Future Thinking

A few things you want to know about tomorrow



We all apply strategic thinking to reduce uncertainty and to maximise competitiveness. But what lies beyond strategy?

…The Future

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When we look at the future, we do it in the context of technology trends (not science fiction, but technologies that are recognisable in the research and development phase); the behaviour of people (young and old, in the workplace and in society, at work or at play) and events that change the world (geopolitical events, natural events, predictable and unpredictable events, avoidable and unavoidable events). In this triangle spanned by technology, behaviour and events, we can see the future unfolding in the form of possible probabilities…

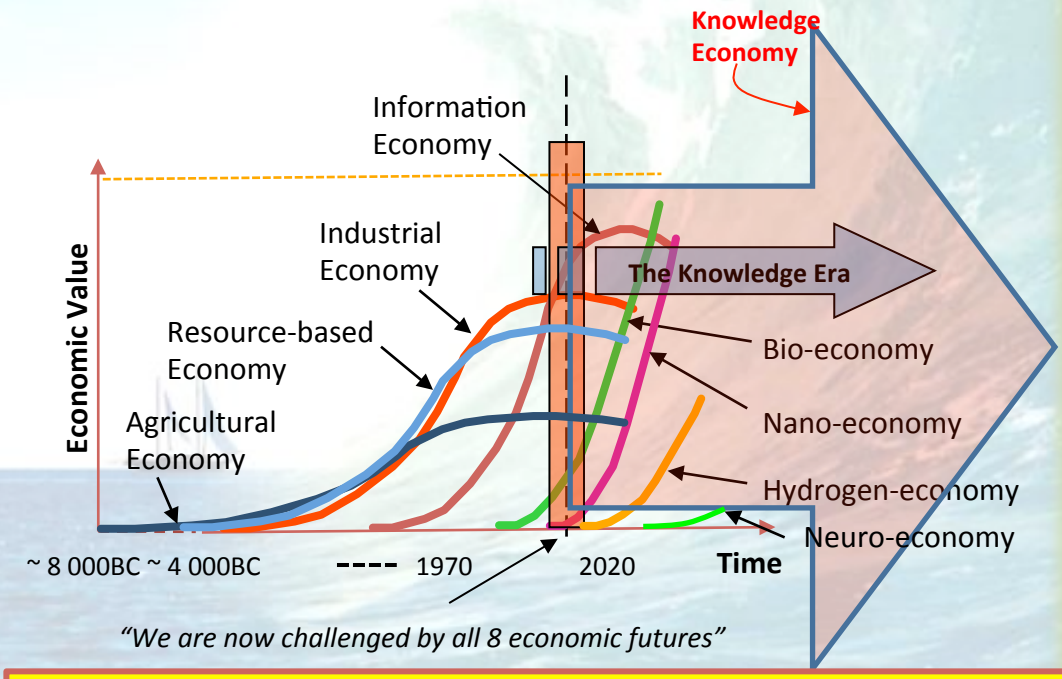
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- New oceans, new tsunamis
- The sky is not the limit
- New humans…and non-humans
- Technovolution
- Cluttered spaces, open spaces
- The last drop of oil
- Ingested intelligence
- Methuselas
- Imagine…
- Location, location, location…

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New oceans….



On these oceans we encounter old and new economic waves; waves that drive economies of countries. We are now living in the knowledge era. The knowledge economy is not a unique economy, but the confluence of many modern emerging economies. As we sail into the knowledge economy, we are facing some tsunamis that draw us up to new heights we may not be prepared for…

