

# FUTURE NEWS

TO CONNECT, TO INFORM AND TO INSPIRE

## IN THIS EDITION

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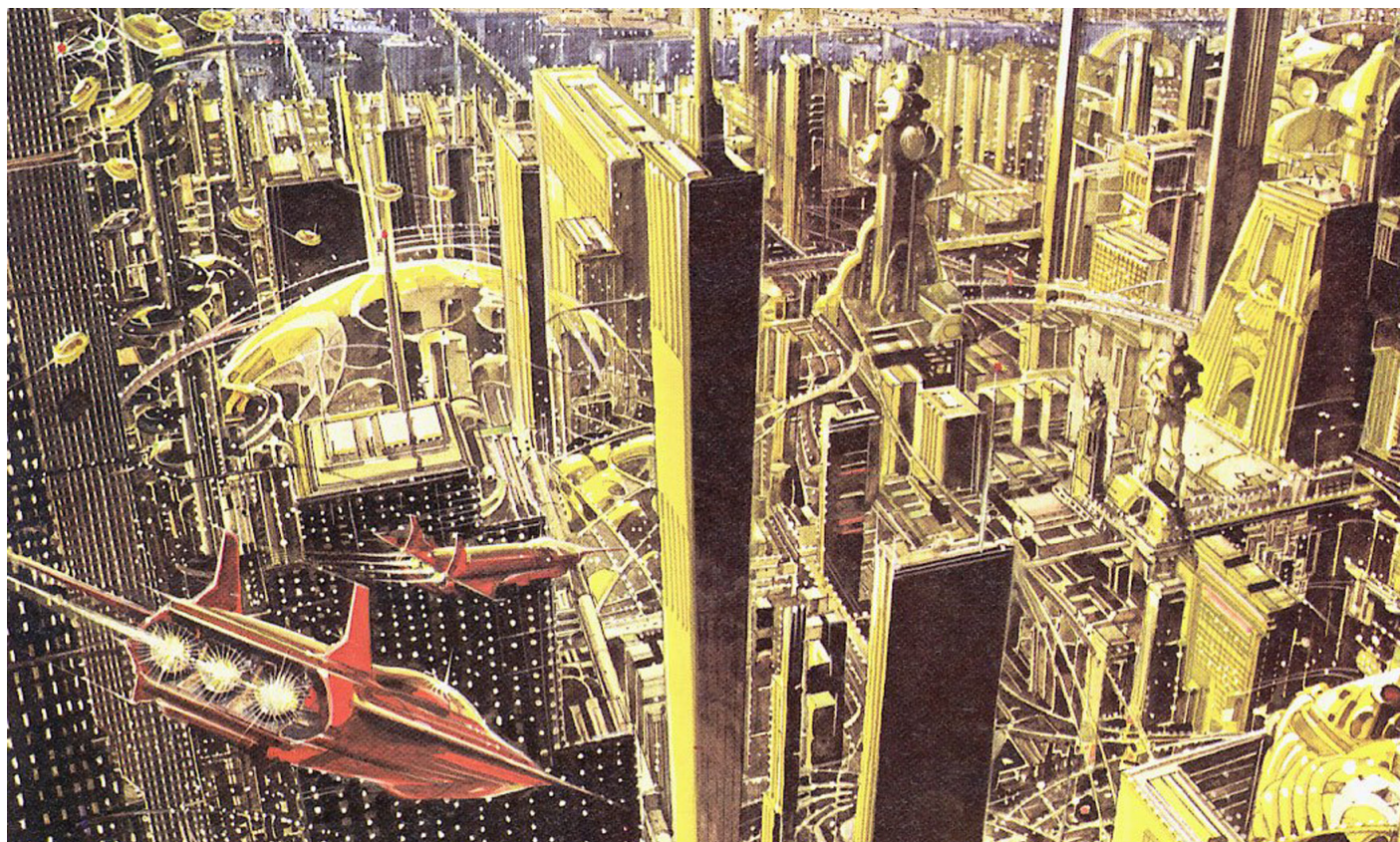
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# IS PREDICTING THE FUTURE FUTILE OR NECESSARY?

