of production, making the workers even more productive. This is a behavior of the capitalists as a whole, but it does not lead to the success of all of them. The capitalists who innovate first can capture greater profits and improve the research and development of technology, guaranteeing lower costs and even higher profits, while the others that operate below average tend to have problems to improve their technology due to the lack of resources to pay for such investment. Their costs cannot be reduced rapidly and, again, they obtain less profit to invest in technology, which makes it increasingly difficult to win the battle of competition and remain as capitalists. The consequence is the concentration of capital in even fewer hands.

Another type of inequality associated with the process is unemployment. Since the goal of productivity growth is to reduce wage costs, and not the effort of the workers, the consequence is the greater productivity of the workers. Consequently, employment does not grow

at the same rate as the use of machinery and equipment. So, technical progress tends to be capital intensive, which creates technological unemployment.

This type of argument shows a conception of inequality coming from the concentration of capital and from the loss of income with the unemployment that is inherent to capitalism, but that can be increased even more with the reinforcement of competition in a free market economy, as is the case in globalization. Profit is the goal and it is impossible to limit the desired profit, because in competition nobody knows how much the competitors will be able to invest in order to reduce costs and win the competition. Under these circumstances, it is necessary to seek to maximize profit to remain as a capitalist. Consequently, competition in globalization is amplified, which magnifies those processes.

The search for profit maximization leads to a continuous process of technological progress increasing labor productivity and producing a profusion of commodities. This means a permanent stimulus to waste. On one hand, because the technological race cannot wait for equipment to physically deteriorate. This is an imposition of competition. The competitors do not know what the technological progress obtained by their competitors will be, and this progress will imply lower costs. To ensure that they are doing their best, it is necessary to anticipate the change of equipment in a sort of early obsolescence, which means waste. On the other hand, the technological progress leads to a profusion of commodities that must be sold, to accomplish or materialize the profit they contain. This is what leads to consumerism.

More particularly, the profit can only be obtained by the sales of commodities. The quest to maximize profit, capitalism's objective, leads to a general stimulus to buy. This explains the importance of possessing in capitalism, which stimulates consumerism.

5. Moving Towards a Different Dominant Economic Paradigm

- What was seen so far—differently from the ideas of the economic mainstream—is that, for heterodox economists, globalization gives rise to greater inequality and macroeconomic instability. This makes the defense of competition and the free market system questionable. At the same time, the reality of more than thirty years of economic globalization, the current global crisis and the problems of unemployment, poverty, inequality and the environment provide good arguments for the critics. In this vein, among the reasons for, and the interest in changing the current economic paradigm, as was proposed by WAAS (World Academy of Art & Science), we notice the perception of "low employment rates, and huge inequalities" leading to the deterioration of several socio-economic indicators (Šlaus, 2014, p. 2), and the need for a "human-centered development perspective" (Šlaus, Giarini and Jacobs, 2013). This section contributes to this discussion.
- We have seen that the economic connections of the contemporary world are established primarily through free market relations, with all the problems that we have pointed out. The way to alleviate those problems is, as defended by the Post-Keynesians, to re-regulate the economy, as a way to guarantee investment growth and, in so doing, increase the supply of jobs. This initiative is shared by a large number of Marxists.

They know that even though employment implies exploitation, the workers still need to sell their labor power in order to survive in capitalism, and that a better position in the capital-labor relation implies more employment and higher wages.

- Marxists also know that it is possible to re-regulate the financial system to guarantee higher levels of investment and even to avoid financial crises that punish the workers severely, especially the less skilled among them, which is another reason to demand the re-regulation of the economy. However, regulation can be insufficient to address the issue of inequality if investments fail to absorb unemployed people. Since the private investment decision is guided only by the goal of profit, this can lead, and it usually does, to the use of less labor-intensive technology. This offers another reason for State intervention: the guarantee of higher levels of employment. Even if the State in democratic societies is ruled by the popular vote, and although this is a form of collective representation, it only guarantees what is called the **will of all** but not the **collective or common will** or the **universal interest**. It is what will be discussed in this section.

Several authors in the history of ideas discussed the notion of common will or common interest using different denominations. Rousseau, for example, offers a well-known analysis of the collective or general will which, for him, is different from the will of all. In his own words: "the will of all is very different from the general will; the latter looks only to the common interest, while the former looks to private interest and is no more than a sum of particular wills" (Rousseau, 2010-2015, p. 14).

This means that the general or common will is not the will of people measured by vote, which is a sum of different and private wills, but the interest that is common to all citizens.

This general will was also analyzed by Hegel, and this is what Marx (1848) called the universal interest. But as analyzed by Coutinho (2010), for Rousseau, the subject is a matter of moral question or the fruit of the repression of private action by public action; for Hegel (2001, § 199, p. 164), it is something spontaneous, the outcome of the reciprocal dependence of everybody or, as he puts it, "through the dependence and co-operation involved in labor, subjective self-seeking is converted into a contribution towards the satisfaction of the wants of all others". For Marx it is the result of the transformation of the society; it is necessary to build the collective will in order to reach a society where "the free development of each is the condition for the free development of all" (Marx, 1848, p. 27).

The collective general will or the general or universal interest of everyone is easier to build when people's life conditions are similar, which is a good reason to reduce inequalities. In this sense it is necessary to improve equality in a general way and in a general sense. This cannot be built in adverse conditions and, at the same time, it implies substantial transformations, some of which will be discussed here: a) the creation of alternative channels for listening to people, largely replacing the market channel; b) the development of common or universal interests; and c) the development of cooperation instead of competition.

5.1. Creating Alternative Channels for Listening

- One of the problems we have analyzed above is that the market has a questionable way of defining people's lives. In capitalism, the market is almost the only channel of expression of demands. If society wants more of a commodity this is seen as the growth of demand, and so supply promptly responds, regardless of environmental consequences. The opposite happens if demand falls. The problem is that whoever participates in those demands must have money and the more money one has the more he or she will influence demand and stimulate supply. Unemployed and poor people, however, do not have enough money, and thus the problems of unemployment and poverty cannot be resolved by a market system.* This is the reason why I agree with Jacobs (2014, p. 11) who says that "in countries around the world ruled by money power, plutocracy masquerades as representative democracy". Hence, if the idea is to change the economic domain in terms of stability (of employment, to guarantee a human-centered development), reduced inequality (to improve development sustainability) and to increase awareness while using natural resources (to improve environment sustainability) the first suggestion is to create alternative channels for listening to people.

"What is difficult and needed is to create greater opportunities for people to say what they really want."

- The current progress of the Internet makes this technically easier. What is difficult and needed is to create greater opportunities for people to say what they really want. It is also necessary to think together how best to achieve it, supervising and discussing measures to guarantee what is decided. Not only is this a way to temper the market channel, reducing its power, but also to qualify State intervention, making it more adequate to achieve the collective will. This is the first suggestion to build the collective will and the common or universal interest, because it is fundamental to listen to people's aspiration in order to build a consensus, including those who are outside the market because they do not have money.

5.2. Developing the Universal Interest

We know that people have different conditions of life and, consequently, different necessities, priorities and interests. To develop the collective or universal interest it is essential to guarantee a large level of common interest which requires not only a wider participation in decision-making, as proposed above through the suggestion for alternative channels for listening to people, but also a greater scope for the consumption of collective goods.

This is a suggestion made by Gouverneur (2006) for a more democratic society. He points out that there are three types of goods in our societies: i) individualized goods, which are acquired with personal income; ii) goods acquired through policies of solidarity, because they are financed by social security or social policies; and iii) collective goods, which are

* For the evolution of inequality and poverty in the world and their relation with market behavior, see, for example, the conclusions of Piketty (2013).

financed by taxes but are free at the point of consumption. In his opinion, a democratic society must increase the share of collective goods. This means that not only do we have to have public education and public health, but also public transportation, public leisure and a lot of public goods and services accessible to everyone regardless of their income or wealth. Consumption by both rich and poor people is absolutely necessary because it guarantees the high quality of the goods and services, since rich people form opinion in market societies, and they have the political power to guarantee their supply. This is the most appropriate way to improve the general interest, because it gets everyone involved in the struggle to ensure a good quality of goods and services produced. It is the best way to guarantee a good quality of public goods, and also a way.

Even the environment can benefit from a larger share of collective goods. This saves natural resources, reducing the production of private goods and services and expanding the collective ones that tend to save resources because of their higher scale of production. It also engages everyone in the task of setting priorities, in the choice of what to produce and how to do it in a more conscious way.

5.3. Developing Cooperation instead of Competition

We saw that one of the problems with globalization is the fierce competition imposing or requiring the maximization of profits and giving rise to an increasing concentration of capital in the hands of those who are better placed in the competition process. Competition also tends to increase technological unemployment and the problems related with the environment, because it compels capitalists to maximize profits, regardless of the environment costs involved, provided that the pollution fines and taxes can be passed on prices.* Finally, the spur of competition in the current phase of globalization gives rise to the need for obtaining profits rapidly, stimulating the quest for speculative profits instead of investments in real production, which has been responsible for the financialization of the economies and the current crisis.

To avoid those adverse consequences but, especially, to achieve more equality among people as we are proposing in this article, it is essential to change the competitive logic into a cooperative one. Cooperation is needed in the decision-making process, and on the management and enjoyment of what society and its development can provide. Decision-making, planning and management must be shared to help build the universal interest and they are also a condition for a sustainable development in human, social and environmental terms. Although we do not have space here to give more details, there are some interesting experiences in this respect, as is the case of community's councils, participatory budget, and some cooperative experiences (Devine, 2012 a and b; Campbell, 2011).

6. Conclusion

We have discussed globalization from an economic point of view, and pointed out that it has some features that, instead of producing positive outcomes, as is expected by mainstream

* The mainstream solution to environmental damages, imposing taxes and fines is open to criticism because it preserves inadequate behaviors, giving moneyed people the right to cause damages provided that they pay for them in a pecuniary way.

economics, generate significant economic problems. The two main features of globalization stressed here are the extension of market relations, and the spur of competition. The consequences in terms of greater inequality and instability around the world make the prescriptions of the economic mainstream questionable.

In order to support a change in the currently dominant paradigm in economics, we have also discussed some ideas associated with heterodox economic thought, showing that those adverse consequences were foreseeable in the heterodox analysis of the market regulation and of competition.

In order to confront the challenges of the global society we have proposed some measures to reduce inequality, especially through the re-regulation of the economy in order to protect jobs, listening to everyone, by way of creation of channels for listening to people other than through the market; increasing the participation of people in planning, management and the enjoyment of society; and, in this manner, building the collective or universal will. These are measures that can help to build the material conditions for a better society.

These suggestions can help to secure a more sustainable form of development in human and social terms, and they also can guarantee a more sustainable environment. The alternative channels of listening can improve the preservation of environment in the sense of offering a more efficient way of prioritizing what needs to be produced, and the best way to produce for society as a whole. A major part of collective goods in collective consumption can save natural resources used in production by reducing substitute private goods and because of the better efficiency of a higher scale of production. Finally, the tendency that we have also mentioned of wasting as a consequence of technological competition can also be avoided in a society motivated by cooperation.

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Concepts for a New Generation of Global Modelling Tools: Expanding our Capacity for Perception*

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Abstract

It is now more than forty years since the issues associated with the global 'problematique' were widely publicized in Limits to Growth, the pioneering study commissioned by the Club of Rome. In the meantime much has been written, but real action that might lead to a more harmonious and sustainable future has not been forthcoming. Indeed there is evidence that these issues are becoming even more threatening to humankind. There is an apparent inability of human societies to address the global problems of sustainability identified by the Club of Rome more than forty years ago.

This paper advocates the use of global modelling tools as a means of expanding our collective capacity for perception. What is proposed is not the development of another model but the establishment of a process consisting of the design and use of modelling tools to further the explication and communication of understanding, and thereby facilitating both individual and societal action. The proposed approach builds upon the strength of World Dynamics Model as a communications device and seeks to take advantage of scientific and technological advances of the past decades.

1. The Problem

It is now more than forty years since the issues associated with the global 'problematique' were widely publicized in *Limits to Growth*, the pioneering study commissioned by the Club of Rome. Since then, much has been written on the subject. As well, the authors of *Limits to Growth* updated and reiterated the original findings in *Beyond the Limits* [Meadows, 1992]. Innumerable conferences on 'sustainable development' have been held so far.

