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In this issue:

2019 – The Year of Convergence:

forecasting the big themes for the coming year

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In this month's issue, I look ahead...

To what 2019 may bring. Or more specifically, what it may *bring together*.

In his book *Clean Disruption of Energy and Transportation*, Tony Seba speaks about a **technological convergence.**

Why do technologies that change the world forever appear when they do?

Why did the internet evolve in the 1990s instead of the 2000s?

Why did we get the first iPhone in 2008?

Why has social media exploded to dominate so many lives in the last five years?

A groundbreaking technology can only appear when all the conditions for its genesis are all in place first. When that occurs, lots of companies come to the same conclusion at the same time and new technologies explode on to the market.

Think about the iPhone. It took a lot of different individual pieces of technology to evolve before a smartphone was possible but once that time arrived, they exploded on to the market and now almost every phone is a smartphone.

People tend to forget that before the iPhone neither Apple, Google nor Samsung had ever produced a phone. Now they dominate a several trillion-dollar global market.

Even more importantly, the previous leaders in the sector have almost all disappeared or are doing something else.

When I think about the iPhone and the internet, that leads me to consider what pieces of technology are close to the point where they are going to converge to create the kind of explosive innovation that characterises a new of golden age of technology. One that leads to secular bull markets where fortunes are made.

The important thing to remember, and perhaps the most important point from Nick O'Connor's book *The Exponentialist* (a copy of which is in the subscriber area), is that

once the conditions for change are met, it happens all at once and takes everyone by surprise.

Before the conditions are met the majority of people sit around and continue to think in linear terms because that is what they are used to and what works most of the time.

The exponential pace of innovation that leads to mass adoption in very short periods of time is often referred to as an S-curve after the sigmoid function in mathematics.

What technologies are converging?

Where is the next mass adoption mania coming from?

And, of course, how can we intercept these exponential moments for profit?

Electric vehicles

The sector where we have the clearest evidence of an S-curve ready to explode into the mainstream and become completely dominant within the decade is electric cars.

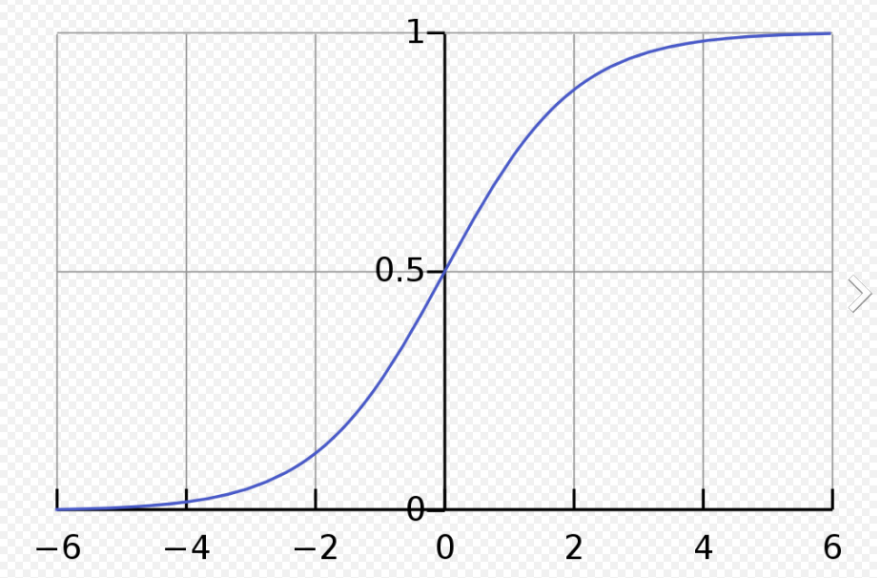
It's why Volkswagen is spending $40 billion, Mercedes $11 billion, and the list goes on.

You can see from the below chart that the beginning of the cycle can appear quite sedate, but once it gets going it accelerates at a blinding pace so that the advance is 90% complete in a third of the time the cycle takes to unfold.

So that is the lens through which I am peering into 2019...

The pace of adoption has been steady but not especially impressive. However, that belies the fact massive investments are being made in battery production facilities, particularly in China and South Korea.