**Predictions about what to expect decades from now will tend to fail. But that is no reason to stop making them.**

by Stephen Cave



An illustration of Mega-City One, the futuristic setting of the Judge Dredd comic strip in 2000 AD

As a boy, I enthusiastically read the British comic *2000 AD*. It told sci-fi tales set in the far future — which at that point meant any date after 1999. Judging by its stories, it seemed obvious back then that at the dawn of the next millennium we would be riding our hover-boards to engage in laser battles with rogue robots — though only, of course, if we survived the coming nuclear apocalypse.

Now it is 2016, a date so far into the future that it gives me vertigo. But it is not the future of my teenage imaginings. We were spared the apocalypse; the cold war ended as suddenly as a computer game switched off by a bored child. Instead of rogue robots, we are battling religiously motivated terrorists. And in place of a laser gun, I have an internet-enabled smartphone — a

far more wondrous device that is transforming many aspects of our lives but which was entirely unforeseen by anyone in the 1980s.

Given no one a few decades ago successfully predicted how the world would be today, we might wonder whether we have any hope of predicting how it will be 10, 20 or 50 years from now. Yet we are compelled to try. We are not passive observers of an unfolding drama, but actors shaping the story — and with a strong interest in how it turns out. Every time we take a new job or make a decision about our children's education, we are speculating about how events will unfold. This makes us all both forecasters and visionaries, attempting to read the trends and at the same time to create the future that we want for ourselves.

Books that promise to help us achieve this have been around as long as publishing. But perhaps because today's pace of change is so dizzying, there is currently a surfeit of new works attempting to make sense of what lies ahead. Taken together, they reveal much about the complex relationship between sober forecasts and fantastical visions, future hopes and present fears.

For states, corporations and investors, predicting the future is a high-stakes game that they must play every day. So they hire people like Alec Ross, the technology consultant who was Hillary Clinton's senior adviser on innovation in the State Department. While working for Clinton, Ross visited more than 40 countries to gain insight into the developments that could shape the coming decades. In his new book



The Industries of the Future, he presents his conclusions about which developments “will drive the next 20 years of change to our economies and societies”.

Ross focuses on industries that already gain considerable coverage and investment, such as robotics, genomics, digital currencies and big data. His predictions are therefore squarely in the mainstream, and some — such as that within our lifetimes robots will “walk the streets with us, work in the cubicle next to ours, or take our elderly parents for a walk and then help them with dinner” — could have come straight from my 1980s comic books. But he is a lucid and informed guide, even on the most technical issues. So, if you need to brush up on blockchain technology or cyber security, this is a good place to start.

His goal, however, is more ambitious than a survey of current trends. Ross describes how he would have loved to have read a book as he was leaving college 20 years ago that told him about the coming digital revolution. That there was no such book is what inspired him to write this work predicting the next 20 years. This is a nice story but Ross fails to grasp its cautionary moral: the book he wishes he had read was absent not because authors were blind to the gap in the market but because no one was able to foresee the rise of the internet. Rarely can the future be predicted by simply extending current trajectories.

Certainly the psychologist Philip Tetlock would be sceptical. He has spent his career putting people’s conjectures to the test and has found — unsurprisingly — that the accuracy of predictions declines as they reach further into the future, with anything beyond five years being basically a stab in the dark. Nonetheless, on shorter timescales, he has found that some people really are better at predicting than others. Who and why are questions he attempts to answer in his acclaimed

book *Superforecasting: The Art and Science of Prediction*, written with journalist Dan Gardner.

Superforecasting is based on Tetlock’s most recent study, the Good Judgment Project, in which he and colleagues recruited more than 20,000 people to make some 500 predictions on questions ranging from the likelihood of political protests in Russia to the course of the Nikkei index. Tetlock’s team was one of five competing in a competition sponsored by IARPA, the research and innovation arm of the US intelligence community, which also set the questions. But Tetlock’s recruits were so much more successful that IARPA dropped the other teams two years into the four-year contest.

