



Environmental Acceptability as the Driver of New Civilization

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Abstract

We are on a collision course with nature. And the underlying reason is that humans' creative capacity has largely bypassed their adaptive capacity.

Due to existing trends in 10 years the world will be changed dramatically.

These trends will change the social standards and human behaviour patterns; shift “centres of gravity” from the West to East, from the North to South, and from nation-states to private actors; spur deep reframing of global governance; force us to develop new patterns of production, trade and consumer standards; advance human capacities and possibly beyond the limits of the traditional definitions of humanity.

The development of new policies to manage these challenges and to respect the realities of the natural world offers a myriad of positive opportunities to generate the new ideas, new policies and new partnerships that are needed to overcome the present crisis by reorienting and restructuring our economies on a more sustainable, resource-efficient and inclusive path.

But, however important economics and technologies are, achieving the required level of global systemic change and overcoming the seemingly immovable implementation gap that is blocking progress will require political leadership, vision and courage, rather than an adaptive strategy of small steps, and a revitalized multilateral governance architecture adequate to meeting the interconnected challenges reflective of the 21st century.

“The problem is not about the world; it is about us, it is about our inability to change our eternal belief that we will always be able to shape the world according to our needs.”

Crisis is the most quoted term today. The notion of crisis – multifaceted, systemic, on-going etc. – is used to explain the need for a new civilization shift. However there is no such thing as climate crisis, water crisis, or economic crisis, because these are all but the demonstrations of a much deeper problem we are facing, and the problem is not about the

world; it is about us, it is about our inability to change our eternal belief that we will always be able to shape the world according to our needs, while we are demanding more than the earth can sustainably provide.

We are on a collision course with nature. And the underlying reason, as I understand it, is that humans' creative capacity has largely bypassed their adaptive capacity.

The problem is also related to the transformation of liberal values.

The modern market economy was a natural outgrowth of the rise of liberalism and political democracy in the West. The extension of freedom and democratic rights to every citizen has gradually led to the emergence of economic democracy as well, in which each individual casts monetary votes according to his individual needs and capacity. In the absence of basic human rights, economic life as we know it today is inconceivable.

But the further evolution of this value has played a trick with civilization. In this consumption driven world mentality of the people has more and more started to be characterized by the belief in economic prosperity as an organic part and the guarantee of human freedom. Material prosperity has become implicitly related to the extent of individual freedom. Personal wellbeing gradually has turned from a tool of liberal values into a competing goal, devaluing these values. That is why the threat to prosperity standards (leading to unbridled economic growth) is seen as the erosion of freedom.

As a result of human development, personal status has become hostage to economic success, distorting the basic civilisation's ethical matrix.

However, due to existing trends and regardless of our acceptance, in 10 years the world will be changed so much that we will be surprised with our current concerns:

- An integrated global economy functioning as a holistic entity will spur deep reframing of global governance;
- IT and communications revolution connecting billions of people to rapidly expanding volumes of data will evolve into a Metaweb that will change social standards and human behaviour patterns;
- A completely new balance of political, economic, and military power will shift "centres of gravity" from the West to East, from the North to South, and from nation-states to private actors;
- A radically new relationship between the aggregate powers of human civilization and the Earth's ecological systems on which humankind depends will force us to develop new patterns of production, trade and consumer standards;
- A revolutionary new set of powerful biological, biochemical, genetic, and material science technologies, synthetic biology and human enhancement will advance human capacities and possibly beyond the limits of the traditional definitions of humanity.

What are the immediate, predictable implications of these transformations?

Firstly it should be noted that 95 per cent of urban expansion in the next few decades would take place in the developing world, shrinking the population of the North to just 10% of the world's.

From 1980 to 2009, the global middle class grew by around 700 million people, to 1.8 billion, from roughly 1.1 billion. Over the next 20 years, it is likely to grow by an additional 3 billion.

Exploding growth in the developing world has already created there a vast new middle class, 66% of which will live in Asia by 2030. That is a lot of new consumers! How will they live, eat, shop, and travel? Will they emulate the worst habits of the developed world, or lead the way as better stewards of the planet?

Secondly, current estimates of global GDP are around US\$60 trillion and even at modest per capita growth rates in the emerging economies of the world to meet poverty targets we could easily see a world GDP (as we conventionally measure it today) closer to US\$200 trillion by 2050. Three worlds sitting on our present one world but stretched to the limits with regard to consumption and production patterns.

During the 20th century, the world increased its fossil fuel use by a factor of 12, whilst extracting 34 times more material resources. Today in the EU, each person consumes 16 tons of raw materials annually, of which 6 tons are wasted, with half going to landfill. In absolute figures some 65 billion tons of raw materials entered the economic system in 2010, and this figure is expected to grow to about 82 billion tons in 2020.