But real action that might lead to a more harmonious and sustainable future has not been forthcoming. Indeed there is evidence that these issues are becoming even more difficult to deal with and more threatening to humankind. There is an apparent inability of human societies to address the global problems of sustainability identified by the Club of Rome more than forty years ago.

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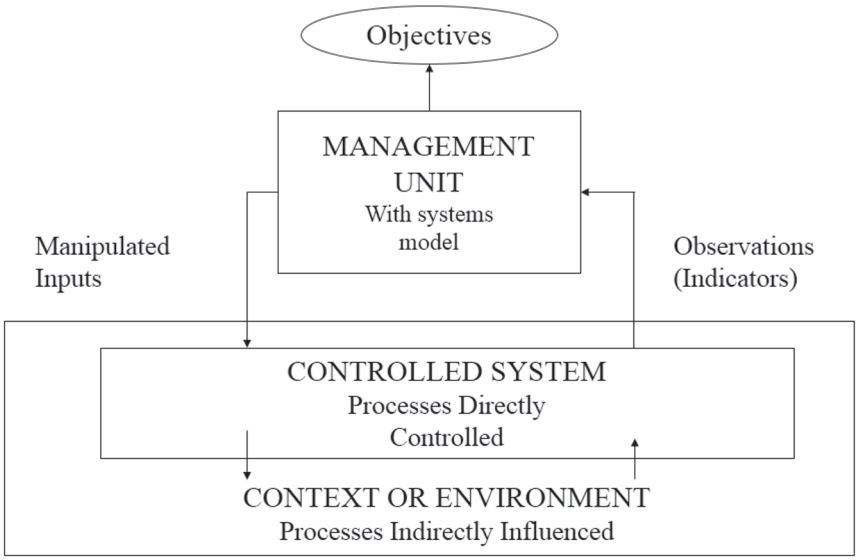
2. Why is this the case?

In the answer to this question lies the key to the current impasse. We approach this question from the perspective of control theory: Effective action arises from a decision process that has three necessary ingredients: a well-defined objective, an understanding of how the system in question works, including how it interacts with its environment, and continuing observations of the state of the system that provide feedback to the system manager.

Figure 1: Effective Action Arising from a Decision Process



The understanding, which is in fact a model of the system—a systems model, plays a pivotal role in the decision process. It serves to identify the set of state variables or indicators to be observed or monitored and relates the observed state variables to the objective, in this way providing feedback to the decision making process. The systems model also supports the choice of objectives by facilitating the definition and exploration of alternatives.

In this context, it is worth recalling the cybernetic theorem, the Law of Requisite Variety, which states that the regulation that the regulator can achieve is only as good as the model of the reality that it contains [Ashby, 1956].

> *It comes down to this: we cannot regulate our interaction with any aspect of reality that our model of reality does not include—whether as to its theoretical range or as to its observational facilities and resolution—because we cannot by definition be conscious of it.* [Beer, 1980].

The systems models associated with the decision processes which give rise to individual actions are seldom explicit, nor is the individual even conscious of their existence [Maturana and Varella, 1980, Senge, 1992, Erlich and Ornstein, 1989].

"Just as 'temperature' and 'pressure' are properties that apply to a gas, not to the individual molecules that constitute the gas, sustainability is a property of the global ecosystem, not its constituent processes."

In the application of this framework to the issues of the global problematique, a number of problems become apparent.

(a) If we accept the concept of sustainability as the 'objective', three complicating features arise. First, sustainability is a comprehensive concept; it is a property that applies to a system as a whole. Just as 'temperature' and 'pressure' are properties that apply to a gas, not to the individual molecules that constitute the gas, sustainability is a property of the global ecosystem, not its constituent processes. Second, sustainability has a clear reference to the future as it is concerned with the persistence of harmonious relationships between human activities and the environment indefinitely into the future. Third, the sustainability of human populations is an objective that is potentially in conflict with the objectives of individuals.

(b) In the case of global problems, the 'manager' or controller is society itself: individuals and the institutions of society that have been delegated responsibility for managing various aspects of human activities. Since this 'manager' system is obviously not monolithic, effective action will depend upon managers having a common understanding or shared systems model.

(c) The understanding of the system is (i) incomplete to the extent that specific processes are not understood and (ii) fragmented in that partial systems models exist in narrowly defined disciplines. These various systems models are uncoordinated with the consequence that understanding of the system as a whole is impeded.

(d) The implicit perceptual apparatus that guides individual actions is dysfunctional to the extent that is far too limited in time and space. Peter Senge argues that *if we're really trying to create a whole new domain of behavior, actions and possibilities, ... , then we have to become conscious about it.* [Senge, 1992]

(e) In the absence of widely shared understanding or common systems model, the feedback loop from observations of the system to the system manager is weak. The property of sustainability cannot be directly observed or monitored because it is a property that applies to the future of the system and the future of the system is not fully determined or indicated by its present state.

From the discussion above, it is clear that a conscious and explicit systems model plays a crucial role in developing and communicating a common understanding needed for effective interpretation of the observations and for both individual and collective action.

"The scientific method is reductionist and by itself is inappropriate for holistic analysis of evolutionary systems (of which humanity is an integral part)."

It is equally clear that the written word has failed to develop this common understanding. Much of the writing on the subject of the 'problematique' takes the form of expert analysis followed by prescription, a form that combines elements of verbal description and persuasion. Verbal description, relying on the linear subject/predicate cause/effect constructs of language, has not proven to be effective in describing acausal and complex systems; persuasion, relying on rhetorical technique and selective arguments, may trigger action, but seldom convey understanding. Prescriptions made by 'experts' are increasingly suspected by a vast majority of people who believe they are not capable of understanding but have learned through experience not to trust such pronouncements. Argument, according to Northrop Frye, relies on the arrangement of data. Arrangement means selecting for emphasis, and selecting for emphasis can never be definitively right or wrong [Frye, 1990].

John Ralston Saul neatly states this point in his book, *Voltaire's Bastards*, when he observes, with respect to the Western world, that:

> *Our unquenchable thirst for answers (for 'answers' read 'prescriptions') has become one of the obvious characteristics of the West in the second half of the twentieth century. But what are answers when there is neither memory nor general understanding to give them meaning? This running together of the right answer with the search for truth (for 'truth' read 'understanding') is perhaps the most poignant sign of our confusion.* [Saul, 1992]

The scientific method, relying as it does on controlled and repeatable experiments, does offer a powerful means of communicating understanding. But the scientific method is reductionist and by itself is inappropriate for holistic analysis of evolutionary systems (of which humanity is an integral part) which are structures fixed in space and time. These systems are subject to constant and irreversible change.

We believe that the success of the World Dynamics project may be attributed to its ability to communicate an understanding of a complex and dynamic system through the description of the structure of a mathematical systems model [Forrester, 1971]. This experience suggests that a computer based simulation model that can be used to explore the future consequences of societal actions may be an effective means to communicate the understanding needed for effective societal action.

3. World Dynamics Model

Perhaps, the single most effective project undertaken by the Club of Rome was the development of the World Dynamics Model. The Club of Rome commissioned the project to a team of researchers at the Massachusetts Institute of Technology led by Jay Forrester using the system dynamics methods previously developed by Forrester. The results of the project were published in two volumes: *World Dynamics*, a description of the World Dynamics Model [Forrester, 1971]; and *Limits to Growth* [Meadows, 1972]. The authors of *Limits to Growth* concluded that:

1. If the present growth trends in population, industrialization, pollution, food production, and resource depletion continue unchanged, the limits to growth on this planet will be reached sometime within the next 100 years. The most probable result will be a sudden and uncontrollable decline in both population and industrial capacity.
2. It is possible to alter these growth trends and to establish a condition of ecological and economic stability that is sustainable far into the future. The state of global equilibrium could be designed so that the basic material needs of each person on earth are satisfied and each person has an equal opportunity to realize his or her individual human potential.

"In the final analysis, Limits to Growth failed to stimulate the action that might lead to a more harmonious and sustainable future. Why?"

3. If the world's people decide to strive for this second outcome rather than the first, the sooner they begin working to attain it, the greater will be their chances of success.

Limits to Growth served to identify the two most dominant elements of what came to be known as the world problematique, a term associated with the Club of Rome, namely the population explosion and the macro impacts of human activities on the environment.

Limits to Growth is remarkable for its success: some 10 million copies in thirty languages have been sold worldwide; it stimulated debate, generated the controversy that gave recognition to the Club of Rome, and brought about an increased awareness of the interactions that take place among the elements of the problematique. Yet in the final analysis, *Limits to Growth* failed to stimulate the action that might lead to a more harmonious and sustainable future. Why?

It may be that the inevitability of the overshoot and collapse predicted by the World Dynamics model led implicitly to the conclusion that nothing could be done with the consequence that nothing was done. However, the inevitability of the overshoot and collapse predicted by the model may be as much an artifact of both the paradigm to which the model belongs and the structure of the model as it is an accurate reflection of how human societies interact with global systems.

The World Dynamics Model belongs to the deterministic natural science paradigm in that it represents a closed system and presumes that the future of the system is predictable to the extent that the model captures the laws of motion of the system. It makes the user of the model an observer of a (closed) system rather than an integral part of an open system. The deterministic character of the World Model, by its nature, excluded the possibility that human societies can learn and adapt. The relationships of the model represent both the dynamics of the interactions among physical transformation processes and the behavioral responses. The Model does not have a direct representation of 'process'; rather it represents stocks and the factors that influence the rate of change of stocks. The system of feedbacks, both positive and negative, is complete. Human response, one of the factors that may influence the rates of change of stocks, is triggered by the levels or rates of change of stocks. The model structure is such that human decisions are based only on what has happened; it does not represent the fact that human decisions are based on expectations of what will happen. Furthermore, expectations of what will happen are subject to change as humans gain a greater understanding of the world. For these reasons the natural science paradigm is inappropriate in circumstances where social actors are viewed as the essential forces that structure and restructure social systems [Burns, 1985].

As well, the structure of the World Dynamics Model contributes to the inevitability of collapse. The Model portrays a human population living off a non-renewable resource base; as there is no spatial differentiation, the population is homogeneous and the resources are equally accessible to all. Ultimately, the system is rate limited, not stock limited and it is the renewable resource base and the rate at which solar energy is used to fuel the biological process of photosynthesis that will determine the sustainability of human populations.

Many of the shortcomings of the World Dynamics Model were addressed in the Mesarovic-Pestel Model which introduced the concept of organic growth in a spatially differentiated world; it also introduced an explicit accounting for energy [Mesarovic, 1974].

4. A New Approach

What is needed is a new approach that builds on the strengths of the World Dynamics Model and its successors and that emphasizes the process of designing and using computer-based global modelling tools as a means for developing the common base of understanding needed for effective societal action.

Such an approach is feasible because of advances in our understanding of ecological systems, the emergence of an evolutionary paradigm to augment the deterministic natural science paradigm, and a revolution in computer technology.

The evolutionary paradigm reflects advancements in the fields of general systems theory, information theory, control theory, and ecology. References are provided in the bibliography. (See particularly the work of Jantsch, Prigogine, and Bateson.) Ervin Laszlo describes the evolutionary paradigm in the following terms:

> *The evolutionary paradigm challenges concepts of equilibrium and determinacy in scientific theories; and it modifies the classical deterministic conception of scientific laws. The laws conceptualized in the evolutionary context are not deterministic and prescriptive: they do not uniquely determine the course of evolution. Rather, they state ensembles of possibilities within which evolutionary processes can unfold.* [Laszlo, 1987]

From this it is evident that models intended to predict or prescribe are of little interest. Rather what is required is a set of tools for exploring the 'ensemble of possibilities' of the evolutionary paradigm. The need is not for a 'better' model that might be developed within the confines of a small group to further the advocacy power of that group; rather it is to use the process of designing and applying global modelling tools to facilitate the communication of understanding within as broad a group of actors as possible.

The word 'tool' is used deliberately, as a tool is an extension of the user of the tool. The use of well-designed tools enhances the ability of the user to accomplish explicit tasks. A shovel facilitates the task of digging a hole and extends mechanical capabilities; a ruler makes more accurate the recording of the property of length of objects; a telescope enables visual perception of objects that could otherwise not be seen. Knowledge of the availability of tools suggests tasks or objectives that would not otherwise have been considered. The global exploration tools herein proposed are intended to enhance the ability of individuals and societies to understand the longer term implications of societal actions and to explore alternative global futures.

