PETER HESSELDAHL
GROUND RULES FOR THE 21ST CENTURY
Chapter 22

THE CURRENT GROWTH CAN'T CONTINUE

Occasionally, you can suddenly see the world with different glasses. I was in New York once, and stayed at a hotel. In the room there was a bottle of water on the table, and I drank it. Next morning, when I was leaving, all the papers were already printed out and ready for quick check out. But since I had drunk a bottle of water, they had to make a new bill. So we went through the entire payment procedure at the counter before I could get out the door. If instead I had simply drunk water from the tap – and really, New York's water is not *that* bad - I would have saved time, the plastic bottle, transportation of the water, the paper work etc. All this, just for a sip of water.

But it certainly keeps the wheels of industry humming. It creates economic activity, but the question is whether it is productive in the sense that it creates real value? Is the pleasure of drinking water from a bottle in my hotel room worth the costs in time, money and resources? For many types of consumption that equation is doubtful, and that is an important point.

The rich world has reached a unique point: Throughout history, man has always struggled to provide food and shelter, but now our wealth has grown to the point where greater material wealth does not necessarily mean greater happiness.

On birthdays and at Christmas we notice how rich we have become: you have to strain your creativity to the utmost to find gifts for people who already have everything they need. It's hard to think of any more to consume.
It seems almost symbolic that two of humanity's biggest problems are hunger and obesity – at the same time. There are about as many on the planet who starve, as there are people who are overweight - in the order of one billion people in each group. In Denmark, more than one in five people in the working age are "severely overweight" - and the problem is far worse in many other countries. Obesity is a clear example that there is a point at which *more* is no longer *better*.

<u>The duty to be rich</u>
The rich have always managed to find new, spectacularly profligate ways to squander their abundance of money. In this respect we have not stopped innovating. Until the financial crisis hit the tiny state, Dubai was a sort of development laboratory for unrestrained consumption. One result were the plans for the Palazzo Versace hotel, with cooling water pipes under the beach, so the sand shouldn't become uncomfortably hot for the guests to lie on. The idea seems almost natural in a city where one can walk in from the burning dessert sun and ski on a 400-meter long indoor ski slope with artificial snow. Currently, space tourism seems to be the new new way to consume at a level, which no one could imagine previously. Virgin Galactic expects to send the first tourists into space in 2012. You can already book the tickets; they cost $ 200,000 for a trip to the edge of the atmosphere at an altitude of 110 kilometers. The duration of the trip will be two hours, including four minutes of weightlessness.

It is not only the ultra rich who spend. Quite a number of us have been able to go on long voyages in our holidays, build beautiful kitchens and shop till we drop. The decades leading up to the financial crisis were an amazing expansion of living standards: Since 1990, the average size of a new Danish family house has increased from 134 to 189 square meters. In just ten years, the number of small cars with a weight below 800 kg halved, while the number of cars weighing over 1200 kg more than tripled.

But again: It comes at a price - and it's not just about the environment. If we want to be spending at that level, we must create value. If we want a slightly higher salary every year, the productivity of our work needs to go up correspondingly, so every year the pressure increases. There is no room for loafing, no tolerance for inefficiency.
There are scientists who investigate happiness and the factors that make people feel happy. One of the aspects that have been thoroughly studied is the link between income and happiness. It turns out that when you are poor, you will be happier if your income increases, but when people attain a certain level of income, there is no longer a clear correlation between higher income and greater happiness. The evidence suggests that people, who already have a good standard of living, do not become significantly happier from earning even more - if at all. The scientists describe the effect as *diminishing returns*: The more you have already, the more additional income it takes to achieve an even higher feeling of happiness.
Happiness research shows that in countries going through rapid economic growth, people are often less happy. South Korea is a clear example. Between 2002 and 2007, the Korean economy grew by 21 percent, but people's life satisfaction decreased by four percent. During the same period, people's satisfaction with life also decreased in the USA, Japan, Canada, Britain, France, Italy and Germany - despite economic growth.