Tetlock won by systematically identifying the best forecasters within his large group, then giving their predictions extra weight when coming up with an aggregate to give to IARPA. The real research then came in finding out what these overachievers — the “superforecasters” of the book’s title — were doing differently from everyone else. Tetlock discovered that they were analytical and numerate but at the same time intellectually humble and self-critical. They were not ideological but quick to change their minds in the light of new data and were very open to different, even contrary perspectives. This is, he claims, a mindset that we can all aim to cultivate.

Tetlock’s work is fascinating and important, and he and Gardner have written it up here with verve. Admirably, he also wrestles openly with his study’s limitations — though it is not entirely clear he wins.

Tetlock focuses on those who study the unfolding events as if they were fully removed from them, like viewers watching a TV drama. At this game, his select group of retirees and housewives could beat the professionals of the intelligence community. But usually forecasts are part of a more complex game in

which we are players, not spectators. For states and corporations, predictions are hypotheticals — if we do this, they will do that — which can be self-fulfilling or self-preventing. If the retiree predicts there will be war between two countries and there is not, then she has failed as a forecaster; but if the State Department predicts there will be such a war and there is not, it might instead be because of a triumph of diplomacy.

Hence what we value in leaders is not the ability to predict the future but rather to envision it. Amid the chaotic tangle of possibilities, passively predicting is a game of chance; but good leaders know that you can load the dice by actively rallying people around a vision. For the author, entrepreneur and activist John O’Brien, this is what is holding back the environmental movement: although predictions abound about how our actions will affect the future of our planet, there are not enough compelling visions of the happy, sustainable society to which we should be moving. So he asked a range of leading figures in the field to come up with some, and collected them in his new book *Visions 2100: Stories from Your Future*.

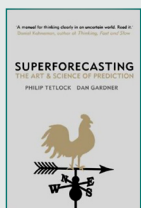
The visions it contains, interspersed with O’Brien’s meandering prose, demonstrate the complex interactions of our predictions with our hopes and fears. Many follow a similar (and ancient) formula: our current folly leads to catastrophe, which eventually leads to renewal and wisdom. The energy adviser Tony Wood, for example, writes about the “dislocation and decimation of many populations” finally galvanising global leaders into action; while environmentalist Bill McKibben writes of how in 2100 “we live in a low-carbon world and it works just fine — except that there’s no way to refreeze the poles, or lower the sea level”.

These are predictions, meant to be plausible, given our current trajectory; yet, at the same time, they

## Details of the five books referred to in this story are:



*The Industries of the Future*, by Alec Ross, Simon & Schuster, 320 pages



*Super forecasting: The Art and Science of Prediction*, by Philip Tetlock and Dan Gardner, Random House, RRP£14.95 / Crown, RRP\$28, 352 pages



*Visions 2100: Stories from Your Future*, edited by John O'Brien, Vivid Publishing, 384 pages



*Visions of the Future*, edited by J Daniel Batt, The Lifeboat Foundation, 682 pages



*Here Be Dragons: Science, Technology and the Future of Humanity*, by Olle Häggström, Oxford University Press, RRP£25, 288 pages

are dystopian visions that are meant to be self-preventing. The authors hope we will heed the warning and take action now, so bypassing the disasters they describe and going straight to the waiting utopia. Though for that to happen, the promised paradise might need to be made more vivid still: the picture in these pages of solar power and worldwide solidarity, though worthy, is just a little too colourless to inspire the masses as O'Brien wants.

Another recent collection extends the idea of predictions further still — into the realm of science-fiction. The anthology *Visions of the Future*, edited by writer J Daniel Batt, brings together classic and new stories about what might lie ahead for us. But its visions come from a different milieu: whereas the hopes and fears found in O'Brien's collection revolve around our relation to the environment, Batt's collection focuses on the hopes and fears generated by technology.

This is the realm of *Star Trek*, *The Terminator* and the still-running 2000 AD, a realm where predictions, visions and fictions seamlessly blur into each other. And that, for Batt, is the point — which is why the collection includes both tall tales of starships alongside more sober analyses of promising new inventions. It is an exhilarating and thought-provoking intergalactic trip, which captures our contemporary sense that, like the sorcerer's apprentice, we are tapping into powers that we cannot fully control.