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…new tsunamis



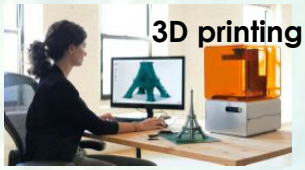
mobile life & apps



augmented reality









Internet of Things







Nanofluidics



Genetic Engineering



geospatiality

Social media will keep us connected in a human world-wide network. One million **mobile apps** exist on about two billion smart phones in 2015 and already change the way we work and play. **Augmented reality** brings us real time information by viewing objects through a mobile device. **3D printing** is the next major disruptive technology. Not only can we make anything where we want it, we will soon be able to grow organs and body parts for implantation and replacement. **The cloud** is ubiquitous and accessible, splitting our processing and data. **Virtually** is a space without a place and shapes the future of work. **The Internet of Things** connect humans and their appliances or systems and these things with each other. **Big data** is the least understood tsunami: in total, the world is generating 1.7 million billion bytes (Petabytes) of data *every single minute*. That is enough to fill 360 000 DVDs. From the dawn of civilization until 2003, humankind generated five exabytes of data. Now we produce five exabytes every two days…and the pace is accelerating. **Geospatiality** gives coordinates to everything, including our information. **Genetic engineering**, also called genetic modification, is the direct manipulation of an organism's genome using biotechnology. **Micro- and Nanofluidics** is the study of the behaviour, manipulation, and control of fluids that are confined to structures of micrometers or nanometers. We can simulate a body on a chip or use these devices for accelerated clinical trials, interacting pharmaceuticals with living cells outside the human body.

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The sky is not the limit

Our discoveries and operational space become extraterrestrial



Sensing, patrolling, inspecting, guarding, spying and tactical targeting will increasingly be done by **drones**



Nano-satellites that are dispensed in space will replace large and micro-satellites because of low cost launch and management

Asteroid mining, the possibility of exploiting raw materials from asteroids and other minor planets will enable minerals to be mined and taken back to Earth or used in space for construction materials.





Mars One has selected volunteers to be sent to Mars from 2024 onwards. More than 200 000 men and women from around the world responded to the first call for astronauts

Space tourism is generally seen as the next tourism wave. Several organisations are investing in building spacecraft that could take tourists into space and back, including Virgin Galactic of Richard Branson and SpaceX of Elon Musk. The involvement of the private sector and not government in space exploration is a new trend.



Exoplanets are explored for the quest of knowledge, but also to find possible habitable platforms for humankind. In about 5 billion years from now the sun will expand and turn into a red giant after exhausting its hydrogen fuel. The Earth will become engulfed and disappear.



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We are experiencing a consumer revolution and are seeing a confluence of generations in the workplace. The emergence of Artificial Intelligence is leading to the possibility of an era of steel collared workers. In the **marketplace** the buying power lies with the older generations, but the influence on the markets lies with the millennials. Meeting user needs is not enough anymore - to make a client interested, you now have to predict his or her needs. In the **workplace** companies are now looking at CEOs of a younger generation. The need for leadership with maturity and stability is making way for CEOs that can drive innovation and connect to younger people. Many of today's CEOs and executives grew up in the pre-Internet and pre-PC era; new CEOs have lived with the Internet their entire career. Baby boomers will be working longer before retirement, although generation X is fast becoming the change masters, whilst generation Y communicates and shares at unprecedented levels. All three generations now cohabit the workspace. Generation G is already working, older people just don't know that, because at their age they are *earning* more money than any generation before by using cyberspace as a marketplace.

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Artificial Intelligence

Hollywood has exposed us to cyborgs, a fictional or hypothetical person whose physical abilities are extended beyond normal human limitations by mechanical elements built into the body. Will cyborgs take over from human beings? Closer to our time now is the question whether Artificial Intelligence can become a threat for workers.

