

Thinking about the Future

A journey across six disruptive technology trends that could impact the regulatory industry

FUTURE CRUNCH

Technology, which used to be thought of as a sector on its own, or a function to be outsourced, is now a strategic layer across all aspects of organisation. As a result disruption, is happening in every sector at once. Understanding these changes is essential to respond to a rapidly changing global economy in the 21st century.

Six fast-paced 'future technology' trends — digitisation, connection, automation, material manipulation, augmentation and regeneration — are emerging that have the potential to disrupt the regulatory industry.

1 Digitisation

Digitisation is the conversion of an object, data or image into an electronic format. The power of code is that it creates a common language: it means that data on information, ideas, behaviour and even the physical world can be stored, analysed and shared on a mass scale.

This is why technology, which used to be a sector on its own, is now a layer over everything. We've already seen how powerful the digitisation of images, text, media, voice and physical location can be - disrupting media, transport and retail industries.

In the next decade, we will see similar disruptions in the banking, property, legal and insurance industries. Key to this is the development of new forms of transferring value via [blockchain, or distributed ledger technologies](#).

Not only do these allow for new forms of money (such as cryptocurrencies), but they pave the way for a new digital substrate for the global economy, the so-called "internet of agreements."

2 Connection

The internet has [changed the way humankind functions](#). In its pervasiveness, the internet has altered the way people communicate and the way they form and develop relationships. It has redefined language, concepts of privacy and how people work, play and relax. It has [changed the way they do business](#) and exchange information, how they shop, bank and navigate and importantly, how (and who, or what) they trust.

It is the biggest and quickest technology uptake in human history, and has ushered in a new, digital form of globalization that has opened the door to developing countries, to small companies and startups, and to billions of individuals.

There is no evidence to suggest that the development of the internet is slowing. Indeed, its [geographical reach is expanding](#), thanks to 4G and 5G connections. Approximately half of the world's population are [now connected to the internet](#) – most via their [mobile phones](#). It is estimated that by 2020, 90 per cent of all people over the age of six will have a mobile telephone.

Value is shifting from physical and social assets to digital assets, with soaring flows of data now driving more global GDP growth than the physical goods trade. Data is the new oil. In the next decade we will see the number of connected people rise to 5 billion and a world in which every device, building and phone, is

permanently connected to us, to other devices and to the internet, leaving us in a sea of enmeshed consequences.

And the [Internet of Things \(IoT\)](#) opens the door to every device, building and phone being [permanently connected to humans](#) and to other devices and to the internet.

3 Automation

Improved power systems, new materials, advances in computing, manufacturing and new and better algorithms are [accelerating robotics](#). This is making robots faster, stronger, cheaper, and more perceptive, allowing them to engage with their surrounding environments, and carry out new and increasingly complex tasks. The value of the output of the global robotics industry is expected to surpass \$151 billion by 2020.

Associated with this is the development of artificial intelligence (AI), perhaps the single most revolutionary technology trend of the future. AI enables machines, through a combination of self-learning algorithms and computer systems, able to perform tasks normally requiring human intelligence, such as visual perception, speech recognition, decision-making and language translation. [Investment in AI start-ups](#) has increased significantly in the last five years. Machines are rapidly challenging humans at learning, predicting and deciding.

In the same way that smartphones became widely available everyone in the world in the last decade, robotics and AI will become cheap, easily accessible and deployable for everyone in the next. We will be living in a highly automated and advanced computerised world, sharing it with smart machines that have a form of limited or [governed artificial intelligence](#).

These technologies are revolutionary because they minimise human intervention in areas we previously thought could never be automated - for example, driving a car, investing money, or teaching in classrooms. Automation minimises dangerous or boring tasks. It allows for new insights and greater capacity.

It will create new jobs and give birth to entirely new fields of human endeavour. But in the process, it will disrupt old industries and create structural changes to the economy, with [major implications for employment](#), giving rise to [complex new legal and ethical challenges](#).

4 Manipulation

The digital revolution is changing the way we make things. Four technologies – digital manufacturing, nanotechnology, gene editing and synthetic biology – are enabling society to digitise, manipulate and reproduce nearly every aspect of the material and biological environment.

Digital manufacturing (also known as [3D printing](#)) has rapidly advanced from producing cheap plastic gimmicks to enabling [printing of almost any material](#), from [carbon fibre](#) to [marble](#) to [human tissue](#). New methods of 3D printing such as [laser sintering](#) and [stereo lithography](#) are dramatically improving in the speed and accuracy of digital manufacturing. More powerful 3D scanning techniques allow for the capture of any object or scene in high fidelity and new [light field camera](#) technologies create entirely new possibilities for digital imaging. In the future, these technologies could be combined with [advanced spectrometers](#) to allow the reproduction of any object just by taking a picture of it.