It is significant that the anthology is published by the Lifeboat Foundation, an advocacy group that aims to ensure we pursue scientific advancement without accidentally blowing ourselves up (or similar) in the process. The collection is intended to inspire us with equal measures of awe and dread at what is possible. Which is just the sentiment that motivates Swedish statistician Olle Häggström in his book *Here Be Dragons: Science,*

*Technology and the Future of Humanity.*

"There is no denying," Häggström writes, "that advances in science and technology have brought us prosperity and improved our lives tremendously... but there is a flip side: some of the advances that may lie ahead of us can actually make us worse off, a lot worse." Chapter by chapter, he then details some of the ways in which things could go badly wrong, from out-of-control Artificial Super Intelligence to the risks of trying to re-engineer the planet. Like the predictions in Ross's book, these will not be entirely new to readers of these pages but, also like Ross's book, this is a thoughtful and lucid overview, should you feel a need to elevate your background anxiety levels.

Pace Tetlock, who likes his predictions specific and testable, Häggström is not trying to tell us that things will definitely work out one way or another. Rather, he is reminding us that the future is an uncharted land in which there might be monsters. We need these gloomy forecasts, just as we need glimpses of a solar-powered utopia. There are some predictions that we make in the hope that they will prove wrong, and others that we very much hope will come true. The better we envision them — whether through sober statistics or the all-action sci-fi of my comic-reading boyhood — the better chance we have of steering the ship of fate along the happier course.

*Stephen Cave is author of 'Immortality: The Quest to Live Forever and How It Drives Civilisation' (Biteback/Crown)*

*This article originally appeared on January 8, 2016 on the Financial Times website ([www.ft.com/cms/s/2/5815c14a-b2e7-11e5-b147-e5e5bba42e51.html#axzz3x5zUw2FB](http://www.ft.com/cms/s/2/5815c14a-b2e7-11e5-b147-e5e5bba42e51.html#axzz3x5zUw2FB)) and is reproduced both with their permission and the permission of the author.*

# FUTURISTS IN ACTION

## Q&A WITH A FUTURIST: DR JOSEPH VOROS



### How did you become a futurist and can you describe the work you do?

I clearly remember the moment I decided to become a futurist. I had been laid off along with hundreds of others by the once-world-famous Silicon Valley company Netscape Communications during their major downsizing in January 1998, and received outplacement consulting as part of the severance package. The consultant asked me what I was interested in enough to want to leap out of bed in the morning, to which I immediately said “the future! That’s it! I want to be a futurist”.

Having been interested in thinking about the future since my youth, the consultant suggested that the audacious idea of trying to make a living doing it might actually be possible, with some effort. After quite a bit of work (and quite a lot of luck) making contacts and keeping my eye on the goal, I eventually ended up running my own small consulting company, and subsequently landed at Swinburne in 2000-initially as a foresight consultant on a small project, then as a strategic foresight analyst working in the strategic planning unit of the Chancellery, and ultimately becoming an academic futurist teaching in the Master of Strategic Foresight at the then Australian Foresight Institute.

These days I teach in both postgraduate and undergraduate Foresight courses, and this year

Futurist and Big History Institute Academic Member (and presenter at our February 2015 Futures Forum) Dr Joseph Voros considers the past, the present and the future in a Q&A with Project Coordinator Kathryn Ford.

(after many years of planning) I managed to introduce Big History to Swinburne, the first university in Victoria to have it (as far as I know). We teach students to think about the future in a systematic and disciplined way, treating different scenarios of and ideas about the future as hypotheses to be tested, and looking for evidence of these possible futures in the present. This is called ‘futures scanning’, and it is an uncontrollable compulsion among practising futurists.

### How can we use Big History as a framework to consider the future of our world and humankind?

As part of my research over the years, I developed a framework model for doing foresight work. One aspect of this is a way to try to look more ‘deeply’ beneath the ‘surface’ trends that seem to be what many people think are the main game of the multi-discipline of Futures Studies. Good foresight work is based, in part, on a clear understanding of the dynamics of change that have led to the present situation. There are many layers to the model, but the deepest layer involves large-scale long-term historical change, on multiple possible scales and time-frames.