With this background, we conclude that there is both need and potential for the development of a generation of global modelling tools that can serve to facilitate and communicate a more appropriate model of reality such that human society can perceive the full consequences of actions. Such modelling tools can take advantage of both theoretical and scientific advances and advances in computer technology.

What follows is an outline of the features and characteristics of such global modelling tools and a discussion of the strategies for the organization of their development.

5. Features of the Proposed Global Modelling Tools

- **The User/Society as an Integral Part of the System:** The systems model consists of two components: an open simulation framework that represents the processes of the system to be managed with their context and the user/society that is the source of novelty or learning. Through interaction with the framework, the user/society explores the implications of decisions and changes in the environment. Exploration is a learning process that enables the user/society to increase his understanding of the system. In this way learning from experience can be incorporated into the framework.
- **The Concepts of System, Process, Dynamics:** A simulation framework is a representation of the processes that constitute a system. The system of concern for the

issues of the problematique is human activities and the naturally occurring biological and geological processes that sustain human populations. A fundamental concept of systems theory is that (The concept of) "*process is primary… every structure we observe is a manifestation of an underlying process*". [Capra, 1985]. 'Process' is a dynamic concept concerned with the transformation of input streams into output streams within an arbitrary system boundary. The properties of the system as a whole, such as sustainability, emerge from the interactions among the constituent processes and are not simply the properties of the component parts. The representation of time structure is essential. *Interactions among component processes take the form of causal chains that may be complex. When sequences of cause and effect become circular, then the mapping of those sequences onto timeless logic becomes self-contradictory or paradoxical*. [Bateson, 1980]

- **Stocks and Flows:** *Another taxonomic and conceptual problem that has plagued economics from the time of Adam Smith is the confusion between stocks and flows… The capital stock is a population of items, production is births into that population, consumption is deaths… Furthermore, the idea that production is consumption is only partly true. What we get satisfaction from for the most part is use, not consumption… This has led to… the absurd view that it is income which is the only measure of riches*. [Boulding, 1978]. The simulation framework should keep track of the evolution of stocks of human population, the stocks of artifacts constructed by those populations for their use, stocks of land, stocks of biological resources, and stocks of geological resources, and it should keep track of the flows of materials and energy from the environment as they are transformed into the artifacts used by human populations and returned to the environment as material and thermal waste. Stock/flow accounting identities are used to maintain coherence over time; supply/disposition flow identities are used to maintain coherence within time periods.

- **Disequilibrium and Tension:** The simulation framework should be designed in such a way that the system of feedbacks among the processes represented in the framework is incomplete. To the extent that the feedback mechanisms are incomplete, the possibility of discord or disequilibrium among the constituent processes arises. This discord creates tension in the mind of the actor or framework user that invites a creative response. It is this idea of tension arising from disequilibrium that makes the user of the framework an integral part of the model. Equilibrium has become a kind of holy sacrament in economics and has seriously diverted attention from the real world of Heraclitean flux… The economic system is a structure in space-time. Consequently, it is evolutionary, subject to constant and irreversible change. [Boulding, 1988]

- **Spatial Scale:** The spatial scale of the simulation framework should of course be global, but the world should be subdivided into a sufficient number of regions to reflect differences in culture, lifestyle, resource endowments, and power. The framework should represent the flows of people, materials and energy that cross the regional boundaries. The number of regions to be represented will also depend on the nature

of the processes to be included. The simulation framework will be designed so that more detailed representations involving more regions could readily be developed as the framework evolves.

- **Temporal Scale:** The temporal scale of the simulation framework should span a sufficient past that we can see where we are coming from and a sufficient future that the possibilities for sustainability can be explored. The accumulation of past actions to the stocks that presently exist must provide the starting point for future explorations; in this sense, future possibilities are constrained by past actions. *Trying to sharpen one's sense of the future is useless, as the future has no existence; trying to see the present as an interim in which anything may go at any time merely adds to the mood of destruction. Not everything that can happen will happen: we have to understand what kind of people we are before we can begin to guess what we shall do. What kind of people we are is perhaps determined, and certainly conditioned, by what we realize of the past, and sharpening our sense of the past is the only way of meeting the future*. [Frye, 1982] Different processes have different time dynamics; very slow moving processes such as geological processes may be ignored or represented as stocks; fast moving processes may exhibit seasonal or cyclical patterns and are represented as stock/flow structures.
- **Structure:** The simulation framework should focus on the representation of those physical transformation processes that are of significance for the relationships between human population and the natural resource base. Of great importance are processes associated with the renewable resource base; processes affecting soil quality, forest growth, processes yielding nutrients, processes transforming primary sources of renewable energy into useful energy forms. In the final analysis, the level of human population that can be sustained will be determined by renewable resources and the effectiveness with which they can be used to provide nutrition and energy for extracting and recycling materials.
- **Adaptability:** Since it is difficult to foresee all the structures and transformation processes that need to be represented, the simulation framework must be open ended with respect to the addition of processes. Each process or group of processes can be independently modeled; these sub-models can be linked together to form the simulation framework. This module management process should support the creation and modification of sub-models as well as the linking of these new or changed sub-models in a manner as flexible and transparent as possible.

6. Development Strategy

A key feature of the proposed approach is that the understanding arises from interaction with the framework in the process of exploration. The communication of understanding is achieved when a number of people share the experience of interaction. If common understanding is to lead to improved societal decision-making, the correspondence between the framework and reality must be accepted both in terms of the processes that constitute the framework and the representation of those processes.

The acceptability and impact of the proposed decision tools will be greatly enhanced through involvement of as wide and as diverse a set of interests as possible in the process of designing the structure of the framework. This key assumption reflects extensive experience with complex decision systems involving diverse and competing interests.

The primary task will be conceptualization and construction of sub-models. This task will require people with expertise in modelling, theoretical knowledge of the sub-model issues and relevant field experience. Many of these will be potential users of the Global Exploration Tools. University groups or research institutes are best equipped to take the lead in the conceptualization and associated data collection and calibration tasks. A key requirement in the management of sub-projects would be to ensure the ongoing participation of organizations with interest and experience in the subject areas concerned.

Since the proposed Global Exploration Tools have the capability of "learning", their utility will increase through use. Thus, users will become collaborators in future development of the framework. Mechanisms for feedback and update of the framework will thus need to be developed.

At each stage in the development process, it is important to consider potential users of future generations of the framework and seek their involvement. Conceptually, the Project could be viewed as a knowledge system in which knowledge development is integrally linked with knowledge application within a structure which encourages feedback through rewards of utility. Identification of knowledge networks and involvement of key players in such networks become important components of development strategy.

7. Epilogue

The author is aware that this paper is itself an example of an argument intended to persuade the reader, and, as such, is subject to the weaknesses implied by Frye's criticism. In the spirit of learning through experience, we invite the reader to explore the concepts described in this paper using a computer based simulation framework, the Global Systems Simulator, developed by ROBBERT Associates. The GSS is a process based simulator that embodies many of these concepts.

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Socioeconomic and Environmental Performance:
A Composite Index & Comparative Application to the USA & China*

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Abstract

This paper deals with an analytical framework to provide a measure of overall performance which involves both socioeconomic activities and environmental sustainability using a recent Index of well-being. The composite indicator, created by Medrano-B & Teixeira (2013), is associated with the so called "Magic Square", a diagram stimulated by the work of Kaldor (1971). From this starting point, we introduce a set of four variables to measure their total impact on the sustainable development of regions. They are: human development index, per capita carbon dioxide, drinkable water and sanitation, and intensity of renewable energy measured as a fraction of the total generated energy. This formal approach is applied to the comparative performance of the USA and China from 2002 to 2012. As expected, environmental, socioeconomic and institutional indicators affect the level of welfare. This being the case, an important lesson to be learned is that careful regulation and policy actions, not just proposals, are required to implement a sustainable and acceptable quality of life. In this article we complete the argument by suggesting that a new paradigm is required to fulfill our desirable objectives, and get more out of our intellectual effort, capabilities and political influence.

1. Introduction

Given the current immense accumulation of negative effects on the environment, we wonder at the relative complacence worldwide with the impact of the present patterns of production and consumption. No longer is it only dreamers and visionaries who are alerting society to the deep and undesirable consequences affecting humanity as well as other species and future generations. It is actually interesting to observe the relative alienation, silence and apparent indifference of many people and governments in this matter. We need urgent action to change the present situation. However, we must recognize that actions and changes, without

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precise thought and clear goals, are counterproductive. In this vein, the major challenge for humanity is to develop a shared socioeconomic vision desirable to a vast majority of people and ecologically sustainable from a global perspective.

This paper is the product of a research agenda the core of which is to design a modeling framework to measure the impact of a set of variables with a composite index of welfare constructed and computed from indicators of trends. The original insight is encountered in the work of Kaldor (1971), but he was only concerned with macroeconomic variables. He did not consider environmental issues nor did he introduce equations or numerical or graphical illustrations in his analysis. Here we extend his method to include aggregated indicators on socioeconomic performance and environmental and sustainable development. We stress that due to the efforts of Karl Schiller and economists of the OECD, an intuitive geometric diagram was established in the 1970s dealing with fundamental macroeconomic variables. This representation, called 'Magic Square', is associated with the size of the area of a figure conceived in such a way that its four directions (N, S, E, and W) are expressed in percentages.

Medrano-B & Teixeira (2013) normalized the mentioned vectors to make them uniform. The area of the quadrangle was calculated due to the non-uniform scales of the axes. This produced an analytical transformation which allows the calculation of the area of the relevant quadrangle. The measure ends up as a composite index of welfare. Such an indicator captures the impact of the re-dimensioned components of the index. The new method was used by Firme & Teixeira (2014) focusing mainly on Brazil's macroeconomic performance. The formal approach is expanded here in order to integrate a set of interconnected socioeconomic and ecological measures to produce a single welfare index.

We believe that a collection of composite indices is necessary for measuring multi-dimensional characteristics which would be hard to explain using a single variable. This is certainly the case with sustainable development. The latter concept remains somewhat elusive since it may encompass a wide set of issues over different time periods, regions and theoretical visions. Under this complex circumstance there is a widely shared consensus that the ecosystem is a non-ergodic dynamic structure. Omitting to describe development in a holistic perspective and to measure its impact for meaningful comparative work is a pressing problem worldwide.

Gasparatos, El-Haran & Horner (2007) argue against a reduced form approach for assessing sustainability of the ecological system. According to them, the use of a single metric to address the environment is a naïve approach to the serious threat confronting society. This is the main reason why we decided to examine the problem by combining a set of composite indicators integrating socioeconomic and ecological variables. Here, special emphasis is placed on the challenges confronted by states in transition.

The present article focuses, simultaneously, on the relationships among four composite key variables: Human Development Index (HDI), Per Capita Carbon Dioxide (CO_2CAP), Drinking Water & Sanitation (WATSAN), and Renewable Energy Intensity as a share of national (total) generation of energy (SHARENEW). We highlight the main reasons

accounting for the fragility of the environment by clarifying the meaning of the above variables and their significance in the process of sustainable development.

Our empirical analysis examines the comparative performance of the USA (an industrial country) and China (an emergent one). We are concerned with the conflicts between economic prosperity and welfare on the one hand, and its ensuing environmental problems on the other. Accordingly, the somewhat prevalent feeling of increasing welfare may well be deceptive and unsustainable. Therefore, solving the sustainability problems of development is required in order to reduce the major environmental threat to the present and future generations of society.

"The common position on efficient allocation of resources remains founded on self-interest and Pareto optimality and is inadequate for treating the complexity of the real world."

Following this introduction, the paper is subdivided as follows: Section 1 centers attention on sustainability and sustainable development. Section 2 presents a composite formulation of a normalized index which measures both socioeconomic and environmental performance. Section 3 estimates socioeconomic and environmental trends for the USA and China at the beginning of this millennium (2002 to 2012). Section 4 presents some concluding thoughts, summarizes policies to promote sustainable development and highlights the main comparative conclusions about the two countries.