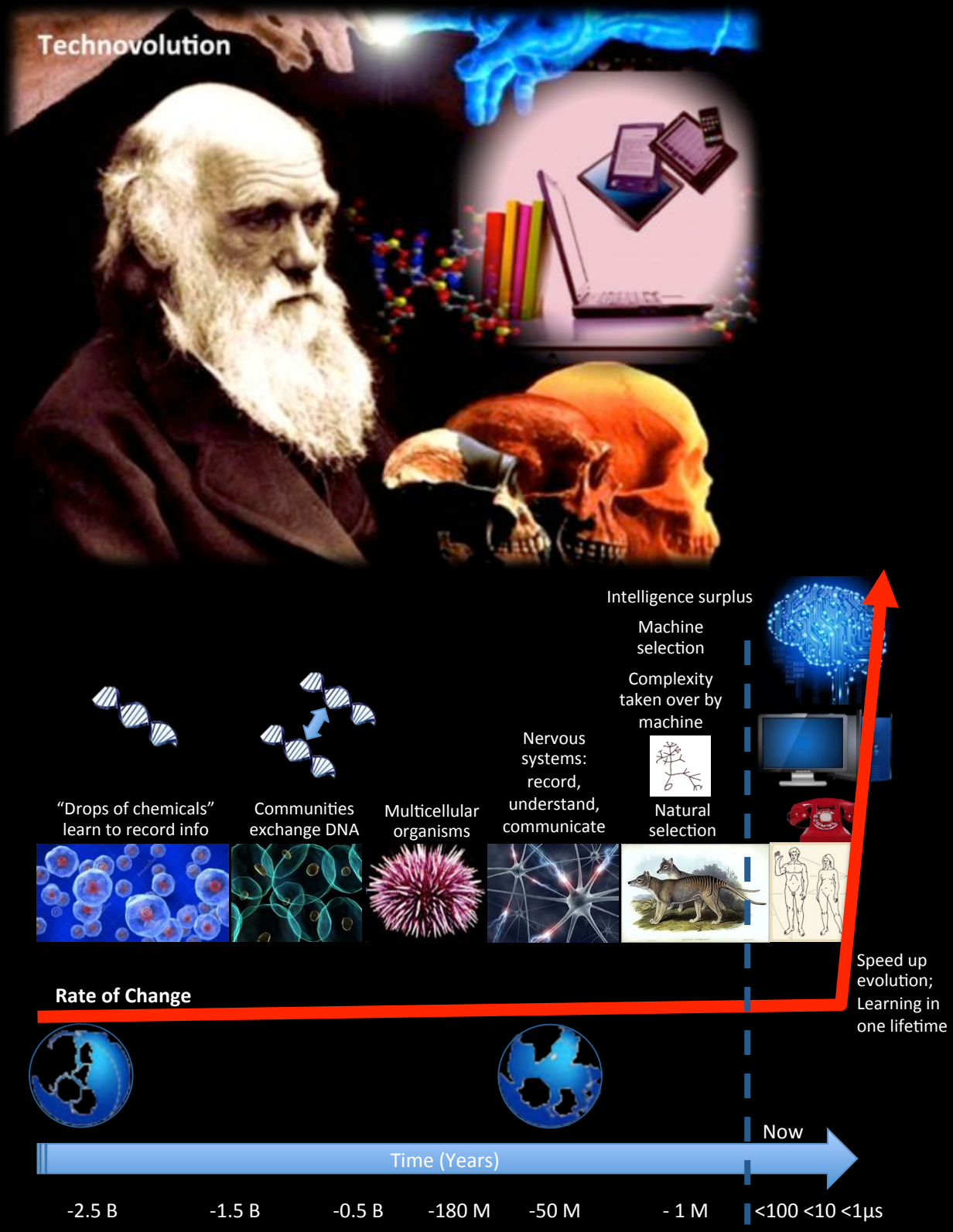
Scientifically a singularity is a point at which a function takes an infinite value, especially in space-time when matter is infinitely dense, as at the center of a black hole.

The technological singularity of Ray Kurzweil is the hypothesis that accelerating progress in technologies will cause a runaway effect wherein artificial intelligence will exceed human intellectual capacity and control, thus radically changing civilization in an event called the singularity. The so-called Kurzweil curve predicts that by 2023 we will be able to buy a US$ 1 000 computer that will have the intelligence of one human brain, by 2050, one that will have the intelligence of the entire human race.

Highly trained people may become unemployed.

But can our bodies and psyches keep pace with this pace of development?

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Biological (Darwinian) evolution took billions of years. Today, following the development of a central nervous system that can record, understand and communicate, learning takes place over one lifetime (<100 years). By developing technology, *homo sapiens* can now speed up technological evolution in technology life cycles of less than 10 years, with complexity taken over by machines that can, through machine selection, produce an intelligence surplus in less than a microsecond. We live in an era of technovolution, where the rate of change is astounding.