If we apply the Big History frame as the basis for our thinking about the future, we get a very different perspective than if we apply smaller frames, such as an industry sector, or a nation-state. Big History provides the ideal planetary-scale frame for thinking about the future-namely, the Earth as a whole system-while the related ‘sibling’ fields of Astrobiology, SETI, and Cosmic Evolution move beyond even the scale of the Earth as a focus for thinking, although they do share much in common with

Big History, so there is considerable cross-fertilisation possible between all of them. Many themes emerge from each of these fields, and we can improve our thinking about the future through the careful and systematic examination of them. Two of the more important of these themes are: the range of conditions necessary for life to emerge and prosper; and the longevity of (intelligent) civilisations. Both of these are of quite direct practical benefit to thinking about the future of the Earth and humankind at this moment in our collective history.

### What is the greatest lesson you think we can learn from Big History?

That “this, too, shall pass”. Big History, through its macro-zoom-lens view of time, forces us to consider the temporary nature of all things; although ‘temporary’ can be a somewhat relative term sometimes. Nonetheless, even the Sun itself will eventually die (taking the Earth with it), so Big History helps us to notice and think about the sometimes fairly limited range of boundary conditions under which things can continue to exist. This realisation that nothing-but *nothing*-lasts, can be a useful antidote to some of the delusional thinking that permeates modern societies, such as some ideas about economics, or industrial processes. When we look to the confident beliefs in their own longevity of long-departed civilisations, we are reminded to be humble about the use of our powers and to pay attention to the conditions which allow us to exist at all here at this moment in time.

As David Attenborough has noted: “anyone who believes in unlimited growth on a finite planet is either delusional, or an economist”. That’s why the idea of an economics for the



Anthropocene is such an important one-how do we ensure an equitable distribution of the necessities for living well without it leading to counter-productive and unjust concentrations of wealth or over-exploitation of resources, including natural and human. History is replete with examples of civilisations that undermined their own viability through ecological over-reach or social inequality. If we heed the lessons of their examples, then perhaps their suffering might not have been in vain.

### **What do you think is the greatest challenge we face today?**

We are in danger of undermining the very conditions which have allowed us to flourish these last 10 millennia or so. Like the sight-gag found in some cartoons, we are sawing through the very branch of the tree upon which we are sitting. Instead of realising this and stopping, as sanity would suggest, we seem determined as a species to saw ever more quickly, and anyone who suggests that this might not be wise may be ridiculed or vilified by others who, essentially, claim that by the time the saw cuts right through we will have found a way to circumvent the law of gravity. This delusional 'magical' thinking-that if we don't like the answers that science reveals about reality, then we can just choose to ignore them or wish them away somehow-is alarming in its pervasiveness in modern global decision-making.

Our organisational and national policies assume an infinite capacity to extract resources from the Earth with scant if any regard for the consequences of doing so. Human history seen from the scale of Big History tells us what we might reasonably expect to follow from this astonishingly short-sighted attitude. It may have served us well back in the Palaeolithic, but it does not serve us well here in the Anthropocene, so we need to grow up as a species, and treat the future as though we are serious about it.



### **What is your biggest concern for the future?**

The primary immediate dangers I see for human civilisation (barring the obvious, like nuclear war or asteroid/comet impact, and so on) are two-fold, but closely related. One, we are approaching a time-at least on a Big History timeframe or perspective-when easy access to the cheap, abundant fossil-fuel energy that has built our modern civilisation is becoming something we can no longer take as utterly for granted as we have done so up to now. The second is that we cannot even utilise the existing known reserves of fossil fuels without effectively cooking ourselves in the process. The metaphor of the boiled frog is apposite here. Thus, energy-the life-blood of the Big History narrative-not surprisingly emerges as the key concern for the future of human civilisation, as we contemplate the possible contours of the future, including the likely profile of any putative 'Threshold 9'. Too little, and the story of rising complexity might well go into reverse, while too much might also do the same. You cannot escape the laws of physics, despite what *Star Trek* might suggest. But perhaps it is the magical thinking that surrounds the energy question that is the most concerning. Delusion-whether it be excessive optimism or pessimism-is not the best way to confront reality. We need a clear-eyed and unflinching view of what may lie ahead.