2. Sustainable Development and Sustainability: An Overview

It is well known, although frequently obscured, that conventional economic analysis takes for granted two twin assumptions: a) free endowments of natural resources, and b) free disposal of wastes. Accordingly, the environment is envisaged to be, simultaneously, "a horn of plenty and a bottomless sink", as pointed out by Kurz & Salvadori (1997) in the introduction to their article. From the standard perspective of free competition, the environment is basically neglected. They argue: "production can be conceptualized as a process whose inputs are only labor and produced means of production. Thus, outputs are merely commodities". Under these oversimplified conditions, it follows that the environment does not matter and the prices of exhaustible resources are not taken into account. From this standpoint they criticize such approaches and conclude that, despite the progress made in their own dynamic analytical framework, "many more steps will have to follow before one arrives at a moderately satisfactory theory of exhaustible resources".

Indeed, we do not have a complete dynamic model on sustainable development. Such a paradigm is unquestionably desirable for a proper analysis of environmental performance in a world surrounded by uncertainties. Unfortunately, most of mainstream economics literature dealing with the dynamics of the environment tends to obscure some essential

points. Although market failures and externalities are mentioned, they are considered mainly and merely as exceptions. In the same vein, along with questionable propositions connecting living standards to simple productivity, the common position on efficient allocation of resources remains founded on self-interest and Pareto optimality and is inadequate for treating the complexity of the real world.

Despite not being immediately recognized, the publication of *The Limits to Growth* in 1972 did mark the starting-point of an era of criticism of the unquestioned faith in the conventional analyses of the economics of environment. No doubt, an expanding network of persons, worried about the effects on both nature and humankind, started to work out some rethinking. New thought and actions led to increasing doubt and uncertainty about the sustainability of the dominant ecological and socioeconomic organization of society. Jacobs & Slaus (2013) summarize the vigorous debate between the orthodox (or standard) vision and the search for the key elements of an alternative paradigm.

Naturally, a set of seed-ideas was required to highlight the reasons that may account for the fragility of the conventional theory of growth and accumulation of capital. To do so we need to clarify the meaning of "sustainable development" and "sustainability". It is of interest to note that Solow (2012, p. 543), a neoclassical economist, pointed out: "The questions that come to be connected with sustainable development or sustainable growth or just sustainability are genuine and deeply felt and very complex". Those concepts have been defined in many ways, but the most quoted one is from the Brundtland Report (1987), published by the "World Commission on Environment and Development" (WCED), with the title "Our Common Future". It states that "Sustainable Development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (p. 43). "Sustainability", on the other hand, is currently defined as the practice of maintaining the process of productivity indefinitely—natural or manmade—by replacing resources used with resources of equal or greater value without degrading or endangering natural systems.

In our understanding the above definitions contain two underlining views: a) the concept of need is actually concerned with essential needs of the world's poor for which overriding priorities should be given; b) the idea of limitation involves serious considerations on the state of technology and social organization on the environment's possibility in such a way that thought and actions should meet both the present and future needs. Surely, such double foundations require that the physical planet and society should be looked at as a system that connects space and time. These may well be considered important formulations, but they are methodologically problematic, as also emphasized by Solow in the same article, page 544: "If we try to look far ahead, as presumably we ought to if we are trying to obey the injunction to sustainability, we realize that the tastes, the preferences of future generations are something that we don't know about. Nor do we know anything very much about the technology that will be available to people 100 years from now".

Despite the current difficulties, including the economic crisis started in 2007/08, the movement towards better socioeconomic and environmental performance produced some

positive effects worldwide. For instance, one of the main outcomes at the United Nations (Rio+20) Conference held in Rio de Janeiro, Brazil, in June 2012, was the formulation of an agreement by member states to set targets for sustainable development—the future we desire. The objective sought to include the fundamental aspirations of both people and important institutions. Sustainability and the effort towards Global Footprint Network, it may be argued, are to a large degree a 'fait accompli'. However, we need to be cautious in this matter.

"The hardest task is to change deeply held attitudes."

Nowadays, people worldwide are more aware of global climate changes. Alarm about the increasing planetary warming is in the daily press and such global concern does not constitute a novelty anymore. The Synthesis Report of the Intergovernmental Panel on Climate Change (IPCC), in November 2014, from Copenhagen, did spread some scary statistical data and projections on the matter. In the "Approved Summary for Policymakers" (p. 3) the report mentions: "Human influence on the climate system is clear, and recent anthropogenic emissions of greenhouse gases are the highest in history". On the same page, it also mentions that: "Each of the last three decades has been successively warmer at Earth's surface than any preceding decade since 1850". Furthermore, as indicated in page 7, "Cumulative emissions of CO_2 largely determine global mean surface warming by the late 21st century and beyond. Projections of greenhouse gas emissions vary over a whole range, depending on both socioeconomic development and climate policy".

In December 2014 a conference on climate, the COP20, took place in Lima, Peru. It was not a success, but kept open the possibility of some agreement in the forthcoming important meeting, the COP21, which will occur at the end of 2015 in Paris, France. It hopes to establish a global accord on the subject—provided that nations will look beyond their navels and their own frontiers. No doubt, to address effectively the mitigation and adaptation of the present environmental condition, and to identify the path towards the desirable one, raise fundamental issues concerning equity, justice and fairness. They also face varying challenges and capabilities to finance the process of sustainable development.

Most people point to the success of some affirmative actions towards sustainability. However, it may be argued that it is possible to attribute the declining resistance to sustainable development to guilt, indifference and the fear of being accused of old-fashioned or backward thinking. It is important to realize that there is a veiled rationality, sometimes disguised, that can't be ignored. A strange paradox: Sustainable development is desirable but perhaps too costly for the investment projects of most entrepreneurs. Furthermore, it has an invisible enemy: almost no one is apparently against sustainability but the hardest task is to change deeply held attitudes.

The deep understanding of the circumstances, past and present, as well as potential paths towards a desirable future, is not a simple matter. History, statistics, philosophy and values are all required in effective formulations to guide the decision makers. We know that to

generate such models is a difficult task. For instance, the uncertainty or vulnerability of the variables involved, the creative and robust definition of each indicator being used, and the analysis of possible multiple correlations among them can make the comparative analysis of alternative paths quite complex.

We intend here to outline a proposal for a composite index which can evaluate socioeconomic welfare defined to include environmental performance. As pointed out by Marien (2011, p. 139), "Green growth is not a replacement for sustainable development, but should be seen as a subset, in that it is narrower in scope". Nagan & Arena (2014) propose what they consider to be the necessary elements of a new paradigm and seek to locate the new paradigm of political economy in terms of its global reach. We add that, to aspire to and accomplish such an aim we need to construct a vision which serves the planet consciously and not only use it for its own selfish needs, as we have been doing.

In this vein, formal models with strong analytical features are desirable. The resulting empirical analyses, based on both the historical record and projections, may result in propositions for research on the transitions and dynamics of sustainable development. Our composite socioeconomic and environmental Index of Welfare is presented in the next section.

3. Formulation of a Composite Index for Welfare and Sustainability

We need an Index of Welfare which can measure both socioeconomic development and its sustainability. Such a metric should be designed to take into account the health of people of a region, nation or the world, of other species as well as the impact on the natural environment. We consider that the Gross Domestic Product (GDP) or the GDP per capita over time do not capture these features by themselves. Actually, Kuznets (1934), the inventor of the concept of GDP, indicated in his first report to the USA Department of Commerce, Senate document, that he disapproved the use of the GDP as a general indicator of welfare. He noted that "the welfare of a nation can scarcely be inferred from a measure of national income" (p. 7). Hicks (1946) also pointed out the practical difficulty of using GDP per capita as an objective indicator of a nation's welfare.

There are an increasing number of scholars and institutions working hard on the search for how to go beyond the Human Development Index (HDI). This is the case of initiatives by the European Union, Club of Rome, World Academy of Art & Science, OECD, etc. Surely, the relevant indices of welfare must take into account a wider context and changes in related spheres of human knowledge. To make the required progress in this direction involves visions, values and methods. New theoretical formulations and empirical data are important to capture the dynamics, complexities and sustainability of socioeconomic development.

Fullerton & Stavins (2012, abstract, p. 3) argue that, "Economists themselves may have contributed to some misunderstandings about how they think about the environment, perhaps through enthusiasm for market solutions, perhaps by neglecting to make explicit all the necessary qualifications, and perhaps simply by the use of jargon". We state specifically that the expansion of global output is not a reliable measure of development. This indicator may

encourage a search for unbounded higher productivity and consumption. It may tend to overvalue unviable expectations of sustained higher levels over time. It obscures both current and potential ecological problems. It may somewhat stimulate the expansion of the economy but frequently degrades the environment and even the welfare of both humans as well as other species.

There is an extensive set of models dealing with the relationship between socioeconomic variables and measures of their environmental effects. Most such models are goal-oriented as their authors take their ultimate purpose to be the search for practical ways of improving human welfare. As expected we are unable to build models which can include most of the immense number of indicators or variables that shape the interaction between human behavior, institutions and the environment. From a methodological stand point, we need to set up reasonable abstractions and simplifications of reality. Conceptually, we need to express in simplified forms a number of different alternative representations of a complex whole. In this sense, although one should search for a more encompassing perspective, no doubt, any specific model represents a particular viewpoint. Therefore, the relevant conclusions will be the result of an emphasis on the set of particular factors being considered. Nevertheless, a formal approach is crucial but can be viewed as no more than providing some building blocks for a representation of the complex nexus of reality.

We will propose here a composite indicator of welfare which takes into account social, human and environmental criteria. We believe that our composite index provides insights into comparative development levels which most of the current indicators cannot. In this sense, our model provides a new alternative step to reach a desirable measure.

It is not surprising that we have witnessed numerous attempts to construct composite indices intended either to replace or to complement both GDP per capita and HDI. Some critics argue that while generally held to be politically useful, such new indices have proved to be somewhat redundant in the sense that their values have been shown to exhibit a positive and statistically significant correlation with GDP per capita. It follows that these indices may have failed to encompass what GDP per capita cannot capture.

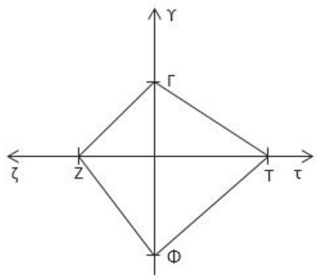
As we mentioned in the introduction, a stimulating starting point to deal with the formulation of a model encompassing the interrelationship involved in the sustainability of development is a seminal article by Kaldor (1971), in which he considers the macroeconomics of the conflicts across national policy objectives. However, he does not deal with the environment. An extended enquiry led to the introduction by Karl Schiller, in the early 1970s, of a graphical representation of Kaldor's original view. A glance at the resulting diagram reveals a diagnosis of comparative performance. This analytical instrument was called a "Magic Square" (MS) and soon after some economists from OECD began to use this geometric apparatus to evaluate economic policies. The "wonderland", which was introduced by OECD, is an ideal configuration which takes into account desirable features of a system composed of a set of variables represented by the larger area of a quadrangle. It involves the calculation of norms or values postulated as idealized references for a given accounting period. To start the procedure, we need reliable information on the numerical values of the variables, and then to find the limits (bounding conditions), designated as "awful" and "desirable" for each.