These companies are aiming at supplying the global market for vehicles with batteries by the early 2020s. Even more important than that is the fact that, just like Apple and Google before them, neither Tesla nor Dyson had ever built a car before. Yet this new technology and the lower barrier to entry are helping them do exactly that. Meanwhile China has over 300 battery and electric car companies that did not exist three years ago.



It's an easy thing to predict therefore that the world is going to be swimming in electric vehicles within five years and that within ten, manufacturers of internal combustion engines will be an oddity. This is by far the clearest example of what we can next anticipate from the S-curve in mobility.

It's why General Motors fired 14,000 workers in the US and Canada last week. It's why Volkswagen is spending $40 billion, Mercedes $11 billion, and the list goes on.

An additional important consideration is that there have been articles to the effect that Tesla's batteries lose about 5% of their capacity after the first 50,000 miles but at 160,000 miles they tend to have about 90% of their capacity.

There have even been reports of Tesla anticipating that its newest line of vehicles could keep going for 1,000,000 miles. By the time it takes anyone to drive that distance, the inside of the car is probably going to look pretty tatty but the car would still be going.

That suggests every taxi, Uber, Lyft, Didi, etc, will be electric within the next few years and that electric cars' dismal resale value should begin to improve for newer models.

That's why I want to reiterate last month's recommendation that I believe 2019 is going to be

a very big year for Tesla Motors.

Without question, I will be watching this market for more buying opportunities as the year unfolds.

Autonomous vehicles

Everyone is familiar with the argument for electric vehicles, but autonomy is going to be making a lot more headlines in 2019.

That's because Waymo's CEO, John Krafcik, is due to make a keynote presentation at the Consumer Electronics Show in Las Vegas in early January. He is probably going to concentrate on two big announcements.

Firstly, the firm is now offering a robo-taxi service in Phoenix. That's a progression from the service it was offering this year which was free and was just looking for people to try it. The new service will charge but the company has been coy about exactly what that charge is going to be. I'm expecting that to be the primary point Krafcik makes when he talks.

The second thing I am expecting is more colour on the fact that Waymo has just become the first company to get permission to run cars in California with no driver at all. This is a significant turning point. 35 cars will hit the roads in January around Silicon Valley and highlights the fact that California is powering ahead with legislation to facilitate the next phase of global innovation growing out the Bay Area.

The most important thing about any computer algorithm is you only have to teach it how to handle a given situation once. After that it is simply a matter of copy and paste to every other user of the knowledge. This is the exponential benefit of networked learning.

Imagine if you had the combined knowledge and experience of every human being who had ever taken to the road. Eventually, autonomous vehicles will be *undeniably* superior to even the most ardent deniers.

This account from one of the test passengers, Lilla Gaffney, in Phoenix is illustrative of that phenomenon.

> *"When you think about how you approach a stop sign, the Waymo at first was like, 'This is how I stop. Now I'm going to go. Nope. I'm going to go. Nope.' And then it would go."*
>
> *But as the cars racked up the miles — Waymo says its vehicles have traveled 8 million miles on public roads — Gaffney said they became more sure of themselves. "It drives the way I drive," she said. "It's a very cautious driver."*

Waymo has ordered 62,000 plug-in hybrid Chrysler Pacifica minivans and another 20,000 Jaguar all-electric I-Pace SUVs which are to be delivered in increments over the coming couple of years. That gives us a clue to the growth intentions the company has as it ramps up towards true commercial scale.

Waymo also understands that the reason Android is really the only operating system to compare with Apple's IOS is that it is available for any phone company to use. Waymo is in discussions with Fiat and other car companies to provide them with its technology so autonomous vehicles can be sold to individuals as well as accessed through its own ride hailing service.

News over the weekend that a Tesla drove seven miles at 70 miles an hour, with the driver asleep at the wheel, before police could bring the vehicle to a standstill, highlights both a problem and a positive for the company. Drivers are not supposed to be able to fall asleep at the wheel because the car sends impulses through the steering wheel to make sure you still have your hands on the wheel.

On the other hand, the car did not crash and seemed to be getting along fine until the police pulled in front of it to slow its trajectory and get it to stop. Surely the real story here (that underpins the need for safe autonomous vehicles) is the fact that the chap was fast asleep while driving!

In February, Elon Musk announced Tesla has almost 200,000 cars on the road running Hardware 2, which refers to the sensors, cameras and computing power the company believes are necessary to run autonomous driving.