### **And on the flip side of that, what possibility excites you the most when you consider the future of the Earth and us?**

That our remarkable capacity for collective learning might be harnessed into our doing the necessary collective *un-learning* of some of the habits of mind we have acquired recently-habits that have served us fairly well for a time, but which may well now be counter-productive to the continued existence of our world as we know it, and possibly even our species itself.

If we do manage to grow out of what Carl Sagan famously called our 'technological adolescence' and on into an initial maturity as a planetary civilisation, then perhaps we may imagine and enact an even larger future-of possibly galactic or even cosmic significance. Perhaps we might become not just a planetary civilisation but a galactic one, bringing consciousness and awareness to the rest of the Galaxy; or perhaps we might meet up with other intelligent civilisations similarly involved in-or, more likely, long past-their own maturation as a post-planetary species.

What wonders lie yet undiscovered in this and other galaxies? What fellowships might we forge with other intelligences and civilisations? What manner of expanded collective learning might become possible once we cease to find ourselves alone in the great cosmic dark and become part of a galaxy-scale community of intelligent beings exploring the secrets of the Universe together? Who might we meet, and what might we learn in the futures that yet may come? And that thought is still one that helps me, albeit a little more slowly, to leap out of bed in the morning.

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**ANTIFRAGILE**

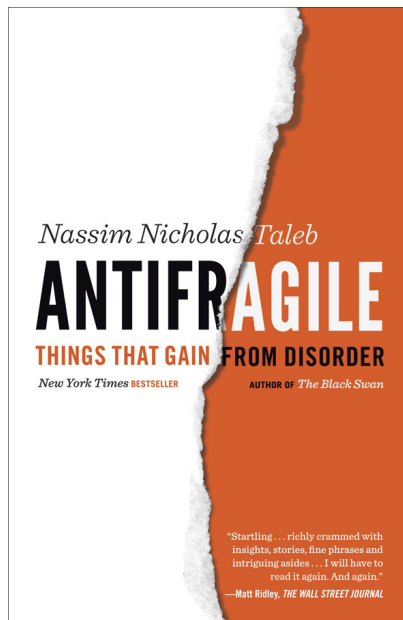
Things That Gain from Disorder

By Nassim Nicholas Taleb

Random House, 2012

# Book Review

by Charles Brass – Chair, futures foundation



Nicholas Taleb first gained wide public recognition with the publication of “The Black Swan” in 2007, but he had been writing about uncertainty, probability and knowledge for many years prior.

For those interested in better understanding the difference between skill and luck I recommend reading “Fooled by Randomness” (2001) or if your interest is more in understanding the implications of rare but high impact events throughout history then “The Black Swan” is for you.

Taleb also spent more than 20 years as a financial trader, which is where his interests in these topics emerged. He has been a scathing critic of traders who claim to have skilful trading strategies when their actual performance is no better than random chance.

This book is a call to action – how to live effectively in an uncertain world. And it is nothing short of brilliant.

Taleb celebrates what he calls “antifragility” a phrase he has coined in response to many others calling for increased ‘resilience’. Taleb doesn’t think resilience – being able to survive shocks or stresses – goes nearly far enough. He wants systems to be antifragile – to actually benefit and grow stronger through being stressed and shocked.

He points out that many natural systems are antifragile. Those ecosystems that are rejuvenated by intermittent but recurring bushfires are just one example. Although he is scathing of the poor design of many human created systems, he does point out that even some of these

are antifragile – for example, receiving a non-lethal dose of a disease (vaccination) stimulates the immune system to be better prepared for the real thing.

As Taleb says: “The antifragile loves randomness and uncertainty, which also means – crucially – a love of errors, a certain class of errors. Antifragility has a singular property of allowing us to deal with the unknown, to do things without understanding them – and do them well” (p4).