Denmark is one of the worlds' wealthiest and most equitable societies. Happiness research shows that Denmark is also the country in the world where people are happiest. Yet it is striking how many people have difficulty getting through their daily lives without assistance. One out of 14 Danes in the working age population receives disability benefits. In 2009, 424,000 doses of antidepressant medication were sold every day – in a country of 5 million people. This is almost a doubling since 2001. Especially, the medication has increased dramatically among children. In the world's happiest country it is frightening how many people are seriously hurting.

We are getting richer, we're living to the max - but there is a cost of climbing to a still higher level of consumption. In particular, the environmental and social costs are hard to measure and estimate, so they tend to simply be omitted in the accounting. Thus we risk ending up in the situation, which Alex Steffen from the environmental NGO Worldchanging.org describes, where "we're destroying the planet and we're Not Even Having Fun". Growth is costing more and more, but it gives us less and less.

<u>Three economies, three kinds of growth</u>
Although growth is problematic, it is very difficult to challenge. The need for continued growth is one of the basic mechanisms of our economic system. If there is one thing that can mobilize the political system, it is when growth fails. Growth is like oxygen: we can't do without it. But paradoxically, in many respects, continued

growth is becoming a direct threat to our welfare.
Part of the explanation for this paradox is that we usually only think of one kind of growth. A more nuanced view of what we want to grow would help. There is not just one type of economy; in fact, we can distinguish between three very different types of economies - each with their associated type of growth. The three economies are in close interaction, but unfortunately, their respective logics are often in conflict.

The ecological economy is based on the planet's material flows. Changes are driven by the availability of resources like water and sunlight and nutrients that are used and degraded in a circular, balanced economy in which one organism's waste is another's resource.
There are lots of dynamics in nature. Species develop, fight, prosper or perish continuously, but the ecosystem as a whole does not grow. The systemic growth in this economy is rather in terms of increasing complexity of the elements and interactions among them: The emergence of more and different organisms, and more dynamic, widely connected and interdependent structures.

Humans are just one of many species in the large, global household that compete for as large a share of resources as possible. *The economy of human prosperity* can grow, either by humans appropriating a larger part of the rest of the planet's resources for our purposes, or by inventing methods and technologies that can increase the productivity of the resources we use. So far we have done both: We use natural resources like never before, while at the same time we are becoming more efficient in our use of energy and raw materials.
But it is getting harder and harder to increase our consumption of resources. Previously, you could move on to new land when resources were exhausted somewhere, but soon there will be no more spare places left on the planet to sustain our growing appetite for raw materials.

Finally, there is the purely *financial economy*. Originally there was a direct correlation between money and physical resources in the real, physical world. But gradually, money and securities have become a detached, almost abstract system. If you have money already, that in itself is enough to earn more money. The virtual economy can apparently grow into infinity as money is used to generate more money, which in turn warrants the use of even more money. It's exponential growth and it continues, faster and faster, as long as people have confidence that they can get more money back by investing in the system. Therefore, the financial economy has a strong tendency to create "bubbles", where the nominal value of real estate or stock gets inflated to a magnitude that entirely looses its connection to the real underlying value of the physical property it represents. In that sense, financial markets often are like pyramid-schemes. The obvious example are the so-called credit default swaps (CDS), a form of insurance against losses on loans that were issued in the years leading up to the financial collapse in September 2008. At that time of the crash, in the United States there were CDS guarantees issued with a total value of 60,000 billion dollars - more than three times the U.S. annual GDP and comparable to the entire planet's total annual GDP. Fictional contracts were used, over and over, as security for taking out ever-larger loans.

<u>The system demands continued growth</u>
The virtual economy is helping to create growth in the human economy - indeed that

is supposedly the whole purpose of the financial markets. Securities, shares and other "instruments" of investment are useful to fund projects and realize ideas that create real growth. The gains that are achieved when your money grows can also be translated into real, physical consumption, because you can borrow for consumption, using your growing virtual assets as collateral. A very large proportion of the population have funded a considerable part of their consumption in this way, by investing their pension saving or by taking loans in the rapidly rising value of their home. The virtual growth can be translated into real, physical new kitchens, cars and holidays - and there has been plenty of virtual money to spend. In two and a half years, from first quarter 2004 to last quarter of 2006, the value of the Danish housing grew by 63 percent. For the average homeowner, this implied a growth in their equity of almost 55.000 Euros - equivalent to a gain of 58 Euros *each day* over those two and a half years.