A "naïve" macroeconomic representation of the MS was formulated by Bernard et al (1988). Medrano-B & Teixeira (2013) modified this approach. The original figure is conceived in its four directions (N, S, E and W) indicated by Υ, τ, ϕ and ζ. All four variables (axes) are originally drawn at different scales expressed in percentages and the adjacent indices are joined by straight lines. The original area of such figure cannot be calculated due to the non-uniform scales of the axes. To construct a proper MS all four scales must be redefined to be uniform from 0 to b, where b is a numerical constant to be evaluated by normalizing the figure to a unit area. A new MS, with a larger area, is drawn not as a square but a diamond-shaped figure. The greek symbols indicating the superior (sup) and the inferior (inf) bounding conditions, given by expression (1). Note that the first inequality has a different sense as we explain in section 3. The respective differences, expressed by (2), lead to the illustration (Figure 1):

$$\Upsilon_{inf} \geq \Upsilon \geq \Upsilon_{sup};\ \tau_{inf} \leq \tau \leq \tau_{sup};\ \phi_{inf} \leq \phi \leq \phi_{sup};\ \zeta_{inf} \leq \zeta \leq \zeta_{sup}. \quad (1)$$

$$\Upsilon_{sup} - \Upsilon_{inf} = \Gamma;\ \tau_{sup} - \tau_{inf} = T;\ \phi_{sup} - \phi_{inf} = \Phi;\ \zeta_{sup} - \zeta_{inf} = Z. \quad (2)$$

Figure 1



The four new corresponding indices, indicated by primed variables, are given by expression (3):

$$0 \leq \Upsilon' \leq b;\quad 0 \leq \tau' \leq b;\quad 0 \leq \phi' \leq b;\ 0 \leq \zeta' \leq b \quad (3)$$

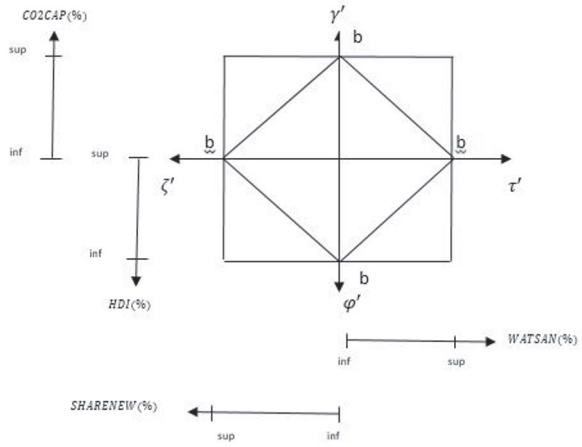
The next step is to find the transformation of the original un-primed to the primed (new) variables. Since all original variables have linear scales, the algebraic transformation constitutes an orthogonal representation leading to a square whose identical sides are obtained by expression (4):

$$\Upsilon' = b\,(\Upsilon - \Upsilon_{inf})/(\Upsilon_{sup} - \Upsilon_{inf}) = (b/\Gamma)\,(\Upsilon - \Upsilon_{inf});\qquad \tau' = b\,(\tau - \tau_{inf})/(\tau_{sup} - \tau_{inf}) = (b/T)\,(\tau - \tau_{inf})$$

$$\phi' = b\,(\phi - \phi_{inf})/(\phi_{sup} - \phi_{inf}) = (b/\Phi)\,(\phi - \phi_{inf});\quad \zeta' = b\,(\zeta - \zeta_{inf})/(\zeta_{sup} - \zeta_{inf}) = (b/Z)\,(\zeta - \zeta_{inf}) \quad (4)$$

Now we illustrate in Figure 2 the visualization of the area of the square, rotated to 45 degrees:

Figure 2



Through a simple algebraic transformation a perfect square with uniform axes is created. Since all the original variables have linear scales, the sides of the new geometric representation are given by expression (4). A' is given by equation (5):

$$A' = \tfrac{1}{2} (\Upsilon'\tau' + \tau'\phi' + \zeta' \phi' + \zeta' \Upsilon') \quad (5)$$

In the next section we will consider the meaning of the four variables involved in the performance of the USA and China. We will also include the relevant statistical data to be used as well as the construction and the result of the Index of Welfare (A').

4. Socioeconomic and Environmental Performance of the USA & China

According to Climate Analytics (2014), the USA and China are responsible for between 35% and 45% of the current world emissions of CO_2. However, neither of these two countries is in the frontier of techniques to improve their respective patterns of energy efficiency. Of course, their joint effort would help considerably to prevent threatening climate change, if they decide to limit the current use of conventional energy and apply an enhanced effort towards a policy of sustainable development. In both countries there is evidence of concern for finding sustainable ways to produce and consume energy. Despite this concern, however, the results have been insufficient to make a major impact on the continuing undesirable transformations of the environment.

In the last few decades, China has taken a big jump in its rate of economic growth. Nowadays, its GNP is about half of the USA while the average per capita consumption of electricity of USA is four times China's. In the last 10 years, the annual growth rate of GNP

was 10.5% compared to USA's 1.6%. Most of it is produced in these economies by burning fossil fuel. In neither is there an important economic sector leading the world in the effort to substitute these fuels for those which can mitigate the effects on climate change. The energy consumption of the industrial sector in China is increasing significantly and recently the national government took some steps in the direction of the use of sustainable energy, but neither China nor the USA is adopting the more environmentally friendly standards of the European Union in this matter. For an illuminating view on the needed institutions and policies, see Costanza et al (2015), which presents a well-worth outlining on this matter.

This being the case, we agree with Johnson (2011, p. 19) that "Our world is headed into a perfect storm of an interconnected financial, ecological and social crisis. Almost all forward-looking assessments demonstrate that business as usual and incremental improvements will not be sufficient to take us to a future world blessed by equitable prosperity, safety and contentment". On the other hand, if the USA and China were to set a good example and start an effective program of sustainable development, we should become less pessimistic about the future of the planet we share.*

The October issue of "Climate Analytics" (2014) indicates that, if China and the USA were to adopt, together, the most ambitious policies of efficiency used by the European Union, it would be possible by 2030 to reduce the emissions of CO_2 to 10% below the current policy projection of "Climate Action Tracker". This may well be a reasonable justification for why we decided to compare here the socioeconomic and environmental performance of these two countries, taking as a theoretical indicator the composite Index of Welfare presented in the previous section.

The results of the present enquiry are somewhat preliminary. They can be considered more of an illustration. We should also mention that our approach does not take into consideration that the relationship between environmental sustainability and sustainable development is to a large extent a function of long term trajectories, and that our time series of statistical data is not long enough. We contend that such long series is not available. To some extent however, it may be justified to try to draw conclusions from the data available even though they are not a totally satisfactory sample.

As an application of the complete set of variables for USA and China, we will use the four variables already defined. To help the exposition, the variables and their extended definitions are shown in Table 1.

In order to calculate the composite index of welfare, we use the period 2002 to 2012. It is worth mentioning that the limits (bounding conditions) we use are based to a large extent on the maximum and minimum values of the four variables CO_2CAP (Υ), WATSAN (τ), HDI (ϕ) and SHARENEW (ζ). They are expressed in percentage changes on the four axes, as indicated in table 2. The meaning of the CO_2CAP has been already explained above.

* Notice that, the USA and China, after a long period of almost secret negotiations, announced, in November 2014, in Beijing, an unprecedented compromise towards the reduction of pollutant gases in an effort to conclude a global agreement on climate change in 2015. However, there is a strong domestic tendency in both countries to postpone such objectives. Anyway, it's better to be pessimistic in this matter, since the result of the agreement will possibly be valid only after 2030 in China and 2025 in the USA.

Here, we consider CO_2 only as a proxy for greenhouse gases (effects) which penetrate the atmosphere, absorbing and emitting radiation. Anthropogenic CO_2 emissions come from combustion of carbon-based fuels (primarily wood, coal, oil and natural gas). Since the beginning of the industrial revolution, the burning of fossil fuels and extensive devastation of native forests has contributed to a 40% increase in the atmospheric concentration of CO_2. The temperature in the planet has gone up 0.8° Celsius since 1880, on average. Furthermore, there is an acceleration of global warming since World War II. This process, if not contained, will drive the planet to a catastrophe.

Table 1: Environmental Variables and Definitions

Name	Definition	Description	Source & Data Link
CO_2CAP **(ϒ)**	Per capita dioxide emissions from the consumption of energy	Metric tons of carbon dioxide	The World Bank Group http://data.worldbank.org/indicator/EN.ATM.CO2E.PC
WATSAN **(τ)**	Access to drinking water & sanitation	Percentage of population with access to improved drinking water & sanitation	Yale Center for Environmental Law and Policy (YCELP) and Center for International Earth Science Information Network (CIESIN), Columbia University http://epi.yale.edu
HDI **(ϕ)**	Human development index	The index combines three major indicators: health, education and living standard.	United Nations Development Program (UNDP) http://undp.org
SHARE-NEW **(ζ)**	Share of renewables in total consumption of energy	Electricity from renewable (hydro, wind, geothermal and solar) plus biomass consumption all divided by the total energy consumption.	Global statistical energy yearbook 2014 https://yearbook.enerdata.net/

Source: The authors' own elaboration from a number of reports

Concerning WATSAN (τ), its welfare implications are quite obvious. To gain access to improved drinking water and sanitation is a vital step towards improving health and well-being. Despite the progress worldwide, the planet remains off-track concerning both targets, for safe water and for sanitation. The economic gains from provision of improved services of drinking water and sanitation must comply with international standards. The adoption of the Millennium Development Goals demonstrated the inadequacies of provision of these services

which were carefully examined in the document. They are important with respect to their ecological, economic and social functions, and also provide important benefits to the ecosystem.

There is no need to emphasize here the importance of the Human Development Index (HDI). However, we should take into consideration that in the 2010 Report a further Inequality-adjusted Human Development Index (IHDI) was introduced. Income distribution and concentration are important indicators of the real wealth of nations. The well documented book by Thomas Piketty (2014) shows that inequality is currently rising in developed countries. He also comments extensively on its harmful effects. In the present article the simple HDI is used. We still do not have a long enough statistical series for an examination of the relevant impact of socioeconomic policies for changing the income distribution on the pathways to human development. For reference, see the United Nations Development Programme's Human Development Report, released in July 2014.

We explain now the SHARENEW indicator. Energy is a vital element in human life and to secure a sufficient and accessible supply is crucial for sustainability in contemporary societies. The demand for energy is increasing rapidly and the trend is likely to continue. Renewable energy—solar, wind, geothermal, modern biomass and hydroelectric—requires appropriate policies and new technologies. Fossil fuels in their crude form, such as wood, coal and oil, have traditionally been used as energy resources extensively. Society has been acknowledging that, although they dominate the market, they present high levels of pollutants, and that a significant effort must be made to reduce their presence in the structure of the planet's economies. This is the reason why we introduce the variable, demand for renewable energy divided by the total expenditures on energy.

Table 2: Environmental Variables—Calculated Data

Environmental Variables (% change)				
	China		**USA**	
	2002-2003	2011-2012	2002-2003	2011-2012
CO_2CAP **(ϒ)**	11,56	8,90	0,07	-6,93
WATSAN **(τ)**	6,19	0,00	0,15	0,00
HDI **(ϕ)**	1,34	4,08	0,53	0,22
SHARENEW **(ζ)**	-12,21	1,58	6,20	1,05

Source: The authors' own elaboration from information in Table 1

Now that the four indicators are described above, it is time to deal with the calculation of the composite index. Naturally, the usefulness of the ideal bounding (wonderland) configuration requires the establishment of suitable numerical values for the four variables. Then, we need to establish the two limits, "awful" and "desirable", for each. Here we introduce statistical data for China and the USA. We estimate the average values for the years 2002/2003 and 2011/2012 in order to compare the changes in the two countries which occurred over the interval of ten years. Such averages of the two years, for the initial and terminal periods, tend to reduce the weight of any peculiarities of an atypical year. The results are shown in Table 2.

Table 3 shows the calculated superior (sup) and inferior (inf) limits given by expressions (1) and (2) as well as the Desirableland* configuration. The perceptions and dimensions of global climate change may, in the long run, prove to be the most significant task in terms of both its potential damages and its cost. We will restrict the discussion to what we view as being the most salient points. Unfortunately, the empirical evidence to date has not provided overwhelming support for any configuration of the Wonderland parameters. However, from historical circumstances, we are able to represent a kind of normative limits, the bounding conditions as explained previously.

To proceed, consider first CO_2CAP. We want to encounter the extreme points (awful and desirable) of the interval corresponding to that variable. In order to determine the lower limit (awful), we just take the average between the observed lower limits on both countries. Notice that this average is taken under the assumption that the worst performance between the two countries gets weight equal to 2/3 and the best one equal to 1/3. We determine the upper limit (desirable) in a similar fashion, but we inverse the weights. In other words, we consider 2/3 for the best and 1/3 for the other. Observe that these weights were obtained through the method of "convergence of opinions in group"—graph algorithm.† Such weights indicate that the former has a superior performance and the latter, an inferior one. We consider the upper limit (desirable) in a similar fashion. We proceed likewise for the remaining three variables.

Table 3: Bounding Conditions and Desirableland

Bounding Conditions		
China	**USA**	**Desirableland**
$11{,}56 \geq \Upsilon \geq 8{,}90$	$0{,}07 \geq \Upsilon \geq -6{,}93$	$7{,}72 \geq \Upsilon \geq -2{,}02$
$0{,}00 \leq \tau \leq 6{,}19$	$0{,}00 \leq \tau \leq 0{,}15$	$0{,}00 \leq \tau \leq 4{,}17$
$1{,}34 \leq \phi \leq 4{,}08$	$0{,}22 \leq \phi \leq 0{,}53$	$0{,}96 \leq \phi \leq 2{,}90$
$-12{,}21 \leq \zeta \leq 1{,}58$	$1{,}05 \leq \zeta \leq 6{,}20$	$-7{,}79 \leq \zeta \leq 4{,}65$

Source: The authors' own elaboration from information in Table 2.