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Green buildings will let us breathe



Our buildings will generate their own energy

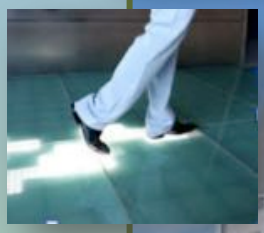


We will have to design buildings for water catchment and storage



We need new forms of transport



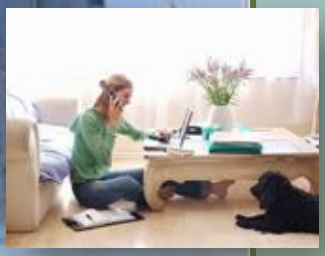


We will transform human movement into energy



We will grow food in vertical farms inside buildings, using hydroponics

We will have to make provision for health and wellness



We can choose where to work



New underground waste management infrastructure will emerge

In the future entire cities may be built in the time it takes to build a bridge today. Our cities are developing into megatropolises as they coalesce and grow. Today more than 50% of all people live in cites; in 50 years more than 75% will. How will we live and work in them and how will we feed the people living in cities, provide energy for them and transport them?



Green spaces will be used for digital detoxing



Forests will be resurrected



Smallholder farming will boom

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For a while in the past decade there has been a scare that the world may run out of oil, the so called “peak oil “ view - the proposition that, as a consequence of resource depletion, it would no longer be possible to increase oil production significantly. Potentially this could have had a large effect on scarcity of many products we use today – asphalt roads, pesticides, plastic packaging, synthetic textiles, detergents, cosmetics, pharmaceuticals, etc. Predictions that oil will last for only 50 years became popular. This anxiety had its benefits in that many new forms of energy and materials started to appear. However, the dramatic collapse of oil prices at the end of 2014 caught most market participants by surprise. The prediction that oil will get scarcer and that the price will continue to rise was turned upside down. Why did this happen? America started producing shale gas through the fracking revolution (although not very popular from an environmental point of view). They had the right technology, high levels of entrepreneurship and good petroleum infrastructure and a favourable tax regime. At the same time the demand for crude oil decreased drastically in developing countries such as Brazil, India and notably China. Selling Brent oil at a price of US$50/bbl is seen as the profitability threshold. A US$50 decline in price knocks US$1.6 trillion off industry revenues, but leads to equal gain by consumers. At these oil prices there is limited investment expected in new oil well infrastructure and in oil sand mining, the more traditional sources of oil. This may lead to a decline in production in two years’ time, with the resultant prediction that the Brent oil price may stabilize at US$80/bbl.

Then there is geopolitics…



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How will we learn in future?

Nicholas Negroponte, the founder of MIT MediaLab said in 2014 that we will soon ingest intelligence. Instead of listening to a lecturer teaching us a new language or literature, we will swallow a “knowledge pill”. In 30 years, Negroponte said, we’re going to be able to literally ingest information. Once information is in your bloodstream, some kind of mechanism could deposit the information in the brain. You could take a pill and learn English or the works of Shakespeare.

Far-fetched? Extreme future? Maybe, but let us consider how we have learnt until now. Audible learning (storytelling) as a human-human interface started to evolve into machine-human interfaces of keyboards, tablets, voice commands, virtual reality and haptic interfaces. The more ambitious research involves chip-to-brain implants, a feat that may be more realistic with the advent of the DNA computer (at least it would be a tissue-to-tissue interface).

But if we look outside the human-machine box, we will notice the dramatic improvements in brain medicine. Maybe the knowledge pill is not as far-fetched as we first thought and chemical-human interfaces may bring us ingestive learning…

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Genesis 5:27
"So all the days of Methuselah were nine hundred and sixty-nine years, and he died".

People are living longer and, in some parts of the world, healthier lives. This represents outstanding medical achievements of the last century but also a significant challenge. Longer lives must be planned for. Today almost **1 in 10** people are **over 60** years old. By 2050, **1 in 5** people will be **over 60**. People aged over 60 **will outnumber children** aged under 15 by 2050.

So what does this mean?

- A lower birth rate is causing world population to slow down
- People in the world are living longer
- Increased strain is put on health and pension systems
- Re-evaluation of social security systems is required
- People will work longer before retirement
- Health care systems will have to reform
- New technologies and services focusing on aged people will emerge
- The number of centenarians will grow significantly
- Disease epidemiology shifts to non-communicable and chronic diseases

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Imagine there's no countries
It isn't hard to do
Nothing to kill or die for
And no religion too
Imagine all the people
Living life in peace...