As long as the financial system continues to grow, this all works fine. The debt you take on to increase consumption or to invest, you can expect to pay back from the appreciation that follows - almost automatically. But if the growth stops, the whole house of cards collapses.

Although we may be inclined to forget it, the virtual economy builds on the economy of human prosperity - which in turn relies on the natural economy. The three types of economy grow at very different speeds, but in the long run, there must remain a reasonable relation between the sizes of them.

The virtual economy bubble bursts the day the distance between the notional value and the actual value becomes so great that people lose confidence that the value can continue to rise and they begin to pull their money out of the pyramid scheme. Similarly, the human wealth can only grow as long as there isn't too much distance between the level of consumption and the quantity of natural resources available. If the underlying system is ailing, then the rest of the economy ultimately will slow down as well.

Growing through debt

If you spend more than you earn, it implies that you are drawing on your savings account or running up debts - and thus you will have fewer resources available in the future. That seems to be happening these days. We are pulling more resources out of nature than it can regenerate, and thus the foundation for continued creation of resources is degraded. Fish stocks, biodiversity, rain forests, ground water, topsoil, oil, gas ... Not only are they dwindling dramatically, we are also drawing harder and harder upon them.

In this sense one could claim that much of the growth we have experienced recently is false. It looks like progress, but actually the cost exceeds the gains - it's just hard to understand, because not all the important factors are included in the assessment.

An illustration of this systemic opacity is our use of gross domestic product as a key indicator of prosperity. GDP is the standard measure of economic activity, though the figure says nothing about crucial determinants such as the diminishing of our remaining resources or the risk of various types of large-scale collapse, whether ecological or social.

Using GDP as the only measure of wealth has been likened to driving a car by

looking only at the speedometer – you have no indication of whether you are going the right way, or how much gas you've got left.
In this sense, GDP is a great example of the pitfalls of reducing a very complex context into a single, very simplistic value. You get what you measure. Fresh air, clean water, a diverse nature, climate stability, joy and love are fundamental values that give life meaning. But we are inclined to downgrade or even forget them, because our political and economic system cannot recognize or appreciate them.

Another way to measure prosperity is to look at the number of options available - consumption opportunities, career opportunities, social opportunities... The richer you are, the more different choices you have available.
The kind of growth we are creating today, gives us more options for consumption here and now, but it is doubtful whether it can actually be called the growth considering that we achieve it by undermining the foundation for the future. The Brundtland Commission, which formulated the original definition of sustainability, pointed out that development is only sustainable if it does not deprive future generations of their opportunities.
If we impoverish the ecosystem and rob it of resources, we become poorer as a species, although some of us in the short term get to enjoy pleasure of unrestrained consumption. The economy is thriving, but the natural resource base threatens to collapse.

We can conclude that there are powerful systemic factors, which push us towards continued and increasing growth - but the growth undermines itself if it is based on resources that cannot be renewed as quickly as they are consumed.

<u>The impossible curves</u>
In strategic thinking, the starting point for thinking about the future is typically the BAU scenario: Business As Usual. The simple, linear projection: What will happen if things continue pretty much as now?
In its simplest form, the projection simply supposes continued moderate growth. That things are going to be pretty much like last year, but with a bit more of everything. Eventually, though, the small steps add up to dramatic changes. If business as usual is two and a half percent annual growth it leads to a doubling in 23 years
But the future will *not* be business as usual. Indeed, a suitable title for the BAU could be "The impossible curves", because the projections can simply not be realized.

The International Energy Agency, IEA, publishes an annual World Energy Outlook for the next 25 years of energy consumption. The so-called *reference scenario* in the report is one of the key forecasts that are used in thousands of PowerPoint presentations about the future. The Energy Agency's experts try their best to compile figures on expectations for growth and the need for energy, and they compare those numbers to the total investments in energy production.
The forecast from 2010 predicted that the global consumption of energy will grow 36 percent by the year 2035 - and a third of that growth will come from coal, the most CO2-emitting energy source. Only a few percent of the growth in energy consumption is likely to be covered by non-fossil energy sources.
As the IEA noted in unusually worried terms, this scenario leads to a global temperature increase of 3.5 degrees by 2100 - unless something happens that would make the world depart from business as usual.