He argues that only antifragile systems survive in the long term and that these systems need to face volatility, randomness and stress if they are to survive: “If they don’t they will weaken, die or blow up” (p5). “We have been fragilizing the economy, our health, political life, education, almost everything...buy supressing randomness and volatility” (p5).

This is confronting stuff. We pay our leaders to protect us from danger and harm, and expect parents to do the same for their children. Often, as Taleb says: “those trying to help are hurting us the most” (p5).

Taleb describes this book as his “central work” (p13), and notes that it is really seven books in one (p18). This makes it rather difficult to effectively review in one paper (even one of Taleb’s own collaborators suggested each should be published as a separate (short) book, but Taleb argued that each section was an application or expansion on a central idea and hence had at least to be published contiguously.

Antifragile is also not an easy book to read. As Taleb himself

says: “I write about probability with my entire soul and my entire experiences in the risk taking business. I write with my scars, hence my thought is inseparable from autobiography. The personal essay form is ideal for the topic of incertitude” (p18).

Hence the chapters mix critiques of real world experiences (Taleb’s and others – he is not shy to name those he believes are contributing to an increased global fragility) and romantic dialogues between two (largely) fictional characters called Fat Tony and Nero (readers of “The Black Swan” will have already encountered these characters, and aficionados of another great polemic – “Godel, Escher, Bach – an eternal golden braid” by Douglas Hofstadter will recognise parallels with Hofstadter’s Achilles and the Tortoise dialogues). Antifragile also contains a detailed appendix with technical notes and equations for those seeking some academic validation of the ideas presented.

Taleb makes his many points about the benefits of randomness in many ways. For example he says:

“...confusing people a little bit is beneficial – it is good for you and good for them. For an application of the point in daily life, imagine someone extremely punctual and predictable who comes home at exactly six o’clock every day for fifteen years. You can use his arrival to set your watch. The fellow ill cause his family anxiety if he is barely a few minutes late. Someone with a slightly more volatile – hence unpredictable – schedule, with, say, a half –hour variation, won’t do so” (p101).

He points out that what we call ‘modernity’ is “in the business of turning history into something

smooth and linear, which makes us underestimate randomness” (p6), and devotes the first two books to convincing his readers to embrace antifragility (both for the sake of our civilisation and our planet).

The next four sections are designed to help those readers prepared to contemplate antifragility to understand what it might mean if practised in a future time (he despairs that the current time is capable of making the necessary philosophical leaps in sufficient time to avoid catastrophe). He recommends a ‘barbell’ or bimodal strategy – i.e. playing it safe in some areas (being robust to unexpected catastrophes) while at the same time taking lots of small risks in others (“...let people experience some, not too much, stress to wake them up a bit. But, at the same time they need to be protected from high danger (p163)). Too often, in Taleb’s opinion, modern philosophers call for a supposedly ‘golden middle’ in which exposure to all risk is somehow minimised.

He strongly advocates all of us take the time to understand the importance of creating options – taking risks with limited downside potential but huge upside potential. Most people associate options with the arcane world of finance (something of which Taleb is well acquainted and which provides many of his examples) but it really means having a hunch about something and then taking steps to benefit if that hunch turns out to bear fruit.

In fact, the earliest example of option taking provided by Taleb concerns the Greek philosopher and astronomer Thales of Miletus, who used his astronomical knowledge to anticipate a larger than usual olive crop and bought options to use all the olive presses in his area six months

before the crop came in. He then profited well from selling these options to those with actual olives to crush.

There are many more examples in these four sections, but the Thales example is a nice lead into the last book where Taleb explores the ethics of fragility and antifragility.

Here he is particularly scathing of those who benefit when society does what they advocate, but do not lose anything if what they advocate turns out to be wrong.

He points out that the ancient Romans used to make bridge builders live under the bridges they built for three months after they opened – whereas those who caused the global financial crisis in 2008 are largely still wealthy today (and many of them are still employed in the same jobs).