* Notice that in the configuration of the empirical data, we changed the expression Wonderland to Desirableland, due to the fact that the first is an ideal vision and the second is only concerned with the potential performance in given historical circumstances.

† This technique is related to the Delphi approach, mainly developed by Dalkey & Helmer (1963), for achieving convergence of opinions concerning real-world knowledge solicited from experts. This led to a mathematical structure—the graph theory.

Thus, according to expression (2):

$$\Upsilon_{sup} - \Upsilon_{inf} = -9{,}74 \qquad \tau_{sup} - \tau_{inf} = 4{,}17 \qquad \phi_{sup} - \phi_{inf} = 1{,}94 \qquad \zeta_{sup} - \zeta_{inf} = 12{,}44 \qquad (7)$$

Since the numerical value of b has been already defined (square root of 2 divided by 2), we will substitute this value in expression (4). This leads us to the transformations required to obtain the corresponding numerical values of the four original variables given by the Greek symbols. That is, the primed ones given by the set of expressions (7). As an example, we will take the transformations of Υ and then ϕ.

$CO_2CAP\ \Upsilon$:

$$\Upsilon' = \frac{(b\ (\Upsilon - \Upsilon\ inf))}{\Gamma}$$

$$\Upsilon' = \frac{(\sqrt{1/2}\ \ (\Upsilon - 7{,}72))}{-9{,}74} = \frac{(\sqrt{1/2}\ \ (7{,}72 - \Upsilon))}{9{,}74} \qquad (8)$$

HDI ϕ:

$$\phi' = \frac{b\ (\phi - \phi\ inf)}{\Phi}$$

$$\phi' = \frac{\sqrt{1/2}\ \ (\phi - 0{,}96)}{1{,}94} \qquad (9)$$

In the same way, we can find the scale transformations of the other two variables:

$$\tau' = \frac{\sqrt{1/2}\ \ \tau}{4{,}17} \qquad (10)$$

$$\zeta' = \frac{\sqrt{1/2}\ \ (\zeta + 7{,}79)}{12{,}44} \qquad (11)$$

Substituting the values of Table 3 in the equations (8) to (11), we obtain the following results:

Table 4: Impact of environmental variables in the index over ten years

Country	**Υ'**	**τ'**	**ϕ'**	**ζ'**
China	0,019	0,104	0,100	0,078
USA	0,051	0,005	0,012	0,029

The area of the square (Desirableland), corresponding to the figure 2 is equal to 1. Now, we calculate the representative areas for the USA and China, given by expression (6).

Table 5: Magic Square's areas

Index of Economic Welfare and Sustainability(% change)		
Country	**2002-2003**	**2011-2012**
China	1,00	83,47
USA	7,00	37,75

Considering the growth rate of the index in ten years, we obtain:

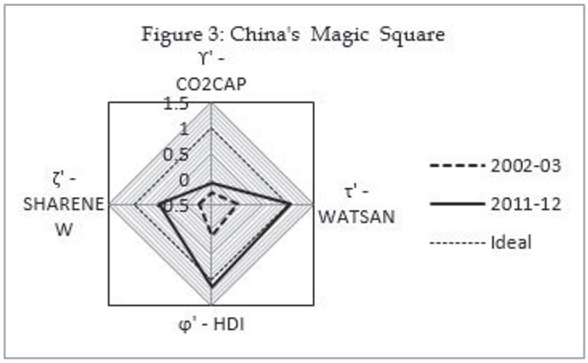
CHINA:

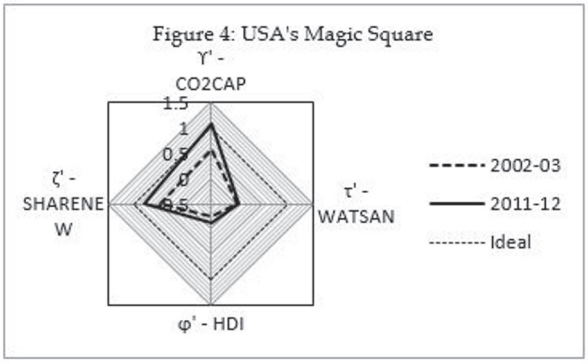
$$\frac{(\Delta A^{\wedge}')}{\Delta t} = \frac{83,47-1,00}{10} = 8,\ 24\%/\text{year}$$

USA:

$$\frac{(\Delta A^{\wedge}')}{\Delta t} = \frac{37,75-7,00}{10} = 3,\ 07\%/\text{year}$$

Now, in Figure 3 and 4, we can visualize the results obtained through Kaldor's Magic Square.





In table 4, we note that China obtained results more impressive than the USA in majority of the variables. Analyzing HDI and WATSAN, the Asian country has performed very well (ϕ'=0,100; τ'=0,104), which is a considerable leap forward in the social area. In compliance with the United Nations Development Program (UNDP), this social improvement occurred due to the significant economic growth that was achieved, especially, the income per capita. Moreover, it appears that governmental support and political willingness became the main driving force to improve the water and sanitation services.

"It is not just an economic question of increasing efficiency (productivity) in order to guarantee growth, distribution and accumulation of capital. The new paradigm requires the much larger dimension of the socioeconomic process and its sustainability."

The USA also had a good performance in these indicators (ϕ'= 0,012; τ'= 0,005). Since 2002, the USA has shown improvements in all areas including the HDI. Furthermore, it has one of the best systems of basic sanitation in the planet. According to the World Bank, almost all citizens have access to treated drinking water and piped sewage.

In relation to SHARENEW, China (ζ'= 0,078) and the USA (ζ'= 0,029) made only little progress in ten years. The Chinese environmental commitment is based on geopolitical and other factors. The country became a major consumer of petroleum. Consequently, the dependency on imported fossil fuels has increased, which is always a risk in the context of an emergent country. Moreover, the consumption of oil and, especially, coal has been creating negative consequences domestically. The number of cases of respiratory diseases in China's big cities has been growing exponentially because of the air pollution caused by the burning of coal. To solve these problems, the government is investing substantially in renewable sources of energy. This reality is captured in China's result for CO_2CAP (Υ'= 0,019). On the other hand, the USA reduced their $C0_2$ emissions significantly in the last ten years, which can be observed in the CO_2CAP result (Υ'= 0,051). According to the U.S. Energy Information Administration (EIA), the country recently started the transition to a low-carbon economy. One example of the new measures put into place by the government was the switch from coal to natural gas in energy production.

5. Concluding Thoughts

In this paper, we have proposed and made use of a composite indicator of welfare which takes into account social, human and environmental sustainability. Our composite indicator provides insights into the development patterns of any given region. Such comparisons are welcome as attempts to quantify patterns which can allow us to rethink the notions of growth, distribution and ecosystem performance in the different countries. Here we concentrated our

effort in the comparison between only the USA and China. We took as reference period the years 2002-2012 and four composite key variables: Human Development Index (HDI), Per Capita Carbon Dioxide (CO_2CAP), Drinkable Water and Sanitation (WATSAN), and Renewable Energy as a share of total energy use (SHARENEW).

"The transition towards a new paradigm involves an international movement which integrates the natural and social sciences in order to address the prerequisites for sustainable development."

We conclude that although the level of welfare and degree of sustainability is much higher in the USA in comparison with China, the comparative welfare performance of the latter, in the period studied, is much higher than in the USA. It means that China has been exerting a stronger effort than the USA in this direction. It happens that we are not sure that such effort is sustainable.

It is unreasonable to be anticipatory and prescient about the future, but the dominant economic paradigm may lead to major challenges. We need a new economic paradigm involving new visions and solutions which have to be implemented. It is necessary to understand that the fundamental problems all living species face are very severe. It is not just an economic question of increasing efficiency (productivity) in order to guarantee growth, distribution and accumulation of capital. The new paradigm requires the much larger dimension of the socioeconomic process and its sustainability. As pointed out by Joan Robinson (1977, p. 1337), "These questions involve the whole political and social system of the capitalist world; they cannot be decided by economic theory, but it would be decent, at least, if economists admitted that they do not have an answer to them".

Naturally, the transition towards a new paradigm involves an international movement which integrates the natural and social sciences in order to address the prerequisites for sustainable development. This movement requires synergy and action through interconnections across research centers at an international level. This deep cooperation is necessary to improve the data and quality of research on topics such as low carbon transitions, global warming, environment, ecosystem services and their accompanying socioeconomic policies.

The basic problem is: in any complex chain of events, there is a fundamental asymmetry between the present (status quo) and the future. During the transition, each element of the chain may break down when it encounters an almost infinite set of uncertainties. When this happens, the narrative may become unpleasant and the prospective path to be followed doubtful. This may allow people and their governments to conclude, erroneously, that it is better to hold on to the current ways. However, this is a naive perception. Actually, creating the shared vision of a new paradigm of a sustainable and desirable material future, is perhaps the fundamental task facing humanity today.

The previous paragraph may give some readers the false impression that nothing really important can be attained by a single individual dealing with the difficult problems posed by the theme of our enquiry. It is true that group research presents great advantages. However, it may be useful to recall the first paragraph of Hahn (1989. P. 13): "those individuals who are endowed with a special genius for the subject and have a powerful economic intuition will often be more right in their conclusions and implicit presumptions than in their explanation and explicit statements. That is to say, their intuitions will be in advance of their analysis and their terminology. Great respect, therefore, is due to their general scheme of thought, and it is a poor thing to pester their memories with criticism which is really verbal". [J.M. Keynes (1924) quoted by Hahn in Kaldor (1972. p. 1249, n. 1)].

"We need a new paradigm of sustainable development, but to improve the possibility to attain success in the implementation of new visions and policies, we must be capable of measuring, analyzing and hedging the relevant variables which can help to improve the commitment of the relevant institutions."

Environmentalism is a social and political tendency that is concerned about the conservation, improvement and sustainability of the ecosystem. This movement has now become worldwide and it is no wonder that scholars, national and international institutions are catching the "green fever", and especially the issue of how to circumvent the global warming trap. The impulses for "going green" are now multiplying faster than was expected a few years ago. However, without a solid socioeconomic foundation, the green movement will scare people and governments. We need a new paradigm of sustainable development, but to improve the possibility to attain success in the implementation of new visions and policies, we must be capable of measuring, analyzing and hedging the relevant variables which can help to improve the commitment of the relevant institutions. Otherwise, a number of risks will be faced by society when new programs of sustainability are implemented.

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Three Global Sustainability Leaders:
Pope Francis, Jeffrey Sachs, and Nicholas Stern

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Global temperatures are rising, along with droughts, floods, storms, wildfires, and melting of glaciers and tundra. Concern about climate change and sustainable development is necessarily growing. Three of the most important recent books and reports are reviewed here, as an introduction to major thinking about what must be done.

I. Pope Francis on Integral Ecology and a New Dialogue

The most widely-known of the recent documents on environmental issues and the human condition is ***Laudato Si': On Care for Our Common Home*** (Libreria Editrice Vaticana, July 2015, 160p), addressed to the world's 1.2 billion Catholics—and beyond. This Encyclical Letter is composed of 246 numbered paragraphs in six chapters, starting with an explanation of "LAUDATO SI', mi' Signore"—"Praise be to you, my Lord," a canticle from Saint Francis of Assisi reminding us that our common home on earth is like a sister with whom we share our life and a mother who embraces and sustains us. Other paragraphs in the introduction refer to Encyclicals expressing ecological concern from previous Popes, echoing "the reflections of numerous scientists, philosophers, theologians and civic groups, all of which have enriched the Church's thinking." (paragraph #7)

After extolling Saint Francis as "the example par excellence of care for the vulnerable and of an integral ecology lived out joyfully and authentically" (#10), Pope Francis summarizes his appeal: "the urgent challenge to protect our common home includes a concern to bring the whole human family together to seek a sustainable and integral development… I urgently appeal, then, for a new dialogue about how we are shaping the future of our planet" (#13-14).