As a result of our economic activity half the tropical forests in the world – the lungs of our ecosystems – are gone; by 2030, at the current rate of harvest, only 10% will be left standing. Ninety per cent of the big fish in the sea are gone, victim to wanton predatory fishing practices.

We are polluting our lakes, rivers and streams to death. Every day, 2 million tons of sewage and industrial and agricultural waste are discharged into the world's water resources.

A comprehensive recent global study, published in 2010 in *Nature*, reported that 80% of the world's rivers are now in peril, affecting 5 billion people on the planet. Fully one-third of global water withdrawals are now used to produce biofuels, enough water to feed the world.

There is no possibility of proving the linkage between economic activity and natural disasters, but the frequency and intensity of the natural disasters have so increased in recent decades that it would be a little incautious to deny such a link. There were 78 recorded disasters in 1978; last year there were 385, and during the last two years we have already witnessed five mega-disasters. Recently, Hurricane Sandy was a reality check in the United States, putting a very clear climate change imprint on the results of the electoral campaign for the first time.

A lot has already been said about climate change, and I think we need to realize that if we fail to put a price on and reduce carbon emissions now, and if we continue to rely mainly on fossil fuels, we will damage our economy. This is not just an assumption; those who argue the converse are failing to account for the costs of damage already caused by climate change. Just five years ago, Stern Report assumed that by the year 2100, 1-2% of global GDP would be gone if temperatures increased by 2.5 degrees Celsius.

A 2012 study by the DARA group and the Climate Vulnerability Forum concluded that failure to act on climate change already costs the world economy 1.6% of global GDP amounting to US \$1.2 trillion in forgone prosperity a year, while rapidly escalating temperatures and carbon-related pollution will double costs to 3.2% of world GDP by 2030 – rising to 11% of GDP for Least Developed Countries. Therefore, the costs of failing to price carbon and reduce emissions are already very real, not to say that climate change and the carbon-intensive economy are leading global causes of death today, responsible for five million deaths each year – 400,000 due to hunger and communicable diseases aggravated by climate change and 4.5 million carbon economy deaths, due mainly to air pollution.

Next. A new digital revolution is coming, this time in fabrication. It draws on the same insights that led to the earlier digitization of communication and computation, but now what is being programmed is the physical world rather than the virtual one. Digital fabrication will allow individuals to design and produce tangible objects on demand, wherever and whenever they need them. Widespread access to these technologies will challenge traditional models of business, trade, and consumer behaviour.

Wohlers Report 2013, published by Wohlers Associates as an in-depth analysis of the worldwide additive manufacturing industry, reported earlier this year that the market for 3D printing (used interchangeably with additive manufacturing) in 2012, consisting of sales of all products and services worldwide, grew 28.6 per cent to \$2.204 billion, up from \$1.714 billion in 2011. Wohlers Associates expects strong double-digit growth to continue over the next several years, forecasting the market to approach \$6 billion by 2017 and reach \$10.8 billion by 2021.

Lux Research, publisher of another report that analyses 3D printing's commercial potential, has forecasted that 3D printing would grow into an \$8.4 billion market by 2025 (up from \$777 million in 2012), with sales of products and services to the automotive, medical, and aerospace industries leading the way. The report, titled *Building the Future: Assessing 3D Printing's Opportunities and Challenges* predicts rapid and widespread adoption for medical applications as 3D scanning technologies, printers, and materials fall in price. The medical market, pegged at \$11 million in 2012, is projected to grow to \$1.9 billion by 2025.

Already today changing 30% of personnel in manufacturing produces 25% gain in productivity and 56% of corporations of US and Europe are ready to switch to robotechnics. So far only the lack of adequate technology prevents this.

Current understanding of the relationship between employment and technological change is insufficient, and adjustment to this structural shift in the nature of work has been slow.

Many countries, companies and institutions continue to believe that the market will correct employment disparities. This view may be too optimistic, especially with a deficit of high-skilled workers and insufficient supply of jobs for low and medium skilled workers.

Production requires consumers but the revolution in robotics and energy will make many old professions extinct. How to stimulate the demand and provide the unemployed with work and livelihood in these circumstances? The problem will be not to supply consumers with necessary goods, but rather how to ensure that products have sufficient number of consumers.

Economic models and political systems built upon a desire for “full employment” will require revision. There is evidence of movement towards a more fluid employment relationship, whereby people are holding portfolios of activities, including paid employment, unpaid employment such as internships or volunteering, self-employment, and caring for children or the elderly.