Unfortunately, there are many others curves like this. They are often exponential, and they grow rapidly, inexorably into the impossible.
The UN predicts that global population will grow from the current 6.7 billion to 9.2 billion in 2050, after which the number is expected to stagnate and then decline rapidly as the population in most of the world experiences the same aging, which the industrialized countries are going through right now. The drama of this forecast becomes clearer if you zoom in on the particular prospects for a few large countries:
- Afghanistan, where women on average deliver more than seven children each, will according to the forecast grow from 28 million inhabitants today to almost 74 million in 2050.
- The Democratic Republic of Congo is set to grow from 77 million to 147 million people in 2050.
- Ethiopia will grow from 96 million to 173 million, Nigeria 176 to 289 million and Pakistan from the current 205 million to 335 million in 2050.

Yeah, right ... It is certainly hard to imagine that countries which already find it extremely difficult to feed their current population, and which in many cases are described with the laconic term ”failed state” because the state, public administration, infrastructure and policy are thoroughly deficient, should be able to double their population over the next 40 years. And the claim is especially hard to believe when the population forecast is seen in combination with the prospects of climate change and environmental disruption.
In the BAU scenario, Bangladesh is set to grow from 175 million to 222 million people by the year 2050, but during the same period, the projections of another UN organization, IPCC, show both growing water shortages and more flooding.
The curves forecasting the earth's need for food seem equally unrealistic. FAO’s projection indicates a need to increase food production by 70 percent between now and 2050. By 2030, the production should be 40 percent higher than today - in about 20 years. This will not only put additional pressure on land and forests. The main obstacle to increasing food production will be water, which is already a rapidly dwindling resource.

There are many curves like these, showing predictions about fundamental aspects of human development, and all them are racing upwards at a pace that is simply unsustainable: the consumption of water, the amount of cars on the roads, air traffic, the aging of the population, demand for raw materials ... They can’t all keep growing exponentially at the same time.
Meanwhile, we can observe how the foundation for future development is undermined by a second set of curves: temperature increases, the depletion of biodiversity, logging of rain forests, falling water tables, the epidemic growth of lifestyle diseases like obesity and diabetes ...
Humanity is in *overshoot*, we spend more than the earth can regenerate. The international NGO Global Footprint Network estimates that it currently takes Earth one year and five months to regenerate the resources that humans consume in one year.

All the forecasts cannot be realized at once. We cannot continue to increase consumption and depletion of natural resources at ever-greater speed. The figures don’t add up, and some of the curves will necessarily have to bend. It

need not end in disaster, but the course *will* be changed dramatically.

Moderation or high-tech growth

There are two extremes in the attitudes towards meeting these challenges: You can try to cut down drastically on consumption, start rationing, retreat to a lifestyle with less transport, locally grown vegetables, fewer acquisitions, woolen sweaters and a generally slower pace of all activities. The objective would be to live simpler, more austere and calm in close and respectful interaction with the natural cycles around us.
The second approach would be to keep the foot on the accelerator and increasingly manage our use of the ecosystem, drawing on an ever better understanding of the natural sciences, and developing technologies that provide control over both raw materials and biology in minute detail. In this strategy, earth is seen as a gigantic hi-tech greenhouse, where all material flows are regulated and optimized to provide the maximum benefits. It is a growth scenario where the turnover in the system is becoming larger and faster, and where an increasing part of life on the planet comes under human control.
The growth scenario has been running for a very long time. It is an integral part of our evolutionary history. Thanks to our intelligence, man has managed to dominate more and more of the ecosystem.

The fundamental question now is:
Are the new technologies we develop sufficient to continue growing, as we know it? Or should we redefine our notion of progress?

