Explore the key messages in Gerd Leonhard's book 'Technology vs Humanity'

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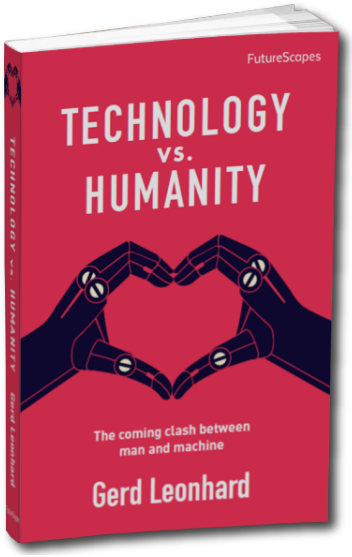
This week, my new book 'Technology vs Humanity' (TVH) will finally be available in print and electronic versions, globally, via my publisher and via Amazon. I am already getting a ton of interview requests and general questions so I figured it may be useful to provide some answers in this new cheat sheet on my book, below. Enjoy and please ping me anytime with questions, comments or your own insights.



New: be sure to download and read this exclusive preview PDF as well: Technology-vs.-Humanity Gerd Leonhard Preview, and check out the slideshow and videos below.

The title: technology *versus* humanity? A clash of man and machine?

The book title is simply meant as a provocation not as a prediction. My position is one of the hopeful optimist, so for me, 'versus' would be the worst possible case – where technology would no longer further the goal of human flourishing, but rather 'flourish itself'. However, I don't think that is likely to happen *if* we can finally start to collaborate on a global set of digital ethics and a collective understanding of what/who we want to be in the future, and define where 'human' ends and 'machine' starts, and vice versa.

In an ideal future, humanity will sit on-top of technology, harness its power

to solve most of humanity's challenges (disease, water, food, energy etc), while allowing us to spend more time on the top layers of the Maslow needs pyramid (i.e. social and cultural needs, self realisation etc). *Humanity plus (or with) technology* would be an overall positive outcome – and this has been our historical default, of course. Therefore, I'm 90% positive and 10% worried, at this point – but it's certainly urgent to not let the 10% grow exponentially along with everything else, either!

Humanity will change more in the next 20 years than the previous 300 years.

Some people snicker at this statement because it sounds like grand-standing. I think it is actually an understatement given the reality of exponential and combinatorial technological change – the compound effect of these changes vastly surpasses the industrial revolution or the invention of the printing press, imho. One key factor is that technology will no longer remain just *outside of us* (such as the steam engine or the printing press which existed outside of human biology i.e. our bodies) – it is actually moving *inside of us* (via wearables, BCIs, nano-technology, human genome editing, AI etc) thus impacting the very definition of humanity. To date, technology revolutions have involved the material world around us. When technology starts involving the biological world within us – and this has really started already – the 300 years in that statement may swiftly expand to 3,000 years.

Embrace technology but don't become it

Genii or Pandora? Because technology is a human product it has always cut both ways. But what I'm concerned about in the current transhumanist debate is the automatic assumption that we aready know the limits of humanity – and that those limits should be dismantled via some type of intervention. Technological progress is clearly not something that we can undo or prevent, or stuff back into the box. Technology is growing exponentially powerful, and much of it is likely to have very positive effects on humanity – such as the possibility of ending diseases, solving energy issues and reducing global warming and possibly halting or reversing

climate change. My point in the book is that we need to embrace technology and harness its positive powers but *we should not become technology ourselves in the process*, i.e. we should pursue human genome editing which may eventually allow us to defeat cancer, diabetes or Alzheimers – but we should probably not use the very same technology to allow us to program our babies, or indeed re-program humanity or create hybrid human-machine 'beings'. Other examples include language translation tools which are certain to become 99% perfect and thus omnipresent within the very near future. While we will and should use such tools to make our lives easier, we should certainly not discontinue language education and training in our schools. An unmediated conversation is an entirely different thing than speaking through an app or bot, and it needs to remain a core possibility of human interaction. We should not automate human interactions to such a degree that we can no longer function without it. The book's chapter on 'not becoming technology' also comments on the debate about human augmentation: once our brains can seamlessly connect directly to the Internet i.e. 'The Global Brain' and the cloud, via wearables and AR / VR, or via Brain-Computer-Interfaces (BCIs) or via implants (within 5-8 years), who would *not* want to have those kinds of super-powers resulting from this development? Yet, if we do embrace this capability as 'the new normal' we may quickly cease to be functional without it. Is that a good idea? Can anything be done about it?