Steady adoption of a portfolio of activities may lead to a different view on economic output and performance generated by the workforce, and shift tax and regulatory burdens away from labour in order to facilitate an inclusive, productive and flexible workforce fit for this century.

Therefore, one of the major problems for the world economy will be employment policy.

But not only the world will differ; we are transforming ourselves – we will differ!

The hourly Internet traffic will soon exceed the annual internet traffic of the year 2000!

The world’s ICT ecosystem uses electricity equal to the combined annual power generation of Japan and Germany – as much electricity as was used for global illumination in 1985. The ICT ecosystem now approaches 10% of world electricity generation. Or in other energy terms, the zettabyte era already uses about 50% more energy than global aviation uses. Reduced to personal terms, although charging a single tablet or smartphone requires a negligible amount of electricity, using either to watch an hour of video weekly consumes annually more electricity in the remote networks than the power consumption of two new refrigerators in a year.

Computers have become a part of our lives. All praise this as an enormous achievement. The achievements are undeniable and plenty. But what about the downside of this transformation?

Evidence is piling up that our reliance on Internet-based digital appliances and functions, such as the search window on your smartphone, affects not just the way we live; it affects our ability to think. In the December 2011 issue of *Scientific American*, Daniel M. Wegner and Adrian F. Ward explore the phenomenon in “How Google is Changing Your Brain.”

Internet, Google Glass, 24/7 online, direct intelligence interconnectivity: are we becoming part of a Meta-web? Looks like soon we will have to pay not to be online!

Computer – mobile computer or wearable computer – contextual web will soon be guessing and then probably shaping your interests and social targets.

Will humans become part of a giant “global software”, a real and not a virtual matrix?

“Human! We used to be exactly like them. Flawed. Weak. Organic. But we evolved to include the synthetic. Now we use both to attain perfection. Your goal should be the same as ours.” – Borg Queen, *Star Trek: First Contact*

What will happen to our individuality? Personality? Creativity? Goodbye, soul-searching; hello, facts-at-fingertips?

Social networks have reduced our vocabulary from 200,000 words to 20 words. Faulkner has become too difficult, Tolstoy – too long, too boring...

Already today half of the adult population in Russia do not read books at all. A lot more are “undecided”. Another 6% responded to the poll saying they read “one a year”, I suppose they lied, ashamed to say they do not read at all.

Russia is not unique. According to recent polls sixty per cent of Americans have not read a book since leaving school. Only 6 percent now read even one book a year. According to a very familiar statistic that cannot be repeated too often, the average American’s day includes six minutes playing sports, five minutes reading books, one minute making music, 30 seconds attending a play or concert, 25 seconds making or viewing art, and four hours watching television.

We have stopped writing. Why bother? There are convenient computer buttons. Psych neurologists argue that handwriting, fine motor mental skills, fine finger movements reflect the subtle movements of one’s mind and soul, the subtlety of perception ... But who will listen to neuropsychiatry today? Only a “modern luddite” would believe that it is necessary to write in their great-grandfathers’ way and voluntarily give up the “achievements of civilization”! Every day we have new gadgets that make our lives more and more comfortable and convenient!

But it’s a fact that psychomotor retardation (also known as “psychomotor impairment” or “motor mental retardation”) involves a slowing-down of thought in an individual.

In order to write a letter, one needs many times higher intelligence, a fundamentally different intelligence, than the intelligence required to push the buttons. Writing a letter requires a complex combination of movements of the mind and muscles. Just compare: fingers (and soul) of the violin virtuoso – and finger, pressing the play button on a machine... You can train a hare to push buttons in the circus. Try to teach it to write....

As a result already today if you google Homer you might get more references to Simpsons than to the great blind author of the Iliad and the Odyssey, and if you try Caesar you risk to get more Caesar salad recipes than references to the great historical general.

Consumption has become the god of our civilization. Last year an American shocked the audience of the NBC “The Docs” show when he offered to sell his left testicle for 35 thousand dollars in order to buy a Nissan 370Z sports car. In Goethe’s *Faust* the devil seduced man; today people stand in line to be seduced by consumption.

All these developments will dramatically and inevitably exacerbate the dual challenge of stimulating the growth needed to provide jobs and well-being to citizens, and of ensuring that the quality of this growth leads to a sustainable future.

One obvious conclusion is that the expected increase in demand cannot be met, unless there is nothing less than a revolution in the way we use natural resources. Our economy will require a fundamental transformation within a generation – in energy, industry, agriculture, fisheries and transport systems, and in producer and consumer behaviour.