The return of Malthus

In nature it is quite common that a species thrives and grows beyond all limits. Unfortunately, it is also common that a successful species suddenly collapses the day the ecosystem can no longer support further growth.
Concerns that humans should suffer the same fate are nothing new. In 1803 the English economist Thomas Malthus published his *Essay on the Principle of Population*. In the book, Malthus observed that the population grew exponentially while food production increased linearly - in other words, that the population would eventually grow faster than the growth in food production could keep up. And therefore famine was waiting ahead.
When Malthus made his ominous charge, there was barely a billion people on the planet, and ever since, the population has indeed been growing faster and faster. But food production has managed to keep up – more or less. Since 1803 we have lived through the industrial revolution, agriculture has become mechanized, we've gotten faster distribution and better storage, and especially after World War II, the green revolution with improved, high yielding varieties and fertilizers has managed to keep hunger at bay, even in regions like India and Southeast Asia, which were previously plagued by regular famines.

In the seventies, The American biologist Paul Ehrlich was a modern version of Malthus. He became known for his book *The Population Bomb*, which he wrote with his wife, Anne, in 1968. The book predicted that the growing population would lead to massive famine as soon as during the seventies and eighties. In a number of other books, he warned that the world would soon run out of the main raw materials, and he predicted that the prices of resources would soon go up steeply as scarcity prevailed. Ehrlich was not alone in having this view. The worry was echoed in the 1972 report

Limits to Growth, which was prepared for the Club of Rome, an international environmental organization composed of many prominent scientists, politicians and businessmen. Limits to Growth was based on mathematical modeling, which showed that the main raw materials would be exhausted within a few decades if current trends continued.

Faith in technology

The seventies passed without the advent of disasters and hunger. Meanwhile, the U.S. economist Julian Simon assembled an arsenal of data that showed the exact opposite: that the environment in all areas was improving. The air was cleaner, far fewer species than expected went extinct, and more people got more food, clean water and better health. Generally, said Julian Simon, an increasing number of people were not a burden but a source of further growth.

In 1980 Julian Simon challenged Paul Ehrlich to bet on whether prices of commodities would increase. Ehrlich and two of his colleagues agreed to pick five metals that they thought would rise in price. They chose copper, chrome, nickel, tin and tungsten. Simon's contention was that they on average would fall in price. The bet ran over ten years and by the deadline in 1990, it was clear that all five metals had fallen in price - despite the past decade's rapid growth in economy and population. The circumstances surrounding the production and use of metals had undergone great changes during the ten years. Copper wires for example, were starting to be replaced by fiberglass, and the use of tin was on the decline, replaced by aluminum.

So Julian Simon was right; the world had found ways to avoid shortages. The famous bet later inspired a young Danish lecturer in statistics, Bjorn Lomborg, to write four articles in the Danish newspaper Politiken, in which he, based on Julian Simon's work perforated many of the prevailing notions of environmental woes. Later came a book, *The Skeptical Environmentalist*, which led to Time Magazine appointed Lomborg to a world's 100 most influential people.

Julian Simon and Bjorn Lomborg's views are examples of one extreme in the spectrum of attitudes toward technology. They have a firm belief that our technology will continue to evolve fast enough to compensate for the problems, which the growth of mankind creates.

With confidence in technology's progress, it is logical when Lomborg argues that we are better served by creating growth now and waiting to tackle environmental issues later, because by then we will have developed the necessary technology to solve problems easier and cheaper.

The race between innovation and need

So who is right? What will work in the long run - limits to growth or transcending technologies? It can resemble a poker game with ever-higher stakes. We are developing increasingly powerful technologies, which at the same time make it possible to continue the acceleration of growth, and create new and ever more extensive hazards. So far technology has come out ahead. But Malthus is still right behind...

Will we make it or not? Maybe it's the wrong question, because it locks us into an either-or mode of thinking. Whether we will make it, is not a question that can be answered definitively with a yes or no. It’s a continued race between our growing needs and our ability to innovate. Moreover, there are differences in degree of

"making it". Compared to the gloomy forecasts of Malthus and Paul Ehrlich, we have largely managed well. We have fed billions of new mouths and supported an almost incomprehensible rise in consumption by a huge and growing global middle class. However, the story has not been equally rosy for everyone. In absolute terms, we have never been more hungry people on the planet than now, or so many without enough water. There have never been so many refugees, either. Already, much of the globe's population is experiencing serious difficulties in getting by.