Technology is not what we seek but *how* we seek

Increasingly, technology is going beyond being merely a tool, becoming its own 'purpose' instead. Facebook used to be a tool for finding and connecting to friends; now it is a giant data-mining operation and global media company that generates billions of $ in advertising (read more on why that's an issue, here). LinkedIn used to be great tool for facilitating business connections between us; now it is becoming a predominant and increasingly self-serving engine for global HR/work/jobs analytics; and we can't even use its most useful features anymore without spending serious money on subscriptions. LinkedIn used to be a great tool – now it is

becoming its own purpose. Our 'tools' have minds of their own, and agendas for our time and attention; agendas which are becoming all too obvious as platforms are bought out and brands are floated on the stock exchange.

Technological change is exponential and combinatorial

Moore's law may eventually end as far as chips and processors are concerned but everything else is still following its basic logic, doubling technological powers while halving the cost every 12-24 months (depending on the exact vertical). The most important thing to understand is that we're no longer at the beginning of this curve i.e. at 0.001, doubling to 0.002 – we're at 4 and the next step is 8. Going 6 steps from 4 to 128 means roughly a 30x change in approx 10 years. The key challenge: *technology is exponential but humans are linear!* This is not a question of evolving from horsepower to the combustion engine – or from rail to flight. Now we are entering much deeper waters where timeless concepts such as privacy disappear and augmented human performance may rapidly fragment our society.

We are at the pivot point – 'gradually then suddenly' is becoming the new normal

We have reached a crucial point in human history: '4' in the exponential scale (2016). This is the pivot point after which doubling really starts to matter, quickly. Going forward, there will be increasingly less 'gradual' and a lot more 'suddenly', across the board – and we need to consider this in pretty much every sector of society. Gradually is over – wait and see means waiting to become irrelevant. When looking at business matters, you can see this most strikingly in the lightning rise of digital behemoths and the mass extinction of age-old brands.

The future is Hellven (Hell+Heaven simultaneously)

This is another key meme in my work and the TVH book: the changes I am talking about will be both heaven and hell, depending on your position and

ability to absorb them. Digitization and automation is heaven for large companies but hell for the employees, and often their customers. Datafication, intelligization and virtualization can reduce costs by 95% (heaven) but also significantly increase security risks and annihilate privacy. Who is in charge? What will our ethics and values be? The linear cycles of historical experience are already morphing into parallel universes of rich and poor, peaceful and war-ridden. Business cycles withn industries also vanish, as winners and losers contrast dramatically at any one time. This is more than just the conflation of time and space so often defined as globalisation – this is exponential technology redefining what it means to exist as a human being at any one time.

So what are androrithms ?

This is a key neologism (i.e. a word I coined) in the book. I use this new term to describe what really matters for most of us: human 'rhythms', as opposed to machine rhythms i.e. algorithms. Just as there are circadian rhythms that rule our daily movements as humans, so are androrithms of behavior and culture which determine our perception and experience. A super-computer can win a chess or GO game but can currently not really follow or understand a 2-year old toddler. A person that meets me in a hallway somewhere needs an average of 1.4 seconds to gain some kind of basic understanding about me, even without speaking – a computer still does not really understand my values, ethics and feelings even after it has ingested my entire browsing and social network history of the past 7 years (an estimated 200 Million data points). **Androrithms** include human-only traits such as empathy, compassion, creativity, storytelling and soon to likely become relics such as mystery, serendipity, mistakes and secrets. Consider, for example, what that will mean for the future history of invention! I sometimes comment that for every new, magical and amazing algorithm we also need to strengthen our ancient androrithms. Every technological advancement impacts on how we interact as humans, and in many future cases we will need to safeguard and hedge our essential human idiosyncrasies so that they are not diminished or even eradicated by the tendency of technology to swiftly present itself as a

solution to everything.

"Computers are stupid – they only provide answers" (after Picasso)

Computers are for answers, humans are for questions (after Kevin Kelly).

