

# 'Bits, Bytes & Bewustzijn' – introduction

*'I don't know the future. I didn't come here to tell you how this is going to end. I came here to tell you how it's going to begin.'*

*'I'm going to hang up this phone, and then I'm going to show these people what you don't want them to see. I'm going to show them a world without you. A world without rules and controls, without borders or boundaries. A world where anything is possible.'*

*'Where we go from there is a choice I leave to you.'*

*~Neo from 'The Matrix'*

We live in an incredibly significant phase of our human evolution. A phase in which computer technologies are emerging that are capable of radically and beyond recognition changing what it means to be human as well as our reality over the next 15 years.

At an unprecedented pace, more will change in the next 20 years than in the last 300 years. This degree of immense growth is also called exponential growth. So far, our growth has been linear. This is particularly evident in the various stages of our industrial revolution. In 1784, the first phase of our evolution took place, which gave a boost to our evolution by the power of mechanical control by means of water and steam. The second phase (1870) brought us mass production through the power of electricity. The third phase (1969) gave us the digital world and introduced us to the information/communication driven society, through the advent of computers and the internet. In all these phases there was linear growth, so we saw a gradually increasing line from 1 to 2, 3, 4 etc. and each phase covered an average period of 100 years. The third (digital) phase develops on an exponential scale, so from 1 to 2, 4, 8, 16, 32, 64, 128 etc. You can imagine that the higher the numbers, the bigger the jumps. At this rate, after 30 steps, you reach a billion. A characteristic of an exponential growth curve is that it first goes up slightly gradually, but then suddenly moves up in a practically vertical line. In this third exponential phase we now find ourselves, on the threshold of the fourth phase: where the line suddenly skyrockets up radically.

The driving force behind this exponential growth is the evolution of the transistor, the basis of the microprocessor: the so-called computer chip. An immense development in terms of production costs, size and capacity. Gordon Moore, co-founder of chip manufacturer Intel, introduced the first microprocessor Intel 4004 in 1971 with a capacity of 2300 transistors about the size of a small eraser at the end of a pencil. This chip evolved in 2004, 33 years later, to the Intel Pentium 4 Processor with 125 million transistors and in 2016, 12 years later, to the Intel Core i7 processor with a content of 14.4 billion transistors. If you want to see it with the naked eye, you have to enlarge it to the size of a house. Among other things, this evolution facilitated the arrival of the smartphone and created the size of chips that can be inserted

into our bloodstream. This evolution in computer chips is also called 'Moore's law' as it was Gordon Moore who observed that capacity doubled every 12 to 18 months. The storage capacity has also been increased at an exponential rate. From bulky devices the size of a filing cabinet in 1956, worth \$120,000 with a storage capacity of 5Mb, we have evolved to a microSD card in 2005 the size of 15 mm with a weight of half a gram with a storage capacity of 128Mb to even a memory card of 128Gb in 2014. A capacity increase of a thousand times in a period of only nine years. All this paves the way for many current, exponential developments in the field of nanotechnology, quantum computing, genetic engineering, virtual reality, Artificial Intelligence, brain-computer and human-machine interfaces. Within ten years we will be able to buy computers that match the calculating power of our own brain and less than 25 years later we will have computers with the capacity of all human brains united.

For example, if our fuel consumption had developed at the same pace, we could now run on one tank of fuel for the rest of our lives. If our cars were to shrink at the same pace as the transistor, it would currently be the size of an ant. If housing prices would have dropped at the same pace, we could now buy a house for the price of a candy.

Remember the Atari game console and the joystick? The advent of the global Internet? From the simple mobile phone and laptop to the arrival of the advanced smartphone? These are all developments within the timeframe of one lifetime.

Did you know that telephony is an invention already made in 1878, during the second phase of the industrial revolution? Followed, more than a century later, in 1983 by the mobile phone. Less than 25 years later, the smartphone was introduced in 2007. Less than 10 years later, our streets, our social and working lives and even our brains are completely dominated by this smartphone, which is now developing at an incredibly fast pace. In the coming years, the smartphone will be one of the most central links in the Internet of Things. Almost every citizen of the world has a smartphone, even in third world countries it is commonplace, in a shared first place next to the (smart) television.

### **The 21st century**

We are now suffering from a collective obsessive screen addiction and there is even a term for the present-day information overkill: infobesitas. In addition to many other emerging disorders and syndromes.

Our reality is currently flooded by new computer technologies and wireless networks. Nowadays our lives are mostly spent online, time and distance are no longer a limitation. Tangible, analog products are replaced by virtual ones. Physical shops close, magazines become e-zines, workshops become webinars, conversations are held via Facetime, Skype or Whatsapp and Virtual Reality goes mainstream thanks to the Albert Heijn (Dutch supermarket chain) and mobile providers. We are in a reality in which the motto is that we have to be online 24 hours a day and not fall behind. A world in which everything and everyone is connected and we experience the world from behind our screens.

Everything is being digitized. All our actions are monitored, all our data is

tracked, traced and stored. Mostly without our knowledge or consent. Thanks to whistleblowers like Edward Snowden, we have become more aware of this. Think of dates of our purchases, transactions, internet browsing, where we are located when, with whom we interact online and when, to all our health data in Electronic Patient Dossiers (EPDs). Data is the new oil. Oil companies used to have the power, but nowadays these are the big tech companies like Google, Apple and Facebook.