3D printing will enable the production of high-quality goods and no longer require complex [global supply chains](#) and economies of scale. Greater productivity, shorter lead times, fewer supply chain risks and [lower environmental and financial costs](#) will result.

Nanotechnology may enable people to rearrange molecules with atomic precision. Similarly, alchemy could enable the creation of new compounds, giving materials new properties – from [self-healing buildings](#), to [tiny robots in the bloodstream](#).

In the biological sciences, the last decade has seen the arrival of full genomic sequencing and new techniques for [gene editing](#) that make it very simple to 'cut and paste' DNA. It is already possible to create [semi-synthetic life forms](#) and alter existing ones such as [crops](#) and viruses. These technologies will enable us to cure many [diseases](#), [extend lifespans](#) and improve [overall health and quality of life](#).

5. Augmentation

Machines and humans are being linked up to bolster physical and mental capabilities. New capabilities will produce unpredictable and possibly profound shifts in society.

New forms of interaction between people and machines will become available. These include [virtual reality](#), which enables users to immerse themselves in a digital environment; [augmented reality](#), which overlays the real world with digital information and images; [machine-to-brain interfacing](#), which enables people to manipulate computers and machinery with their minds; and new forms of [biological](#) and [chemical](#) enhancement, which aim to greatly increase people's intellectual and physical capabilities.

Augmented reality, virtual reality and mixed reality represent the [next major wave of computing](#). That wave is coming quickly – there are already more than a million monthly users of [virtual reality wearables](#). As these technologies develop, they will allow for a seamless interface between the physical and digital worlds. According to experts, [within 15 years](#) the bulk of our work and play time will touch the virtual to some degree. Systems for delivering these shared virtual experiences will become enormous enterprises, providing new mechanisms for people to connect with one another.

Mixed reality will be accompanied by other forms of augmentation. Brain-to-machine interfacing has already been used for [transmitting thoughts](#) across long distances, for [controlling drones](#) and for [moving robotic limbs](#). Implantable devices, controlled by a neural interface, will be able to use chemical or neurostimulation to perform a wide range of tasks – from fighting diabetes to [firing a gun](#) more effectively.

As the brain and body become increasingly blended with digital and physical technology, augmented communities of interest will begin to emerge in some parts of the world, with [significant implications](#) for security and privacy.

6. Regeneration

We are in the middle of the greatest energy transition of all time.

The realities of climate change, political evolution and technological acceleration mean that a new kind of economy is [coming into being way faster than anyone thought](#). Within a few decades, by necessity, we'll be living in a post-carbon future. The high carbon economy of coal, oil, cars, cows and logging will stagger on a little longer, [but its day are numbered](#).

Arriving in its place, the zero carbon economy of solar and wind energy; dense green building in low-car cities; sustainable infrastructure; electric autonomous vehicles; clean technologies and digital

efficiency breakthroughs; on-demand shared goods and low-carbon lifestyles; sustainable farming and forestry.

This transformation has major implications not only for the future of business, but for humanity as a whole.

Further watching

Benedict Evans (2016) Mobile Is Eating the World -

<http://ben-evans.com/benedictevans/2016/12/8/mobile-is-eating-the-world>

Tim O Reilly - WTF <https://www.youtube.com/watch?v=RHEmE53CqNo>

Further listening

Alexis Madrigal (2017) Containers Podcast, *Fusion*, available at

<https://itunes.apple.com/WebObjects/MZStore.woa/wa/viewPodcast?id=1209559177&mt=2>

Ezra Klein (2017) Yuval Harari on why humans won't dominate Earth in 300 years, *Vox*, retrieved at <http://www.vox.com/2017/3/27/14780114/yuval-harari-ai-vr-consciousness-sapiens-homo-deus-podcast>

Further reading

GSMA (2017) The Mobile Economy: Sub-Saharan Africa 2017, *GSM Association* -

<https://www.gsmainelligence.com/research/?file=7bf3592e6d750144e58d9dcfac6adfab&download>

Vinay Gupta (2017) What Does \$300 Ether Mean? *Medium* - <https://medium.com/humanizing-the-singularity/what-does-ether-100-mean-bb58522f781e>

Whitlock, Wareen (2017) What the story of ATMs and bank tellers reveals about the 'rise of the robots' and jobs, *Ochen* - <http://ochen.com/what-the-story-of-atms-and-bank-tellers-reveals-about-the-rise-of-the-robots-and-jobs>

Angus Hervey (2017) Carmageddon is Coming, *Future Crunch* - <https://medium.com/future-crunch/carmageddon-is-coming-899c0f05a2a>

The Economist (2017) 3D printers start to build factories of the future, *The Economist*, retrieved from <https://www.economist.com/news/briefing/21724368-recent-advances-make-3d-printing-powerful-competitor-conventional-mass-production-3d>

Kevin Kelly (2016) "Chapter 11: Questioning" in [The Inevitable: Understanding the 12 Technological Forces That Will Shape Our Future](#), *Viking Press*

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