

Investing in technology – a battle between good and evil

Investing in technology can be a dialectical battle between the forces of good and evil. Rather like the 'Star Wars' saga, tech is a mystical force that binds the world together – and while it has the redemptive potential of the Light Side, there is a Dark Side with threatening and seductive powers.

Episode I: the rise of technology

Technology in its many forms is one of the key drivers of economic growth, global development and equity market valuations. The first trillion-dollar companies (Apple and Microsoft) are both technology stalwarts. Technology has provided good returns for many investors and continues to offer new investment opportunities.

At the same time, technology is increasingly threatening the western way of life and established social structures. It is becoming harder to say that tech – in general – is a great sector to invest in because it can be a force for both good and bad, often simultaneously. In this article, we consider the nuances that investors should consider in order to identify those tech companies that are not only ethical, but that will be successful in the long term.

The good side of technology

The benefits and utility of all the gadgets we live with today are obvious: looking up the weather forecast or train timetables on the go, booking travel and restaurants, streaming films to watch on the way to work, email, social media, keeping in touch with the news, gaming for relaxation. We take all these things and many others for granted.

As well as all the convenient gadgets and connections that save time, hassle and even lives, besides making our lives so much easier and more enjoyable, technology has other positive benefits including:

- Continual major advances, such as quantum computing
- Personalisation, like targeted advertising and advice
- The Internet of Things (IoT) which connects everyday objects via the internet
- The cloud – for infinite amounts of data storage.

The echo chamber

The moment the online functions we now depend on were created, they began to leave digital traces all over the internet and wherever electronic memory is stored. Each time we use them, unless we are exceptionally careful, we leave an echo of where we have been, what we have searched for, bought, downloaded, uploaded, shared, written, and even what we have said.

There was a time when these digital echoes were relatively harmless, since the sheer volume of data created by them made its analysis all but impractical. However, advances in computing power and artificial intelligence mean that it has become increasingly possible for companies and governments to delve into this deep mine of information. From it, they extract precise data that can change the way they address those who leave it behind (i.e. you, me and anyone who ever goes online or interacts with the Internet of Things).

A quantum leap forward?

The most recent example of this advance in computational power was Google's announcement in October 2019 that its quantum computer, Sycamore, had completed a specific, highly complex mathematical process in 200 seconds that the IBM Summit, a uniquely powerful classical supercomputer, would take 10,000 years to complete (i.e. approximately 1.6 billion times faster). IBM rebutted that in fact, with additional memory resources, Summit could complete the task in 60 hours, making Google a mere 1,080 times faster. Even so, Google's achievement represents a huge step forward towards so-called quantum supremacy (the supremacy of quantum computing over traditional computing).

Our digital world



67%

of the world's population use a mobile device¹

57%

of the world's population use the internet¹



90%

of the world's data has been created in the last two years²

45%

of the world's population use social media¹



42%

of the world's population access social media on a mobile device¹

¹wearesocial.com/blog/2019/01/digital-2019-global-internet-use-accelerates

²forbes.com/sites/bernardnarr/2018/05/21/how-much-data-do-we-create-every-day-the-mind-blowing-stats-everyone-should-read/#29dcf63b60ba

We've already seen how the implications of the increase in data processing power work out in the social networking space, where most users are frighteningly happy to give away their personal information. At its most benign, this information generosity allows network providers to offer targeted advertising – knowing that you've searched for a certain item means they can offer you similar products.

There is a great utility in this, and although somewhat disconcerting ('How did they know I'd be interested in that?'), most consumers are happy to be targeted in this way. After all, if you are a vegetarian who likes Indian food and who tends to go out on the last day of the week, it's highly convenient to be recommended a vegan Indian restaurant located 200 metres away at 9pm on a Friday night, complete with a star rating and reviews.

The darker side of information sharing

Over the last few years the assumption that all the data we create will only be used for the purposes we'd like has become naïve and simplistic. The Cambridge Analytica scandal, where 87 million users' data from Facebook was exploited to support both the 'leave' side in the UK's Brexit referendum and Donald Trump's presidential election campaign, was a clear example of this, as was the Russian interference through fake news bots and trolls in the US. And all this was even before the advent of quantum computing.

Famously (and perhaps with hubris), Cambridge Analytica claimed to have more than 5,000 specific items of information on each of more than 220 million Americans, shortly after Trump's election victory. That's around 1.1 trillion data points.

Imagine how much more information a fully functional quantum database might layer on top of this.

Episode II: Investment opportunity or phantom menace?

When analysing technology as an investment theme in a world more and more focused on ESG (environmental, social and governance) factors, it is important to consider what has driven the more sinister turn of events recently and recognise the potential opportunities and threats for investment returns.

Data strikes back

There are two factors at work, which have combined to create a vast, almost exponentially growing ocean of data to mine – in ways both good and bad.

Firstly, there is the extraordinary facility of consumers with their personal data. We generate vast amounts of it, when we shop, talk online or on traditional telephony, surf the internet, and even go for exercise. This is mirrored by the poor quality of personal, corporate and government internet and computer security throughout the world. The best recent example is the multiple US municipalities that have fallen victim to so-called 'ransomware' attacks, where hackers encrypt and take control of town hall networks and then demand payment to unfreeze the data.