“When a system is fundamentally flawed, making it more efficient or accountable will not solve the problem.”

Euphemisms like ‘green economy’ or ‘shared sustainable growth’ will not help. When a system is fundamentally flawed, making it more efficient or accountable will not solve the problem. This model locks the world in continuing crisis – social injustice and the danger of environmental disaster. What we need today is to decouple economic growth from the use of energy and materials; simply increasing resource efficiency will not take us where we want to be. I am not questioning the objective of increasing energy and resource efficiency; essentially, we have no choice. What has to be questioned, however, is how production and consumption are being organized today.

Rapid price increases experienced for many commodities and energy in recent years are already encouraging businesses to develop more efficient processes, but price signals will not be enough to stimulate a wide-spread transition to a new model.

In searching for new models for economic development, two important issues must be distinguished and addressed. First, how to produce more in order to meet increasing demand while making less of an impact on resources (often referred to simply as “decoupling”). Second – even more fundamental – how to limit the increase in overall demand. The challenge is immense as currently we are in a completely contradictory situation where the more successful we are at promoting growth on the existing model, the greater and quicker will be the environmental and social disaster. We need a total reversal of fortunes. Fortunately, many good and workable ideas are already in the pipeline, and beginning to be operationalized. The opportunities for innovation and creativity are enormous.

One emerging solution focuses on the creation of a circular economy (detailed in the works of Walter Stahel, Karl Wagner, Anders Wijkman and the MacArthur Foundation). Today’s business models are based on maximizing the volume of sales of different products. In a circular economy model, sales of products would be largely replaced by leases, combined with exceptional service. Since responsibility for the material used in a product remains with the manufacturing company, strong incentives are created to fully exploit the material as long as possible to earn maximum return on what already has been produced. This results in vastly decreased consumption of both raw materials and energy, and therefore less CO₂ emissions and waste. Meanwhile, profitability rises: a win-win proposition. Some large corporations are already embracing the circular approach: Rolls Royce has replaced sales of jet engines to

some airlines with leases; Michelin rents car tires for heavy vehicles and is responsible for their being maintained, upgraded and recycled as waste product; and Xerox offers copying services instead of selling photocopiers.

Another key component of a circular economy is the maximizing of recycling, reusing and reconditioning – rates of which remain senselessly low. According to a report released in 2011 by the UNEP, recycling rates of metals are far lower than their potential for reuse. Less than one-third of some 60 metals studied have an end-of-life recycling rate above 50% and 34 elements are below 1% recycling, yet many of them are crucial to clean technologies such as batteries for hybrid cars and the magnets in wind turbines. For example, CO₂ emissions are reduced by more than 90% when aluminium scrap is used instead of bauxite, but only one-third of aluminium demand is supplied by secondary production. The primary production of tin requires 99% more energy than secondary production, but the recycling rate is less than 15%. Putting valuable, reusable metals into landfills is a terrible waste. In addition, an estimated 50 million tonnes of electrical waste is generated each year and no more than 15-20% is being recycled. The rest ends up in landfills or incinerators. This e-waste is hazardous but also a potential source of valuable and scarce rare Earth materials vital for manufacturing smartphones and tablets.

The MacArthur Foundation's report *Towards a Circular Economy* was presented in early 2012 and backed by a group of leading multinationals, including B&Q, British Telecom, Cisco and Renault. It states that:

“A circular economy is an industrial system that is restorative by intention and design. In a circular economy, products are designed for ease of reuse, disassembly and refurbishment – or recycling – with the understanding that it is the reuse of vast amounts of material reclaimed from end-of-life products, rather than the extraction of new resources, that is the foundation of economic growth. Moreover, the circular economy shifts towards the use of renewable energy, eliminates the use of toxic chemicals, which impair reuse, and aims for the elimination of waste through the superior design of materials, products, systems, and, within this, business models.”

That such a fundamental shift in perspective, away from the industrial system we have today, is supported by a group of multinational companies, and attracted attention at the 2013 World Economic Forum in Davos, is a sign that these concepts are gaining traction. While there is still significant private sector resistance to change, many forward-looking businesses are accepting that indefinite material growth on a planet with finite and often fragile natural resources cannot be sustainable, and that by embracing sustainability they can both reduce risk and exploit opportunities for new markets.

For example, in recent years, General Electric has earned large profits from its “Ecomagination” energy-efficient products. Siemens is also focusing on the rapid expansion of markets for sustainable products, energy efficiency, and greener buildings. The rapid growth of the renewable energy sector worldwide has been driven in part by big technology

companies, including Google, Microsoft and Apple, investing in clean alternatives to power their own operations.