-John Lennon

Despite or quest for peace…

- Geopolitical complexity and risk are driven by economics and emotion
- Religious tensions and intolerance breed new realms of terrorism
- Financial systems are not operating normally and need to be redefined
- Cyber-crime and cyber-warfare, practiced by states and criminals alike, are a reality likely to cause global disruption
- Democracy is being redefined
- The future of the nation-state may be at risk

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50 billion devices will be connected to the Internet by 2020…

It will be a world of Apps & Maps. We will know where everything is and have it under remote control. Things will be talking to other things, thereby freeing us to attend to more creative activity.

We will gradually move into a world of geospatial intelligence. This intelligence about human activity on earth derived from the exploitation and analysis of imagery and geospatial information that describes, assesses, and visually depicts physical features and geographically referenced activities on the Earth. Strategy will not only be about the *what*, but increasingly focus on the *where*.

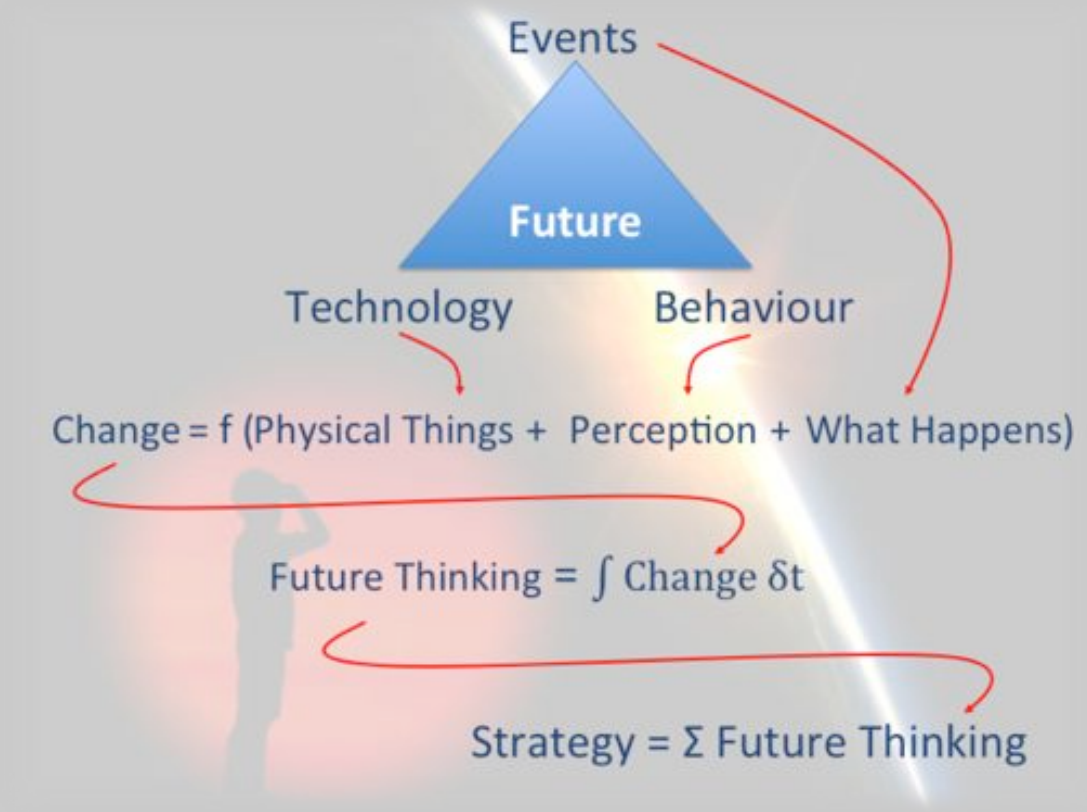
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What lies beyond strategy?

…the future

By applying the Events-Technology-Behaviour approach to look at the future, we can see change which is a function of physical things plus perception plus what happens. Future thinking is then the integral of all change over time and strategy is…

…the summation of all future thinking



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Words of acknowledgement to:

- The numerous web sites used as sources of pictures
- Sandy McGregor, "The collapse of the oil price and its consequences", Allan Gray Quarterly Commentary, December 2014
- Danny Hillis, TED talk on "Back to the future", 1994 on the story of evolution
- Ray Kurzweil, "The Singularity is near – when humans transcend biology," 2005
- Nicholas Negroponte, "A 30-year History of the Future", TED talk, 2014
- John Lennon, for writing and singing "Imagine"

And thank YOU for your interest in the future!



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