At the time the company had about 1.6 billion miles of data collected but all those cars driving around are collecting data all the time. Musk is on record saying the company probably needs about 6 billion miles of data to meet

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the demands of regulators to permission full Level 5 or driverless transportation. Let's start multiplying.

The average commute by a US worker is 32 miles. So that is 160 miles a week times 200,000 times 52 for a conservative estimate of 1.664 billion miles. However, the average driver puts about 13,474 miles on the clock every year so by multiplying up, we get 2.694 billion miles – but even that is ignoring the fact that Tesla is selling an increasing number of cars every month. That has led to Musk predicting 2019 will be the year when Tesla will be delivering on autonomous vehicles.

Let's think about this in terms of the S-curve. Tesla is doing everything it can to increase its production while with Waymo's substantial orders from car companies and plans to license its technology to car manufacturers, there is a real chance that we could see an explosive move in the number of cars on the road with full autonomous capability.

This is once the regulatory environment falls into line. Autonomous cars are an innovation that is a perfect example of the technological convergence that I began this issue with. Autonomy would be impossible without the major innovations we have already seen in artificial intelligence, the miniaturisations of sensors, networking, deep learning, data processing, graphics cards and low interest rates

All of the pieces are in place to deliver a set of products to the market that was unimaginable only a few years ago. And 2019 could be a catalytic time for this innovation.

Our first investment in autonomy was Mobile Eye but it was bought by Intel which resulted in a 59.41% profit. We now own Intel for its exposure to optical computing. Intel will undoubtedly have a presence in the autonomous vehicle component sector as well as providing essential parts to the data centre business on which the burgeoning cloud sector relies. The share was not immune from the selling pressure in the semiconductor sector that lopped the price of Nvidia and AMD in half, but it looks in good shape to rebound.

We are now getting more exposure to autonomy with our long in Tesla, but Alphabet (Google's parent) is the other big potential play. The company's revenue is dominated by advertising at 88% so it is safe to say that while autonomous vehicles are an interesting side line, the potential for the sector is not reflected in the company's valuation.

Alphabet generated in the order of $110 billion in 2017. UBS estimates that by 2030 Waymo will be generating $114 billion in revenues, while Morgan Stanley estimates a valuation of $175 billion. If that is even close to true then it is not unreasonable to expect Alphabet's valuation to double over the same time frame.

So, what is the risk with Alphabet? In a word, it's government. The controversy over election and referendum tampering that continues to rumble through the halls of power in the US and UK represent a risk of legislation that could affect the firm's business in a meaningful way.

Then, the EU is constantly accusing the company of antitrust because it is the world's favourite search engine. I find this argument disingenuous since I would not choose to use any other search engine because they are not as good. If a better product existed, I would use it. However, that argument does not hold much water for European politicians and they appear intent on curtailing Google's activities.

The share is currently bouncing from the $1,000 level and I am recommending you buy it both for the potential that it is going to have as a transformational event with the birth of autonomy, as well as the fact that a lot of the bad news has been priced in over the last few months. I recommend Alphabet as a buy up to $1,200 and if autonomous vehicles do in fact reach commercial potential next year, my 12-month forecast is $1,500 with a three-year forecast of $2,000.

The risk is that political machinations result in antitrust becoming a serious issue and if that does in fact occur.

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AI-powered recruitment

How did you find your last job or how did you kids find their first jobs? Back in 2000, I got my job at Bloomberg by replying to a page ad in The Times. In 2019 that is so old fashioned as to be past obsolete. How to get the attention of young people

who are never far from their phone screens leads us to the conclusion that the only way to have any chance of contacting them is if it happens via an app.

That is particularly true in countries like the US and UK where unemployment is at multi-decade lows and the number of available jobs continues to climb. That means it is a buyers' market and employees are hard to find.

Think about the establishments you visit on a frequent basis. How successful have they been in holding on to client facing positions? My local post office, which I visit just about every day, has seen a conveyer belt of rotating counter staff over the last year.

Admittedly, working in the post office is not exactly the most engaging work and customers are often rather unpleasant, but it does not pay badly and they cannot seem to hold on to workers. It seems that given the opportunity, people would rather do anything than man the counter at the post office.