Complementary to the rise in interest in the circular economy is the rise of “collaborative consumption” initiatives, particularly in urban areas. Businesses such as Zipcar, City bikes, Freecycle, AirBnB and Ebay are creating communities of people sharing resources, avoiding waste and saving money. They are examples of positive behaviour change precipitated by self-interest as well as a desire to be more environmentally and socially responsible.

Another business concept that is gaining attention is companies pledging to become “net positive”, meaning that their positive impacts on the environment and society should outweigh the negative ones. Early (partial) espousers of this initiative include Coca-Cola, which aims to be net positive on water for its bottling process, and BT, which aims to be net positive on carbon emissions. So far, no large company has been able to claim to be net positive over its entire operation, but it is a start.

The next question is, how can these isolated initiatives be massively scaled up to propel society in the direction of a more resource and energy efficient, inclusive economy? How can we move society in the direction of the circular economy? Because relying on pricing mechanisms alone will not be enough.

A fundamentally new transformational leadership and political will are what is most needed to provide effective responses to these new challenges. So far, government claims to prioritize sustainability have been largely rhetorical and have failed to set out clear, practical action plans. Counteracting the formidable economic forces that still benefit from current production systems (i.e., increasing revenue by selling more stuff) will take coordinated, proactive policy action on many fronts. Creating the right incentives and conditions will in turn motivate (or obligate) businesses to do what they do best – innovate and create new markets.

Rapid price increases experienced in many commodities and the energy sector in recent years are already encouraging businesses to develop more efficient processes, but price signals will not be enough to stimulate a widespread transition to a more sustainable economy. This transition will create a great deal of temporary dislocation, and there will inevitably be some losers in the process. Policies will therefore not only have to give clear incentives, but also be able to manage the resulting change, as well as considerable resistance and opposition.

Proponents of new development and business models have put forward a number of “framework ideas” (Club of Rome, WAAS):

(i) Reorienting markets by valuing natural and social capital

Our economies are based on incorrectly measuring and valuing a wide range of goods and services essential to maintaining a safe, secure and sustainable planet. This systematic

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inadequate valuation (both under and over) is at the root of many major problems, such as the degradation of ecosystems, depletion of biodiversity and the destabilization of the social fabric of families and communities. Natural and social capital must be properly valued in economic terms in order for the economy to be “real” and to be built on real values. This will result in energy price increases, as the social and environmental cost of carbon and water use is taken into account, but this will accelerate integrated solutions to climate and energy challenges. The most vulnerable in society can be protected from the impacts of these changes.

“Overcoming the seemingly immovable implementation gap that is blocking progress will require political leadership, vision and courage.”

(ii) Creating an alliance of sustainability winners

Create an alliance of the speedy ones, of the “game winners”; there is no need to wait for everybody (including traditional energy suppliers) to wake up to this call. The “carbon justice” approach can propel low carbon technologies to the South. An alliance of champions on effective climate policy from Europe, Asia and leading “developing countries” (90% of the world’s population) can help provide the revolutionary shift needed to recalibrate our economy, protect our environment and achieve sustainable development. The “early birds” will be the best placed to seize the opportunities of transition and develop strong markets and new jobs in innovative industries.

(iii) Governments acting as custodians of public interest

A prosperous and stable society requires a proper balance between, on the one hand, the role of the market to stimulate innovation and the effective use of resources and, on the other, the role of government as the custodian of the common interest. Governments should provide a clear and predictable framework of law, supervision and regulation within which the markets can operate to achieve a balance between private rights and benefits and the prosperity of the community. Strong regulatory mechanisms that can safeguard common public interests are urgently needed.

In addition, several policy instruments that could help maximize our chances to shift towards a sustainable, equitable and “happier” world by triggering the necessary transition include:

- Agreeing on ambitious, binding targets for resource efficiency to encourage the maximum reuse and recycling of materials;
- Promoting innovation by giving priority to sustainable design and closed material loops;
- And reforming tax, for example, by lowering taxes on labour and raising them on the use of virgin materials.

The development of new policies to manage the challenges and to respect the realities of the natural world offers a myriad of positive opportunities to generate new ideas, new policies and new partnerships that are needed to overcome the present crisis by reorienting and

restructuring our economies on a more sustainable, resource-efficient and inclusive path. But, however important economics and technologies are, achieving the required level of global systemic change – and overcoming the seemingly immovable implementation gap that is blocking progress – will require political leadership, vision and courage, rather than an adaptive strategy of small steps, and a revitalized multilateral governance architecture adequate to meeting the interconnected challenges reflective of the 21st century.

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