The megashifts

Because of exponential technological change and how its forces are combining with each other, these 10+ trends are absolutely essential to understand as they may create huge new opportunities – or challenge existing business models, social contracts or humanity at large. Megashifts are more than paradigm shifts, which affect one sphere of human activity. Megashifts arrive suddenly to transform the basis of whole industries and societies. Megashifts do not replace the status quo with a new normal – they unleash continuously dynamic forces which shape and reshape life as we know it unpredictably. As such, Megashifts radically reconfigure the age-old relationship between our past, present and future. (Visit my new Megashifts.com microsite)

Digitization: everything that can will become digital
Mobilisation: computing is no longer happening at the desk – everything is mobile
Screenification: all that can… will be screenified
Disintermediation: many traditional middlemen are suffering because technology makes it possible to 'go direct'. Examples include record labels, publishers, advertising (brands can now tell their stories without TV or print) etc
Datafication: what used to happen between-people i.e. *not* recorded or mediated, is now being turned into data, e.g. electronic medical records vs talking to the doctor
Intelligization: everything that used to be dumb is now becoming connected and intelligent, such as gas-pipelines, farms, cars, shipping containers etc
Automation: a huge factor in regards to technological unemployment
Virtualisation: no longer just physical things in some room or location

but an ‘instance’ in the cloud e.g. software defined networking instead of local routers, virtual friends such as Hello Barbie etc
Augmentation: humans can increasingly use technology to augment themselves i.e. to be omniscient, omnipresent, omnipotent, and become kind of super-human. Augmentation examples include my smart watch, smart Goggles, Augmented and Virtual Reality, intelligent digital assistants and (sooner or later) brain-computer interfaces BCIs and implants
Anticipation: software can now predict our behaviour, even crimes
Robotization: even many white-collar jobs will soon be done by robots
De-humanization: taking humans out of the equation by cutting a complex human task to its bare bones and giving it to machines
Re-humanization: finally realizing that your customers don’t buy technology – they buy relationships! Thus, brand value is defined by being more human, not less!

The Global Brain

Everything we do is already being tracked, logged, recorded and analysed – and this will only get worse. The largest technology companies around the world are all building their own ‘Cloud OS’ that can be thought of as huge and constantly learning ‘brain’. Billions of users contribute via data feeds and mobile devices. Facebook already runs a global social OS (operating system) and LinkedIn runs a work OS. Google is truly building a Global Brain, and they even call it that. A new company called VIV says that ‘intelligence is a utility’ , and IBM Watson wants to be the brain behind pretty much everything: medical / health, legal, government, media / advertising, and energy… What will happen to our own brains (think of it as a neural network of merely 100 Billion neurons capable of 10 quadrillion calculations per second) once we are constantly connected to the global brain? Will we become useless or irrelevant without it, will we increasingly ‘forget ourselves’? And who is in charge? If your ability to calculate numbers mentally has weakened over time, if your skills in real-world orientation and sensing directions has atrophied as the Sat Navs have evolved, just think of this as the merest hint of what’s to come…

Is software (machines, robots, AI…) increasingly 'cheating the world' ?

Riffing off Marc Andreessen's very prescient meme of 'software is eating the world' (2011 WSJ) I recently started worrying about whether in the near future a) software or algorithms will promise us things they can't ever really deliver, or b) whether we will soon anthropomorphize technology way too much i.e. increasingly feel (and act) that these algorithms and machines are indeed kind of 'human'. In particular, the changing interfaces to powerful technologies such as the imminent shift to voice control will mean that we can actually interact with machines like we do with our friends – a trend which will only increase the confusion about what is real and what isn't. Software could very well end up cheating us i.e. offering something as great value that is actually not humanly valuable at all, such as all the 'quantified self' tools that are starting to appear everywhere now .

Beware exponential abdication, deskilling and 'forgetting ourselves'

The average pilot on the average commercial flight now spends less than 3 minutes actually flying the plane. Pilots 'forgetting to fly' has become a major concern for airlines as the so-called glass cockpit problem is growing exponentially — increased automation has made it virtually impossible for a human to jump into a dangerous situation in often less than 45 seconds, and still make the right decision. Many people stopped trying to learn or even understand the city they live in because Google maps will always tell them where they are. Many people will not eat anywhere that TripAdvisor will not recommend. Millions of people will not sleep without their monitoring devices strapped to their wrists. 10s of millions of Facebook users in developing countries are certain that Facebook *is* actually the Internet. A new bluetooth device measures the temperature of a pregnant woman's birth canal in order to predict when contractions will set in. The first major accidents with self-driving cars are happening everywhere (you ain't seen nothing yet) – and not because the car malfunctioned but

because the driver over-estimated what the autopilot can actually do. Large corporations increasingly use HR analytics software (Happily etc) to measure the performance of their employees with 1000s of data-feeds – and then decide who is dispensable based on that information (or who to hire, for that matter)!

Some related 'Gerd Statements'

"The future is like a box of chocolates. Before you know it there's only one left."
"Magic technologies corrupt. Exponential technology corrupts exponentially"
"Everything that can be digitized, automated and virtualised, will be. Everything that cannot (human-only tasks!) will become extremely valuable"