Chapter One, "*What Is Happening to Our Common Home,"* questions continued acceleration of changes affecting humanity and the planet, coupled with a more intensified pace of life and work. Topics include pollutants producing a broad spectrum of health hazards (#20), dangerous waste that is often non-biodegradable (#21), a throwaway culture that reduces things to rubbish and has yet to develop a circular model (#22), a disturbing warming of the climatic system (#23), melting of the polar ice caps and release of methane gas (#24), the rising number of migrants fleeing from poverty caused by environmental degradation, with widespread indifference to such suffering (#25), the urgent need to drastically reduce greenhouse gases in the new few years (#26), the quality and quantity of fresh drinking water (#27-31), loss of biodiversity as earth's resources are plundered (#32-42), decline in the quality of human life as many cities become unhealthy places (#43-44), increased violence

and growing drug use (#46), overload and confusion in the new digital world (#47), too much blame on "population growth instead of extreme and selective consumerism on the part of some" (#50), growing inequality within and between countries (#51), lack of "the culture needed to confront this crisis…leadership capable of striking out on new paths" (#53), too many special interests and "sporadic acts of philanthropy," too much superficial rhetoric, and the failure of global summits (#54), the rise of a superficial ecology that "bolsters complacency and a cheerful recklessness" (#59), and "signs that things are now reaching a breaking point, due to the rapid pace of change and degradation" (#61).

"If we are truly concerned to develop an ecology capable of remedying the damage we have done, no branch of the sciences and no form of wisdom can be left out, and that includes religion." (#63) Chapter Two, *The Gospel of Creation,* goes on to explain the wisdom of biblical accounts, the responsibility for God's earth (#68), the mystery of the universe, the mystery of each creature in the harmony of creation, the sense of deep communion with the rest of nature, and the gaze of Jesus who lived "in full harmony with creation." (#98)

Chapter Three, *The Human Roots of the Ecological Crisis,* returns to secular themes with a vengeance, covering the dominant technocratic paradigm (#101), our new era where technical prowess has brought us to a crossroads (#102), the lack of human responsibility to match our immense technological development (#105), "the idea of promoting a different cultural paradigm and employing technology as a mere instrument" (#108), how finance overwhelms the real economy (#109), fragmentation of knowledge and technology-related specialization that make it difficult to see the larger picture (#110), an authentic humanity calling for a new synthesis (#112), "the fact that people no longer seem to believe in a happy future; they no longer have blind trust in a better tomorrow" (#113), the "urgent need for us to move forward in a bold cultural revolution" (#114), modernity marked by an excessive anthropocentrism that prizes technical thought over reality (#115), the incompatibility of concern with the protection of nature and the justification of abortion (#120), the need to take account of the value of labor in any integral ecology, which by definition does not exclude human beings (#124), the need to prioritize access to steady employment for all (#127), the need to constantly rethink the goals, effects, and ethical limits of indiscriminate genetic manipulation (#131), and the need for "a broad, responsible scientific and social debate" on the common good, present and future (#135).

"Since everything is closely interrelated, and today's problems call for a vision capable of taking into account every aspect of the global crisis" (#137), Chapter Four considers elements of an *Integral Ecology* which "clearly respects its human and social dimensions." It is essential to seek comprehensive solutions considering interactions within natural systems and with social systems, and such strategies "demand an integrated approach to combating poverty, restoring dignity to the excluded, and at the same time protecting nature." (#139) Other elements include "sustainable use" that considers each ecosystem's regenerative ability (#140), the need for "an economic ecology capable of appealing to a broader vision of reality" and "a humanism capable of bringing together the different fields of knowledge, including economics, in the service of a more integral and integrating vision "(#141), a "cultural ecology" that protects the treasures of humanity in the broadest sense

while calling for greater attention to local cultures (#143), a need to respect the rights of peoples and cultures and avoid "attempts to resolve all problems through uniform regulations or technical interventions" (#144), the need to show special care for indigenous communities and their view of land as a sacred space and a gift from God (#146), authentic development and the ecology of daily life (#147-151), lack of housing in cities and rural areas as "a grave problem in many parts of the world" (#152), systems of urban transport as a frequent source of suffering (#153), respect for the human person underlying the principle of the common good (#157), the broader vision of justice between the generations—the kind of world we want to leave to our children (#159-160), and our inability to think seriously about future generations as "linked to our inability to broaden the scope of our present interests and to give consideration to those who remain excluded from development" (#162).

Chapter Five, *Lines of Approach and Action,* outlines "the major paths of dialogue which can help us escape the spiral of self-destruction which currently engulfs us" (#163).

1. *Dialogue on the Environment in the International Community.* On the need to think of one world with a common plan and a global consensus for confronting the deeper problems of sustainable agriculture, renewable energy, universal access to drinking water, and better management or marine and forest reserves (#164). Also considers the worldwide ecological movement (#166), the 1992 Earth Summit in Rio echoing the 1972 Stockholm Declaration (#167), the "wide-ranging but ineffectual outcome document" of the Rio+20 conference on sustainable development due to countries that place their national interests above the common good (#169), the injustice to poor countries from internationalizing environmental costs (#170), the worry that buying and selling carbon credits can lead to a new form of speculation and could become a ploy that permits excessive consumption of some countries and sectors (#171), the priority of eliminating extreme poverty in poor countries (#172), enforceable international agreements (#173), and governance systems for oceans and the whole range of "global commons" (#174).

2. *Dialogue for New National and Local Policies.* On limits for healthy and mature societies related to foresight and security with regulatory norms and timely enforcement (#177), a far-sighted environmental agenda (#178), more cooperatives to ensure local self-sufficiency (#179), promoting ways of conserving energy and modifying consumption (#180), countering "the mindset of short-term gain and results that dominates present-day economics and politics" and promoting "a genuine and profound humanism to serve as the basis of a noble and generous society" (#181).

3. *Dialogue and Transparency in Decision-Making.* On transparent assessment of environmental impacts of business ventures (#182-185), reassessments when significant new information comes to light, with involvement of all interested parties (#187), encouraging "an honest and open debate so that particular interests or ideologies will not prejudice the common good" (#188).

4. *Politics and Economy in Dialogue for Human Fulfillment.* On an economy that is not "subject to the dictates of an efficiency-driven paradigm of technocracy" and "rethinking the outdated criteria which continue to rule the world" (#189), openness

to different possibilities that direct energy along new channels (#191), correcting the disparity between excessive technological investment in consumption and insufficient investment in resolving urgent problems facing the human family (#192), accepting "decreased growth in some parts of the world, in order to provide resources for other places to experience healthy growth" (#193), redefining our notion of progress (#194), recognizing the economic and social costs of using up shared environmental resources (#195), the principle of subsidiarity which grants freedom at every level of society, while also demanding a greater sense of responsibility for the common good (#196), and the need for a "healthy politics" that is "farsighted and capable of a new, integral and interdisciplinary approach" to the major problems of humanity (#197).

5. *Religions in Dialogue with Science.* On the need for religions to dialogue among themselves for the sake of protecting nature, defending the poor, and "building networks of respect and fraternity"; dialogue among the various sciences is likewise needed, and between the various ecological movements (#201).

Finally, Chapter Six, on *Ecological Education and Spirituality,* considers many matters that have to change course as we set out on the "long path to renewal" (#202), a new lifestyle that confronts "compulsive consumerism" (#203), embarking on "new paths to authentic freedom" (#205), awakening "a new reverence for life" and developing a "firm resolve to achieve sustainability" as proposed in the Earth Charter (#207), environmental education that critiques the myths of utilitarian modernity (#210), the nobility of caring for creation through little daily actions in lifestyle (#211), institutions empowered to impose penalties for damage inflicted on the environment (#214), learning to see and appreciate beauty (#215), ecological conversion to bring about lasting change as community conversion (#219), a spiritual growth marked by moderation and the capacity to be happy with little (#222), speaking of the integrity of ecosystems and of human life (#224), inner peace reflected in a balanced lifestyle, together with a capacity for wonder (#225), and building a "civilization of love" and making love felt in every action seeking to build a better world (#231).

COMMENT

You don't have to be Catholic, Christian, or any type of believer to benefit from this broadly and deeply humanistic statement. Seculars can skip over the Introduction, and Chapters Two and Six, and get right into 1) What Is Happening to Our Common Home, 3) The Human Roots of the Ecological Crisis, 4) Integral Ecology, and 5) Lines of Approach and Action. Seen together, this "different cultural paradigm" (#108), in contrast to the "dominant technocratic paradigm" (#101), is nothing less than the new human-centered paradigm promoted in the pages of *CADMUS*! For example, see the "CADMUS Vision" facing the Contents page, "New Paradigm Quest" by Alexander Likhotal, and several other related essays in the May 2015 issue.

The only complaint that seculars will likely have is the Pope's position that there is too much blame on population growth and not enough on consumerism (#50) and the corresponding defense of the Church's stance against abortion (#120). We can discuss this.

The striking Encyclical Letter from Pope Francis is widely seen as an urgent statement about climate change. But it is much more. The "Integral Ecology" promoted in Chapter 4 is a wide-ranging humanistic worldview that confronts the narrow outlooks taught in our educational institutions and prevailing throughout society. And the "paths of dialogue" outlined in Chapter 5 point to what is needed for the environment, politics, and human fulfillment. We need much more genuine dialogue, and "honest debate must be encouraged among experts, while respecting divergent views" (#61). Unfortunately, there is no suggestion as to how serious dialogue and debate can be promoted in an era of complex issues with many specialized experts and opinionated interest groups.

ALSO SEE the ***Islamic Declaration on Global Climate Change*** issued by the Islamic Foundation for Ecology and Environmental Sciences in Birmingham UK (www.ifees.org), resulting from the International Islamic Climate Change Symposium in Istanbul, August 2015 (www.islamicclimatedeclaration.org) .

II. Jeffrey Sachs on Planetary Boundaries & U.N. Sustainable Development Goals

A very different but equally worthy message is conveyed by Jeffrey D. Sachs in **The Age of Sustainable Development** (Columbia University Press, March 2015, 543p, $34.95pb), the companion volume to a MOOC with the same title distributed by the United Nations Sustainable Development Solutions Network (www.SDSNedu.org; http://unsdsn.org), which is directed by Sachs, who also heads the Earth Institute at Columbia University and served as special advisor to the UN's Millennium Development Goals. SDSN is also offering a course on **Laudato Si'** and promises "more than 30 courses in the next three years**."**

In the Foreword, Secretary-General Ban Ki-moon states that "Sustainable development is the central challenge of our times." (p.xi) This is followed by Sachs' definition of sustainable development as "both a way of looking at the world, with a focus on the interlinkages of economic, social, and environmental change, and a way of describing our shared aspirations for a decent life, combining economic development, social inclusion, and environmental sustainability. Our new era will soon be described by new global goals, the Sustainable Development Goals." (p.xii)

Chapters provide an overview of sustainable development, and discuss an unequal world, the history of economic development, why some countries remain poor, how to end extreme poverty, planetary boundaries (as concerns climate change, oceans, pollution, food, and energy), social inclusion, education for all, health for all, food security (sustainable

supply and the end of hunger; how environmental change threatens the food system and vice versa), resilient cities, climate change and mitigation of greenhouse gas emissions, saving biodiversity and protecting ecosystem services, and sustainable development goals (ending extreme poverty, economic development within planetary boundaries, effective learning for all children and youth, gender equality and human rights for all, health and wellbeing at all ages), improved agricultural systems, inclusive and resilient cities, curbing greenhouse gas emissions by half by 2050 as the world economy grows perhaps threefold, sustainable and transparent management of water and other natural resources, and transformed government for sustainable development (ending corruption and tax havens, more accountability, and transparency).

"Simply speaking, sustainable development is the greatest, most complicated challenge humanity has ever faced. Climate change alone is extraordinarily difficult, but then add in other challenges of a rapidly urbanizing world, a great extinction process underway due to human domination of ecosystems, increasing population, over-extraction from oceans and land resources, massive illegal trade, and other issues. These are complex problems, and are science-based issues without the necessary worldwide public literacy in the scientific underpinnings. These are issues of tremendous uncertainty in chaotic, nonlinear, complex systems. This is a multigenerational problem that we are unequipped by tradition to think about. It goes to the core of our economic life." (p.506)

COMMENT

ALSO SEE: **Big World Small Planet: Abundance within Planetary Boundaries** by Johan Rockstrom and Mattias Klum (Max Strom Publishing, May 2015, 205p), an introduction to the "planetary boundaries" concept pioneered by Rockstrom, Director of the Stockholm Resilience Institute, which emphasizes the Anthropocene era resulting from the great acceleration of human "big world" pressures on the planet. Rockstrom has also contributed a MOOC on "Planetary Boundaries" to the UN's Sustainable Development Solutions Network.