In addition, there is a growing Internet of Things where more and more things are connected to the Internet. Think of your car, household appliances, smartphone or (game) computer; often without the necessity of human intervention. The digital dimension no longer only exists on a computer screen, but is shifting to your everyday objects through the rise of smart products (smartmeter, smart tv and smartwatch), among other things. Everything will be linked to the smart grid: your work, your home and even your family. We already use the term smart homes and smart cities. The digital dimension is increasingly merging with our analogue, tangible dimension. With all its implications for your privacy, personal space, health and free will.

It is only a matter of time before parcels or smart products no longer contain RFID chips but become part of our vaccine doses, given that such chips or technologies have now reached the nanoscale. Obligatory or voluntary, who will say? Enabling your body to be remotely controlled and monitored by computers and Artificial Intelligence.

Drones, unmanned and remote-controlled flying objects, are now for sale at discount supermarkets and are toys for both children and adults. It's only a matter of time before drones start determining our sky view. Underneath, the Self Driving Cars, which are completely driven by artificial intelligence, determine their route, keep their distance and make autonomous decisions in the event of a car accident.

In addition, there is an extensive robotisation in progress. Complex operations are already carried out by robots, children have robot pets and there are experiments to have the elderly 'cared for' by robots in nursing homes. The implications and applications of robot technology are the subject of intense debate. Think of our production chains, our employment. For years, the army has been working intensively on experiments to deploy robots in war and crisis situations, and it is conceivable that entire armies will consist of robots that have to make decisions about life and death autonomously in war situations. This puts the term cyber warfare, digital warfare, in a totally different perspective.

Our food industry and health care have undergone extensive automation for decades, with a focus on artificial, chemical alternatives. A mechanical intervention in or artificial copying of nature. Chemical medicines, genetically modified food (GMO), fertilizers, printed food, laboratory-grown meat, robotization of food production processes and artificial additives... We are moving further and further away from our biology and what our beautiful planet has to offer us.

The Quantified Self-movement promotes the use of gadgets and wearables, gadgets that are worn on the skin, to make everything quantifiable and with all this data impact on our health and performance. Think of pedometers, calorie meters, mood trackers, apps and head bands to regulate your breathing and manipulate your brain frequencies. Improving your health, your biology and your quality of life through gadgets are part of the Biohacking, Neurohacking and Lifestealing movement.

The irony in this digital quest for optimal well-being is that there is little or no awareness of the far-reaching effects of the radiation and frequencies of these same devices on our health, our brain functions and our consciousness.

Developments are increasingly shifting from applications on computer screens to gadgets that are worn on the skin to implanting chips and controlling them from the inside out. From the 3D printing of organs to the actual transcendence of our biology (transhumanism). Think of anti-aging technologies, injecting nanobots (tiny robots, nanotechnology) into our bloodstream and uploading your brain into a computer, controlled by Artificial Intelligence (AI). With finally the creation of a cyborg body from a full fusion of technology and biology, of man and machine.

### **The fourth phase: the Virtual Big BANG**

Imagine again the graph with the exponential growth curve. The line that first goes up gradually but then suddenly seems to go up in a basically vertical line. We are now at the beginning of this immense curvature of the curve. Just before the point that the exponential growth in computer technology will skyrocket. This extremely fast upward trajectory will radically and unrecognisably change our reality in a few years' time. After the current somewhat 'gradual build-up' you will experience this transformation as 'sudden' and 'instant'. So we are currently in a very remarkable and at the same time crucial phase of our evolution.

Due to the recent introduction of the quantum computer, we can no longer even refer to it as 'just' exponential growth, but as a 'quantum leap'. This quantum computer can process such a large amount of data that it can perform complex calculations in a few days for which a conventional computer would take several years.

The fourth phase of our industrial revolution can manifest itself any minute now: the advent of cyberspace in a virtual big BANG. The full, visible and invisible merging of biology and computer technology through the advent and far-reaching development of the artificial alternatives or manipulation of:

**Bits & bytes** -> computer technology such as Artificial Intelligence and virtual realities.

**Atoms** -> nanotechnology, artificial intervention at the atomic level.

**Neurons** -> neuroscience, artificial intervention at the neural level.

**Genes** -> genetic technology, artificial intervention at the genetic level.

For a long time, we had time to anticipate developments, to draw up long-term plans and strategies. At the moment, however, the pace is so fast that it is no

longer comprehensible or followable with our human brain. Such a pace has never been seen before, therefore the effect is unpredictable. On the one hand, however, it is logical that many people are not yet so overly concerned by all the developments. After all, it will probably not happen that fast...right? Nothing could be further from the truth.

The disruptive power of all the above-mentioned computer technologies will be particularly evident in the various combinations. Imagine the synergy and acceleration through the combination of the quantum computer, Artificial Intelligence and Nanotechnology. Still, I'm not a techno-optimist or techno-pessimist, just a techno-realist. What course we will take is up to you and me.

### **Singularity**

We speak of 'singularity' when we reach the point where we are superseded by computer technology. When Artificial Intelligence and robots are more advanced than we are. Today there are robots that can act autonomously, replicate themselves, make their own decisions based on algorithms and are no longer dependent on their programs and programmers. Will they experience emotions, develop a consciousness? Become enlightened? Nobody knows what exactly is going to happen, but the greatest scientists and minds on this planet are warning us, including the British theoretical physicist, cosmologist and author Stephen Hawking and the futurist, entrepreneur and billionaire Elon Musk.

Is this the quantum leap in our evolution or will it be the end of humanity as we know it? Is this progress or are we on a losing streak?

Welcome to the future.



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