Action to take:	**Buy Alphabet**
Ticker:	**GOOG:US**
Price as of 03/12/2018:	**$1,106.43**
Buy up to:	**$ 1,200**
52-week high/low:	**$980.64/$1,273.89**
Market cap:	**$772.686 billion**

Figures accurate as of last market close 04/12/2018

against a background where minimum wages are trending higher towards $15 an hour in many of the US's largest cities.

In 2019 there is a high likelihood we are going to see a lot more artificial intelligence-driven assistants with natural language programming which will ease the burden of trying to sift through the applications of people looking for the kinds of jobs people do in fact want.

> My recruiting assistant (Mya) is a chatbot that can communicate with potential candidates via text, Skype or email and effectively pre-screens them for human resources departments.

That's just a simple example of how difficult it is to find workers. Here's another:

A friend of mine who has a garment factory told me recently that it is increasingly difficult to find workers because there are just so many available jobs that he cannot find enough people to keep up with orders. That is occurring

My recruiting assistant (Mya) is a chatbot that can communicate with potential candidates via text, Skype or email and effectively pre-screens them for human resources departments. Considering the fact that recruiting is one of the most time-consuming and therefore costly endeavours, many companies engage in these tools to streamline the process, communicate with promising candidates and to portray an image of active engagement with the company, which has a clear benefit.

The bigger picture is that this is just one more example of how artificial intelligence is contributing to better service, the streamlining of processes that are prone to backlogs and freeing up the time of talented individuals to do interesting work. As people absorb the fact that it is possible to get more done and in a more efficient manner with artificial intelligence, then those who don't use it will be at a significant disadvantage.

Of course, another friend who manufactures in China, but has a garment packing facility in Los Angeles, got sick of the stress of dealing with trying to find and keep workers and spent $250,000 on a machine to displace about 60% of the

workforce. It's a substantial outlay but his rationale was simple. When the machine breaks down, you can call someone. When your workers are sick, have an ill relative or had a boozy weekend, there is no one you can call.

As wages rise and the pool of available workers decreases, the obvious answer is automation.

Whether that is automating the recruiting process or the manufacturing process, automation is the constant and only the companies that embrace it are likely to survive.

Folding phones

There is no getting around the fact that smartphones are getting increasingly bulky and are rather difficult to keep in one's pocket.

My iPhone 8 makes it difficult to sit down while it is in my pocket but it's great for watching YouTube or other streaming services, surfing the web or browsing iFunny.

It's also easier for online shopping than my old iPhone 5 and everything loads faster. However, all those functions are also easier on my iPad or laptop than my phone so companies have long been seeking to make phones bigger so they more closely approximate the functionality of full-on computers.

Samsung Electronics announced in November that it plans to bring a folding phone to market in 2019. This is a particularly innovative piece of technology since the folding screen does not have a crease and it is looking like it will roll up. Samsung has been promising a roll up phone since 2013 and there have been a number of false dawns, but it is looking like 2019 will be the year we see them in the wild, with a proposed starting price of $1,770.

It has taken it years to perfect the mass manufacturing technique to bring this product to market and it is inevitable that we are going to see a lot more rollup screens in all manner of different sectors.

Samsung is touting the screen as unbreakable. I'm sure almost everyone who has ever owned a smartphone has broken the screen, primarily because it is made of glass and is not designed to be dropped... repeatedly.

Samsung's newest phone will have a plastic screen. Motorola tried this before with its "ShatterShield" screen. The problem with plastic screens is they have tended to be rather prone to scratches. Samsung's screen is being touted as less prone to scratching but it is inevitably going to be a risk.

Samsung has been a pioneer with large displays, whether that is TVs, tablets or phones and other manufacturers have quickly caught on. It has taken it years to perfect the mass manufacturing technique to bring this product to market and it is inevitable that we are going to see a lot more rollup screens in all manner of different sectors. This couldn't be coming at a better time for Samsung because it needs to have something to differentiate its offering from Apple and other phone companies as the Galaxy Note suite of products matures.

Viewed from the perspective of the S-Curve, the company has been developing the technology for a long time and with commercialisation consumer appetite for roll-up products is about to be tested. This will be an intriguing moment for the phone, much in the same way the iPod was crucial for the MP3.