The fundamental question is rather: How far ahead or behind is our technology in relation to the needs that our lifestyle creates? Can our ability to innovate keep pace with the challenges that face us?

Several times in the book we have used the image of the funnel and how things are likely to get rather tight for humanity in the coming decades, as a growing population figures out how to survive on a dwindling resource base.

Man's ability to explore and invent new solutions has expanded the space of opportunities and resources we have available. It is our innovation skills that will determine how well we make it through the funnel.
Earth and the raw materials in it are finite - but there is not necessarily any limit to what we can get out of the resources.

There is no doubt that new energy sources will be developed to replace fossil fuels – be it solar, fusion, wave power, fuel from genetically engineered algae or something completely different. There will be new, fantastic materials invented that are lighter, stronger, cheaper and smarter than steel and plastic, and we will develop processes for production, distribution and reuse, which can deliver what we want, much more efficiently. Great solutions will be developed, but it takes decades to get them online on a large scale.
It might also turn out that climate change is not as big a problem as we fear. The ecosystem may prove to be far more resilient to our exploitation than we thought. Population growth could slow much faster than expected.
Hopefully, we will have lucky breaks and pleasant surprises like those – but at the moment, frankly, they don't seem like the most likely scenario.

In other words: New technologies will hardly be able to support that growth continues as usual - and thus we will be forced to settle for less material consumption, and we will have to direct growth and progress into areas that don't depend on drawing ever harder on the natural resources. We need to reduce our resource use drastically - in part by continuing the technological development at full speed.

We must be optimistic on technology's behalf. We must believe in our ability to find new solutions. The problem is that faith in technology can easily become an excuse for delaying necessary and appropriate changes. If you anticipate that a solution will somehow show up in time, there's no reason to change anything.
It would be naive and foolhardy to expect that there will be technologies that can suddenly remove the resource constraints we face, or to imagine that technological advances will mean that everything can continue more or less as usual. Humanity has previously handled significant challenges, but it did not happen automatically. You must adapt to the current conditions, if you want to survive here on earth. The

necessary change is not about slowing down or going backwards, but about evolving as quickly as we can, in a quite different direction than the one we have pursued so far.

Opportunity or necessity

And why is this important? Because it is a self-reinforcing development.
In the chapter on feedback we observed that the longer it takes before we stabilize the level of CO2 in the atmosphere, the greater the risk will be of crossing various tipping points, at which a warmer climate starts a chain reaction of additional warming.
The problem is also self-reinforcing in the sense that the longer the growth curves reach towards the point where they can't be sustained, the more the political and social conditions will be sharpened. Should we reach the point of some serious collapse, whether it is in the form of natural disasters, or if it is the supply of food, water, energy and other critical resources that fails, the measures taken will be drastic, rapid and driven by raw necessity. The more fragile and undermined the foundation of our prosperity becomes, the more limited our ability will be of implementing a more measured and planned change.
Once the crisis strikes, we risk that trust and the willingness to cooperate on shared long-term solutions disappears. And with that the added value and wealth that we can achieve through our interactions with each other will disappear as well.

We face two very different possible societal developments:
- *Either* a collaboration to develop solutions that can keep the system from a collapse. This would demand that the members of society to some extent would forego their own immediate interests for the sake of the common good. The more serious the shortage is, the stronger the need for solidarity.
- *Or* an ever-tougher race in which everyone fights against each other to grab a larger share of the dwindling resources. A few will prosper at the expense of the many.

Are we all together in the same boat? Or are we all against each other in the same boat? Our actions over the next, few years will determine which of these two very different developments will be realized.

The developments that will bring us through the funnel will necessarily change our lifestyle. We cannot avoid a revision of the kind of growth we aspire to and see as normal. And this is not only a technological change, but also probably as much a mental and cultural transformation.
Maybe it's just as well: If more material consumption does not make us happier, while it undermines the future of civilization, it's probably time to set other goals, anyway.
The next chapter looks at the possibilities for other kinds of growth.