Taleb is not only scathing of those who lead financial institutions in recent years, but also of the economists and financial journalists who gave their actions apparent credibility. He deplores these commentators’ lack of ‘skin in the game’ likening them to someone who drives a bus blindfolded and then refuses to take any responsibility for the inevitable crash.

In this last section Taleb finally offers some hope: “I am convinced that a single person with courage can bring down a collective composed of wimps” (p420). I certainly hope I am a more courageous person as a result of reading this book.

As a call to action for a better way to live, perhaps this quote from page 380 best sums up Taleb’s message: “If you take risks and face your fate with dignity, there is nothing you can do that makes you small; if you don’t take risks, there is nothing you can do that makes you grand, nothing.”



# Signals in the Noise

## THE 10 SKILLS YOU NEED TO THRIVE IN THE FOURTH INDUSTRIAL REVOLUTION

by Alex Gray – Formative Content



Image: REUTERS/Sergei Karpukhin

**F**ive years from now, over one-third of skills (35%) that are considered important in today's workforce will have changed.

By 2020, the Fourth Industrial Revolution will have brought us advanced robotics and autonomous transport, artificial intelligence and machine learning, advanced materials, biotechnology and genomics.

These developments will transform the way we live, and the way we work. Some jobs will disappear, others will grow and jobs that don't even exist today will become commonplace. What is certain is that the future workforce will need to align its skillset to keep pace.

A new Davos Forum report, *The Future of Jobs*, looks at the employment, skills and workforce strategy for the future. The report asked chief human resources and strategy officers from leading global employers what the current shifts mean, specifically for employment, skills and recruitment across industries and geographies.

### TOP 10 SKILLS

Source: Future of Jobs Report, World Economic Forum

#### in 2020

1. Complex Problem Solving
2. Critical Thinking
3. Creativity
4. People Management
5. Coordinating with Others
6. Emotional Intelligence
7. Judgment and Decision Making
8. Service Orientation
9. Negotiation
10. Cognitive Flexibility

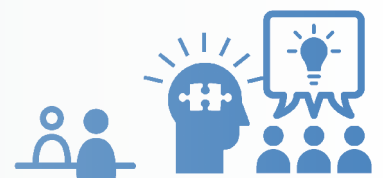
#### in 2015

1. Complex Problem Solving
2. Coordinating with Others
3. People Management
4. Critical Thinking
5. Negotiation
6. Quality Control
7. Service Orientation
8. Judgment and Decision Making
9. Active Listening
10. Creativity

### What skills will change most?

Creativity will become one of the top three skills workers will need. With the avalanche of new products, new technologies and new ways of working, workers are going to have to become more creative in order to benefit from these changes.

Robots may help us get to where we want to be faster, but they can't be as creative as humans (yet).



# Signals in the Noise

The 10 Skills You Need To Thrive  
In The Fourth Industrial Revolution

Whereas negotiation and flexibility are high on the list of skills for 2015, in 2020 they will begin to drop from the top 10 as machines, using masses of data, begin to make our decisions for us.

A survey done by the World Economic Forum's Global Agenda Council on the Future of Software and Society shows people expect artificial intelligence machines to be part of a company's board of directors by 2026.

Similarly, active listening, considered a core skill today, will disappear completely from the top 10. Emotional intelligence, which doesn't feature in the top 10 today, will become one of the top skills needed by all.

## Disruption in industry

The nature of the change will depend very much on the industry itself. Global media and entertainment, for example, has already seen a great deal of change in the past five years.

The financial services and investment sector, however, has yet to be radically transformed. Those working in sales and manufacturing will need new skills, such as technological literacy.

Some advances are ahead of others. Mobile internet and cloud technology are already impacting the way we work. Artificial intelligence, 3D printing and advanced materials are still in their early stages of use, but the pace of change will be fast.

Change won't wait for us: business leaders, educators and governments all need to be proactive in up-skilling and retraining people so everyone can benefit from the Fourth Industrial Revolution.

The Annual Meeting took place in Davos from 20 to 23 January, under the theme "Mastering the Fourth Industrial Revolution".

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