I think it is inevitable consumers are going to flock to unbreakable screens considering the expense and inconvenience of replacing broken panels. Once the market is proven to accept the technology, I believe it is not unreasonable to see it expand in much the same way that Samsung's OLED technology has. Therefore I think it fits rather well into the S-curve model.

Cryptocurrencies

2018 has been a major disappointment for anyone who is invested in cryptocurrencies. The price of bitcoin and the altcoins has plummeted and the decline was extended in November. If you are a new subscriber and did not catch the video I recorded talking about bubbles and crashes on 19 December, a day after the 2018 peak, here is a link to it.

Rather than focus on the bubble and the crash, let's remember that the promise of blockchain is still likely to come true.

That is the biggest lesson from all bubbles. They make enormous promises, prices get way ahead of reality and eventually crash. But the capital committed to developing the new market delivers new products and services that really do change the world. The easy prediction is that blockchain will change the world. *When* is the harder question to answer.

Harry Hamburg is doing a great

job reporting on the crypto market in ***Crypto Wire*** every month so I'll leave the minutiae to him. What I want to think about at present is where blockchain is on the S-curve and what pieces of technology need to be in place before it enters widespread utility on a global basis.

There are two important basic conditions that need to be met. *These are speed and reliability.*

In order for blockchain to "grow up", it needs to first decide what it wants to be. It is just too much to be everything to everyone. One of the biggest issues right now, for blockchains that rely on a Proof of Work (POW) consensus mechanism, is industrial mining. The ideology that a crypto like bitcoin was built on was decentralised control: having millions of different miners with no one person or entity owning a controlling share in the network. But POW has allowed people to band together and this has had adverse effects.

The control miners have over the direction of innovation in bitcoin is a headwind to innovation because of the consensus building required. The forks that result when consensus building fails is deleterious for confidence, but more important than not, it exposes fragility in the system that is just not acceptable when the ultimate aim of bitcoin is global domination.

The additional fact that mining is concentrated in countries where there are low standards of governance leaves a lot to be desired. Regardless of where you put the bar, it is another obstacle to bitcoin dominating the cryptocurrency market.

This is an uncomfortable topic but all of the crypto experts I have spoken with have never been able to adequately explain why blocks should have a monetary value. The present business model of charging for network space works fine and allows data centres to be built all over the world. Recompensing mining as a lottery system is great as a gimmick for gaining adherents, but it's not something a bank can extend credit against when there is a race to the bottom in terms of efficiency and technology.

Directed acyclic graph (DAG) cryptos like IOTA aim at solving for speed because they get faster the more people use them and the transaction rate for cryptos has to be at least on par with the conventional payment providers like Visa, Mastercard or PayPal. My intuition tells me that the best comparison is that bitcoin is to the future of blockchain, what Netscape was to Google and Facebook.

Back in the day Netscape was the dominant internet browser and at one time it looked like it was going to dominate the market forever. Today what's left of it is the free Firefox browser. Bitcoin is a lot like Netscape. It was the dominant feature but is unlikely to be the tool that carries the sector into global domination.

So what will? There is a simple way to ascertain how and when that happens. Temporal leadership. This is something I wrote about in my book *Crowd Money*.

Something that becomes apparent after every crash is that there will be one part of the market that shows early, relative strength and holds it. It will bottom ahead of the wider market and will exhibit clear relative strength on any recovery in prices. Even if the instrument at the epicentre of risk, in this case bitcoin, continues to decline, the next leader should hold its lows. When the instrument at the epicentre of risk eventually does bottom, the next leader should be well on the road to recovery.

So what is the cryptocurrency exhibiting those characteristics today? It's early days yet but, so far, my best bet is Ripple.

I know all of the arguments about Ripple being overly centralised and designed to be used by banks rather than regular people, that the supply is locked up by the founders and the fact banks using the Ripple network are not actually using the Ripple coin for transactions.

However, it is clearly exhibiting relative strength and in an environment where bitcoin lost a third of its value in a month, that is something we need to pay attention to.

This is an uncomfortable topic but all of the crypto experts I have spoken with have never been able to adequately explain why blocks should have a monetary value.

Tech dividends

I know what you must be thinking because dividends are not what anyone expects when we talk about the technology trends of the future, but I expect them to be a big topic of conversation in 2019.