The Age of Sustainable Development is aimed at college-level students and readers.

A more popularized alternative is the **Sustainable World Sourcebook: Critical Issues, Inspiring Solutions, Resources for Action** (Berkeley CA: Sustainable World Coalition/Earth Island Institute, 4th Edition, 2014, 164p, $25). This 'Essential Guidebook for the Concerned Citizen" has a Foreword by Paul Hawken and chapters on environment and healing the web of life, smart energy, a just society in a world that works for everyone, economics that values life (inspired by David Korten and the New Economy Working Group), living well together in strong and nurturing communities, and creating a sustainable future with our daily actions.

III. Nicholas Stern on the Urgency of Tackling Climate Change

Whereas Jeffrey Sachs is a major figure in promoting the UN's Millennium Development Goals and the new Sustainable Development Goals, Nicholas Stern, President of the British Academy and chair of the UK's Grantham Research Institute on Climate Change (London School of Economics), is a major figure in climate change economics. A former Chief Economist of the World Bank, he was the lead author of the **Stern Review on the Economics of Climate Change** (Cambridge University Press, 2007, 692p.), followed by **A Blueprint for a Safer Planet: How to Manage Climate Change** (Bodley Head, 2009). Along with Felipe Calderon, Former President of Mexico, he served as co-chair of the Global Commission on the Economy and Climate, which published its report, **Better Growth, Better Climate: The New Climate Economy Report** in September 2014.

His latest book, **Why Are We Waiting? The Logic, Urgency, and Promise of Tackling Climate Change** (The MIT Press, May 2015, 406p, $27.95), seeks to make the argument "as accessible as possible to a wide audience."

He begins by stating that "The people of the world are gambling for colossal stakes… the risks from a changing climate over the next hundred years and beyond are immense… (with) a strong possibility that the relationship between human and their environment will be so fundamentally changed that hundreds of millions of people, perhaps billions, would have to move." We are the first generation that "could destroy the relationship between humans and the planet, and perhaps the last generation that can prevent dangerous climate change." The potential paths of development embodying strong reductions in greenhouse gas emissions and creative adaptation "are becoming ever clearer, and they look ever more attractive in themselves." And the portrayal of climate action as being in "inexorable conflict with growth, poverty reduction, and radical improvements in human well-being is false and diversionary… A committed and measured low-carbon transition would likely trigger an exciting new wave of global investment, innovation, and prosperity." (p.xxvii)

Chapters discuss the basic choices the world faces between peril and prosperity, alternative pathways we could take (exploring technologies, services, and processes, as well as costs and benefits), domestic policies for achieving dynamic structural change (including lessons from public economics on market failure), models of the economics of climate change that currently dominate much economic discussion (they "grossly underestimate the economic damages and risks"), the need for a new generation of models with "a broader and wiser set of perspectives" and evidence from a broad range of sources, the "serious analytical errors" in many analyses of intergenerational issues (especially in approaches to discounting associated with short-term decision-making), the "inherent conservatism of science and science modeling" (e.g., omitting key factors such as thawing permafrost, collapse of polar ice sheets, release of seabed methane, ocean acidification, collapse of tropical forests, etc.), the "unwillingness or inability to grapple seriously with the basic ethical principles underlying the values and valuations," ignorance of much of the literature in public economics about cost-benefit analysis and discounting, the broader ethical and moral issues that inform policy analysis of climate change, recent global developments in climate action (there are

many positive examples, but "the world is moving far too slowly"), how international climate change institutes and negotiations could evolve in the near future (e.g. the December 2015 "COP21" conference in Paris), and an approach to international equity that could underpin the framework for climate governance. "Progress at the national level would be greatly facilitated by a deeper and broader understanding of what is happening around the world in the movement toward a low-carbon economy." (p.245) Stated differently, "A failure to understand what others are doing, and a presumption that it is very little, reinforced by expectations that international cooperation will be weak, has generally hindered progress." (p.250)

"In the eight years since **The Stern Review** was published, the arguments that the costs of inaction greatly exceed the costs of action, strong then, are still stronger now… The choices we now face present an enormous opportunity. But delay is dangerous. If we fail to take this opportunity and attempt to follow the old ways, the opportunity will be gone. We use it or lose it." (p.303) To avoid the many risks, or reduce them radically, "fundamental change will be necessary, including essentially zero emissions in the second half of the century… Delay is dangerous because flows of emissions build stocks of greenhouse gases…high-carbon capital and infrastructure, which can last for decades, can lock us into high-emission activities." (p.304)

Stern finally asks "Why are we moving so slowly?"(p.305) and explores four answers:

1. *Analytical Difficulties and Failings:* the unwillingness of many to recognize moral responsibilities toward future generations, the importance of equity among people ("it is usually the poorest, who have contributed the least to creating the problem, who are hit the earliest and the hardest"), and the nature and scale of what is happening worldwide;

2. *Communication Deficit:* action has been hampered by lack of communication of sound arguments, and a surplus of effective communication of misguided arguments. Moreover, messengers matters: if movement for change is to gather momentum, we can expect different communicators for different audiences, utilizing rhetoric and frames that resonate with values and emotions that could inspire large-scale action; "the importance of frequent, accurate, clear, and accessible public discussion of climate change places a great responsibility on media organizations" (p.307), many operating under a misguided conception of "balance" between scientific evidence and nonscientific opinion;

3. *Psychological Barriers:* communicating and persuading people to act on climate change may be more challenging than many believe; myriad psychological processes work against action, and risk perceptions too often correlate with basic values;

4. *Structural Barriers:* the organization of politics and the structure of the political economy; disproportionate influence of vested interests; groups that see themselves as threatened and fear dislocation; many politicians facing short-term electoral incentives despite medium- and long-term benefits of climate policy; short-term incentive structures in business; a dearth of disclosure and transparency requirements in many jurisdictions; media that that favor immediate consumer interests or do not promote the long-term public interest.

In light of the above, Stern concludes with several lessons for climate change: 1) Good analysis is critical: "climate change concerns the management of risk on a colossal scale" (p.314); 2) Appealing to values and a sense of justice can be powerfully motivating; "the transition must be equitable and seen as equitable" (p.315); 3) Communicate strategically and use examples; "extreme weather events can be the most powerful examples of all" (p.315); 4) Package policies: "integrate climate action with other reforms"; 5) Technological, economic, social, and political change are all needed and can reinforce each other; 6) Young people will continue to be a powerful source of pressure for climate action; it is they who will suffer most from the negligence of earlier generations; 7) International cooperation can help drive change: "it is important to understand what others are doing and planning; that is the foundation of cooperation" (p.318).

"As pointed out by Nicholas Stern, what we immediately need is "new economic models with broader and wiser perspectives," consideration of ethical principles about future generations and more."

IV. GENERAL COMMENT

The obvious and important difference between these three books concerns their general focus. Nicholas Stern centers on climate change and transition to a low-carbon and no-carbon economy. This challenge is the most immediate of the three, with the clearest alternatives. And, indeed, the transition is already underway to some degree, although much more needs to be done, especially in overcoming "analytical failings" of economists.

Jeffrey Sachs focuses on planetary boundaries—a broader and even more worrisome concern that goes beyond climate change—and on pursuing the UN's new "post-2015" Sustainable Development Goals, a "multigenerational problem" that we are still unequipped to think about, and far more ambitious than transition to a low-carbon economy.

Pope Francis goes even further, calling for a "bold cultural revolution" (#114) to counter the "dominant technocratic paradigm" (#101) that has created much of today's messy mega-crisis. This is the loudest and clearest call for what the World Academy of Art and Science calls a "human-centered paradigm." It will surely be difficult to initiate and maintain the many dialogues and debates that are needed, but such a change toward seriously thinking about "integral ecology" may be the most important of all.

Viewed together, the three books should be seen as complementary. All are concerned, for example, not only with the environment, but with ending poverty and promoting human well-being worldwide. Perhaps these books can be seen as three stages of transition—if we are wise and lucky in overcoming the barriers identified by Nicholas Stern. (Another barrier, generally neglected, is the immediacy of security concerns—especially terrorism and cyber-security—which displace attention to long-term climate threats. Ultimately, we cannot have sustainability without security, and vice versa, and the two realms are slowly beginning to overlap.)

A final note is deserved about the efficacy of a new economic paradigm or new economic theory to displace the industrial-era economics that does not value human and natural capital. This is an important part of the long-term human-centered paradigm project. But, as pointed out by Nicholas Stern, what we immediately need is "new economic models with broader and wiser perspectives," consideration of ethical principles about future generations and more, and overcoming ignorance of the literature on cost-benefit analysis and discounting. Inadequate economic thinking about basic climate concerns is not as grand as a "new economic paradigm," but simply responsible and thoughtful economics for the 21st century, perhaps encouraged by more debates and dialogues, as the Pope advocates. And, as Stern urges, the sooner economists (and concerned citizens to prod them) engage in necessary learning, the better. Continuing education is demanded for physicians and airplane pilots; why not economists, too?

"Continuing education is demanded for physicians and airplane pilots; why not economists, too?"

These three deeply thoughtful global sustainability leaders deserve attention. One does not have to agree with everything they say, but their books could serve as common ground for overcoming fragmentation (Pope Francis, #110) by initiating a "new dialogue" (#14) and the broad scientific and social debate that is so badly needed (#135).

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Education becomes contextualized when studied within the physical, social and cultural circumstances characterizing real life situations. So, creating the relevant context, education comes to life.

Janani Harish, Contextual Education

The transition towards a new paradigm involves an international movement which integrates the natural and social sciences in order to address the prerequisites for sustainable development.

Joanilio Teixeira, Danielle Pinheiro & Anna Vilasboas, Socioeconomic & Environmental Performance: A Composite Index & Comparative Application to the USA & China

Sustainability is a property of the global ecosystem, not its constituent processes.

Robert Hoffman, Concepts for a New Generation of Global Modelling Tools: Expanding our Capacity for Perception

Unless an alternative economic theory is proposed as the basis for viable pragmatic policy alternatives, resistance may be heroic but it will remain quixotic.

Garry Jacobs & Mark Swilling, The Greek Financial Crisis: Theoretical Implications

The purpose of Person-Centered Education is to protect and promote a person's innate creative capacities of learning from their experiences, to promote wholeness and integration in the individual by focusing on their personal growth, and develop them into creative and competent members of the society who can contribute effectively to their community.

Alberto Zucconi, Person-Centered Education

A parallel currency system would make our world more resilient.

Stefan Brunnhuber, How to Finance our Sustainable Development Goals (SDGs): Socioecological Quantitative Easing (QE) as a Parallel Currency to Make the World a Better Place

With all the focus that education gives to science, on closer examination, we see that much of that focus is on the process of validation of discovery, and not really on the process of discovery itself. An understanding of this process, and of what constitutes intellectual genius will move us closer to discovering the method that develops genius through education.

Janani Harish, Report on Future Education Symposium

Continuing education is demanded for physicians and airplane pilots; why not economists, too?

Michael Marien, Three Global Sustainability Leaders: Pope Francis, Jeffrey Sachs, and Nicholas Stern

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Overcoming the Educational Time Warp:
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The key to effectiveness can be found only in the capacity of the system itself to absorb change in a continuous flow.

Orio Giarini & Mircea Malitza,
The Double Helix of Learning and Work

In order to support a continuous and resilient economic growth, the world has to distance itself from a short-sided and unstable form of neoliberal economics.

Hans d'Orville,
New Humanism and Sustainable Development

There are no insoluble problems in the world.

Ashok Natarajan,
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The stresses now occurring globally are largely due to limited perspectives, ancient ideologies and defunct economic models.

Hazel Henderson,
The Politics of the Solar Age: 1975-2015

The State can neither control society as a whole, nor the monetary dynamic, because money is a relation that involves the entire society, while the State is only part of it, despite its high hierarchic position.

Maria de Lourdes Rollemberg Mollo,
Changing the Dominant Paradigm in Economics:
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