The second factor is the rapid development of new technologies that allow for the creation and gathering of truly prodigious amounts of data, even when we may not be aware of it. Artificial intelligence systems and machine learning allow previously hidden patterns to be discerned. Advances in optics and optical technologies allow greater precision in everything from recycling to agriculture. They also increasingly enable the identification of individual faces in large crowds through facial recognition.

Refinements to satellite positioning systems such as GPS make our locations less and less a thing that belongs to us, and more and more just further bits of information that paint an intricate and intimate picture of who and what we are. Voice recognition technologies now mean even conversations on the street may theoretically be picked up and attributed to the speaker. Already home devices from Apple, Amazon and Google, amongst others, routinely record conversations around the home and send them back to company servers – to help these companies 'enhance the user experience'.

The shape of internet things to come

Beyond analysing our personal data echo and listening to our voice for targeted advertising, the Internet of Things (IoT) means that ever more devices are now internet enabled, from domestic fridges to thermostats in the smart home and from agriculture to industry, saving people time and making lives easier around the world. Estimates of the ultimate size of the IoT universe vary widely but to give an impression, a typical range would lie between 50 and 100 trillion internet-connected objects by 2030.

The rapid expansion of cloud-based data storage means that now there is a convenient and almost infinitely scalable way to store the gigantic volumes of data. In a widely-reported forecast from the end of 2018, IDC, a US market information and technology consultancy firm, estimated that the volume of global data would grow at a compound annual rate of more than 60% between 2018 and 2025, to 175 zettabytes. Cisco, a leading US manufacturer of internet technology, posits even larger numbers.

To put those figures into perspective, 60% compound annual growth over seven years turns 100 into nearly 2,700 by the end of the period. A zettabyte represents 1 trillion gigabytes or, put another way, 1 followed by 21 zeroes of individual bytes. It's a big number and big numbers are bewildering. If each byte were a one-pound coin and you stacked them all up, 175 zettabytes would give you a pile stretching slightly more than half way across our galaxy.

East is east and west is west – but for how long?

In the western world, the potential abuses of this data explosion are being met with more intrusive regulation. In the case of the technology titans, companies like Google, Facebook, Apple and Amazon are under threat of being broken up into smaller entities.

In the eastern developing world, however, where personal liberty is often a lower priority than communal prosperity (as defined by the rulers of those societies), these threats

go largely untrammelled. Indeed, in China, the rise of so-called 'social scoring' means access to housing, healthcare and education, the number of permitted children and even the ability to live in certain areas is determined by how well the citizen has 'behaved'. It is similar to how access to credit here in the UK is determined by one's credit score, but has a sinister Orwellian overtone.

In China, the potential for new technologies to corral the masses and to mould them in a certain direction isn't seen as a bad thing. Quite the reverse: it is the object of state policy.

Balancing the benefits against the downsides of investing in technology

The combination of concentrated corporate power and misuse of data in the west, and the use of data for repression in the east, poses difficult questions for investors in the technology sector.

Can it be acceptable to invest in the shares of companies that engage in or facilitate the dissemination of 'fake news', or that surreptitiously collect and exploit data from their users? Is it acceptable to invest in the shares of companies that make high-end semi-conductors used in gaming computers, which also happen to be key in enabling facial recognition, when that is used for racial or cultural repression? Does the nature of technology itself, with its propensity for creating giant quasi-monopolies, lend itself to sustainable investing?

Over the next 50 years, our western way of life, based on democracy, the rule of law and respect for individual human rights, is going to be challenged by a different world view, where the individual is subordinated to the collective (as defined by the ruling elite). As China begins to flex its economic muscles and to regain its historic, millennia-old role of global economic hegemony, it would only be natural for a Chinese view of how global society should be ordered to take precedence over the western tradition.

Should we follow the US and start to erect walls around our own technology and ban collaboration and commercial ties with key Chinese companies? With 360,000 PHD students in Chinese universities in 2017, and China now filing almost twice as many quantum computing patents each year than the US (and 15 times more than the entire EU), this approach may already be too late.

How these questions affect our decisions about investing in technology

We recently reduced our tech exposure in our discretionary portfolios, partly on valuation grounds. Its fundamental role in generating economic growth and the opportunities it presents in terms of capital appreciation mean that at some point we are likely to add back to it. However, in a world more and more focused on ESG factors, we will have to ensure we're on the side of the angels or as Yoda, the diminutive Jedi master, said, "In this war, a danger there is, of losing who we are."

This is becoming increasingly complicated to implement; but if we can get it right, our clients will enjoy better outcomes, and by providing capital to the right technology companies, we can all build a better future.

The acceptable face of tech investing

There are certain areas of technology where we believe that, currently and ethically, the good outweighs the bad.



Health

Technology that helps people to improve their health or fitness can be an ethically acceptable investment. For example, devices or apps that measure activity or record heart rate, quality of sleep and other personal data.



Water

Access to drinkable water is a basic human right. Water technology providers are enabling people to transport, treat, test and use water efficiently. This can help poorer countries and communities to improve water quality.



Communications

Mobile phone technology can help people in poor countries with low-density populations to access education and banking services which would not otherwise be available to them.



Education

Apps and other technology are enabling people all over the world to benefit from distance learning and home tutorials, studying languages and attaining qualifications and practical skills.

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