Historically, when a technology

company decides to pay a dividend it is viewed as the top of its business cycle and an admittance the company is no longer capable of exponential growth. The logic runs that when the business is throwing off lots of cash, it is natural that it would be investing everything in building out the market or developing new ones. When they commit to paying dividends, they are obviously not doing that any more so some investors begin to think they are no longer capable of outsized growth.

That's a mistake.

One of the most attractive features of investing in technology and particularly in software is the high margins they enjoy. Building out of a market for a product that exists on the internet costs nothing more than marketing.

It is possible to commit hundreds of billions to sale and R&D and still have plenty left over to reward the faithfulness of investors. That is exactly what Apple did in 2012 when it started paying a dividend of 37¢. Since then, and even after the recent decline, the company has almost doubled the dividend and the price of the share has risen from $83 to $178.

Microsoft initiated its dividend in 2003 and has been growing it steadily since, from the original 3¢ to the current 46¢ per quarter. Microsoft is now vying for the position of largest company in the world and its recent performance highlights the fact that it is management, governance and ambition drive profits and growth rather than whether the company pays a dividend or not.

Intel initiated its dividend in 1992 at 3.125¢ and it is now 30¢. In that time the share has been through major bull and bust cycles but it remains a dominant force in the global chip sector.

So why is this going to be a big topic in 2019? Dividends are an answer to one of the biggest questions in the market today. "How do I insulate my portfolio from the rising interest rates and the declining value of government bonds?"

Fixed income investors generally try to accomplish this feat by either buying very short duration bonds because they have less interest rate exposure or buying floating rate notes because their coupons move up in value with the interest rate. However, both of these are very crowded trades and have pretty much squeezed all the value available out of the asset classes already.

Historically, equities have been a good store of value in inflationary times because companies get pricing power back when inflation increases and raise prices, which preserves margins and boost stocks. By preserving margins companies can raise dividends at least in line with inflation and therefore investors gain a hedge against inflation.

The companies in the best position to continue to growth dividends well in excess of the rate of inflation today are technology companies.

I plan on writing much more about this topic in 2019 but I thought it important get a note out to you now because this will be an important factor that is already driving performance in our portfolio today.

Magnetic diodes

An electrical diode allows current to flow in one direction but not the other. They are found in just about every electrical appliance and machine today. Everything from LEDs to solar cells is reliant on diodes. They are so common today that we forget the diode was first produced by a British scientist, Frederick Guthrie, in 1873. It's hard to overstate how much of an impact on the modern world the creation of the diode has had.

Until the last few months it was not possible to create the same unidirectional flow in magnetic fields. The Lorentz reciprocity principle states that when a magnetic field from one source, like an electrical wire, is spread to a second wire, that second field exerts is own magnetic field back on to the first. That principle has stood since 1896 but it was disproved in November. Again, this discovery was first completed in the UK, this time by Jordi Prat-Camps at the University of Sussex.

This is big news because it holds out the potential for unidirectional flow of magnetic fields without a feedback loop. In our world where recharging is taking on new meanings all the time, this is a major discovery. It is the first indication that the field of magnetics is now open to the same kind of innovation that the electrical components field has had over the last 150 years.

This UK experiment was completed using pretty bulky equipment and the team has high hopes of miniturising the technology with further research.

Earlier this year scientists at the University of Missouri in the US published a paper entitled "Magnetic Diode Behavior at Room Temperature in 2D Honeycombs" which refers to their work with nanostructures. What is particularly interesting is that their results were not predicted by their theories and they were at a loss at the time as to how to explain the effect. It now

appears that the University of Sussex team has come up with the rationale behind the effect which is a significant iteration of this work.

Deepak K.Singh at the University of Missouri stated:

> *"A diode normally conducts current and voltage through the device along only one biasing direction, but when the voltage is reversed, the current stops. This switching process costs significant energy due to dissipation, or the depletion of the power source, affecting battery life. By substituting the semiconductor with a magnetic system, we believed we could create an energetically effective device that consumes much less power with enhanced functionalities."*

The potential of magnetic diodes is they could eventually extend battery life by 100 times. Now that is not going to happen in 2019, or 2020 for that matter, but the profit potential from this kind of innovation is such that it is unlikely to have any impediment in finding funding to drive research.

So that's my look ahead at the key convergence technologies of 2019, as I see them.

Without doubt, it's going to be a pivotal year for some breakthroughs that have had years on the margin, waiting to hit the market and trigger mass adoptions.

I am very excited about the opportunities these moments of convergence will present. And, of course, you'll be the first to know about the best of these opportunities here in *Frontier Tech Investor*.

All the best,

Eoin Treacy
Investment Director, *Frontier Tech Investor*

Data as of 03/07/2018

Medical

Company	Ticker	Rec Date	Price Then	Price Now	Gain/ loss %
Autodesk	ADSK	19/07/17	$108.83	$108.83	36.01
Illumina	ILMN	05/09/17	$207.22	$350.25	69.02
PureTech Health	PRTC-L	09/01/18	155.75p	180.00p	15.57
Becton Dickinson and Co	BDX	03/05/18	$221.35	$252.56	14.78
Canopy Growth Corp	WEED :CN	21/03/18	C$33.11	C$44.07	33.10
Advanced Oncotherapy	AVO	03/07/18	48p	38.00p	-20.83
Boiquell	BQE :LN	07/08/18	440p	578.00p	31.36
Aurora Cannabis	ACB-T	19/09/18	C$12.35	C$7.52	-39.11

Technology

Company	Ticker	Rec Date	Price Then	Price Now	Gain/ loss %
Garmin	GRMN US	02/08/16	$55.75	$68.57	31.30
Cisco Systems Inc.	CSCO: US	03/04/17	$33.80	$48.74	50.56%
Microsoft	MSFT	31/07/17	$73.04	$112.09	56.93
Northrup Grumman	NOC US	07/11/17	$301.66	$261.47	-11.89
Intel Corp	INTC	06/06/18	$57.03	$50.13	-11.05
Activision Blizzard	ATVI: US	02/10/18	$83.29	$46.60	-44.05
Tesla	TSLA	05/11/18	$346.41	$358.49	3.49
Science Apps Int	SAIC	07/07/16	$58.20	$69.58	24.88
Alphabet	GOOG: US	04/12/18	$1,093	$1,093	–

Energy

Company	Ticker	Rec Date	Price Then	Price Now	Gain/ loss %
Ormat Technologies	ORA on NYSE	06/06/17	$58.79	$56.72	-2.35
Sherritt International Corp	S CN	06/02/18	C$1.18	C$0.52	-55.93

Moonshot

Company	Ticker	Rec Date	Price Then	Price Now	Gain/ loss %
SolarWindow	WNDW	07/04/16	$3.96	$3.50	-11.62
Alkane Resources Ltd	ALK: AU	05/09/16	AU$ 0.31	AU$ 0.22	-29.51
Superconductor Tech Inc	SCON	03/04/18	$9.60	$1.63	-83.02

For the full portfolio including live prices, please visit the *Frontier Tech Investor* subscriber area. **You can view that by following this link.**

Risk warning

Your capital is at risk when you invest in shares – you can lose some or all of your money, so never risk more than you can afford to lose. Bid/offer spreads, commissions, fees and other charges can reduce returns from investments.The Frontier Tech Investor portfolio is not intended to represent the exact price at which you could buy or sell a share. Our reference price is the closing price the day before issue is published. Sometimes readers will achieve better entry/exit prices; sometimes worse. All gains are gross, and returns will be affected by dealing costs and taxes. Profits from share dealing are a form of capital gain and subject to taxation. Tax treatment depends on individual circumstances and may be subject to change in the future. The information and opinions expressed do not necessarily reflect the views of other editors/contributors of Southbank Investment Research Ltd. Small cap shares - Shares recommended may be small company shares. These can be relatively illiquid meaning they are hard to trade and can have a large bid/offer spread. If you need to sell soon after you bought, you might get back less that you paid. This makes them riskier than other investments. Small companies may not pay a dividend. Full details of our complaints procedure and terms & conditions can be found on our website southbankresearch.com Investment Director: Eoin Treacy. Frontier Tech Investor is issued by Southbank Investment Research Ltd. Registered in England and Wales No 9539630. VAT No GB629 7287 94. Registered Office: 2nd Floor, Crowne House, 56-58 Southwark Street, London, SE1 1UN. Southbank Investment Research Ltd is authorised and regulated by the Financial Conduct Authority. FCA No 706697. https://register.fca.org.uk/. ISSN 2398-2470. © 2017 Southbank Investment Research Ltd.