INVESTING IN AN AGE OF DISRUPTION
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Remarks have been edited for clarity and relevance.

Today, I'm excited to share with you a talk that I first gave at Latticework in December. It's been expanded somewhat, however, so I hope you don't fall asleep along the way! But before we begin, I'd like to provide a little background on the origin of this talk.

Last year, when John [Mihaljevic] asked me to speak at Latticework, I enthusiastically said "yes". You see, I said "yes" not because I thought I had any special insights for so many distinguished investors. John just happened to ask me on the same day that I was lecturing my twin daughters about investing. For the first few minutes I thought it was going pretty well. But then they just rolled their eyes at me and asked, "how much longer is this going to take?" This kind of behavior, I'm told, is perfectly normal for aspiring teenagers, but it's just not my idea of a good time! So, I figured that speaking at Latticework would be a lot more fun. Therefore, it's really because of John, and many hours of writing and research later, that this talk was born. So, here we are today. Thank you, John!

There are three points that I'd like to make and then we can open this up to Q&A.

1 – Investors continuously underestimate the speed at which disruption transforms business and society.

2 – In an age of rapid technological change, we need to approach valuation, not with heuristics, but with new eyes.

3 – We should use diversification, not only to play defense, but also to play offense. We don't need a bad-ass, 3 stock portfolio to outperform the market.

But first, since this talk is entitled "Investing in an Age of Disruption", let's define what "disruption" is.

Dictionaries say that disruption is a break or interruption in the normal course of things. In business, that break, or interruption can take the form of a new technology or new business model.

Think of Dollar Share Club, for example, which successfully tackled Gillette. Founded in 2011, this company, empowered by the internet, launched a direct-to-consumer business model that was so successful in attracting customers that Gillette's once impenetrable economic moat was breached and its pricing power curtailed. In the Spring of 2017, only six years after Dollar Shave Club was founded, Gillette had no choice but to cut the price of its razors by an average of 12%.

History shows that disruption is sometimes driven by the convergence of new technologies that in turn ignite causal feedback loops. The iPhone is an example of this, and I'll speak more about Apple later. But for now, keep in mind that these feedback loops exponentially accelerate adoption of the new system and the demise of the old.

Let's talk about a couple of feedback loops for a second. As a long-term investor, feedback loops are so important to me because they can drive exponential growth by providing the fuel for a business to compound earnings in a durable manner.

For example, today the volume-cost feedback loop is helping to accelerate the adoption of battery electric vehicles (BEV) and renewables, including solar. Think about it this way. When volumes rise for new technologies, costs fall. This in turn spurs more consumer adoption and greater volumes. Conversely, falling volumes for the incumbent businesses means lower utilization rates, collapsing profits, more stranded assets, higher costs, less consumer usage and lower volumes.

A technology feedback loop adds momentum to this flywheel, or virtuous cycle. For example, as solar technology improves driving cost per kilowatt hour down, adoption of solar accelerates. This in turn incentivizes further innovation. On the other hand, peaking fossil fuel demand disincentivizes research and development by traditional energy. This in turn stifles innovation, which consequently leads to even less demand for fossil fuel. But like a frog placed on the stove in a pot of water, we don't necessarily notice the changes going on around us until it's too late.

There are many other powerful and disruptive feedback loops of which investors should be aware. They have their roots in finance, politics, geopolitics and society, and they interlink to accelerate the adoption of a new system and the demise of the old.

Disruption has existed going all the way back to The Stone Age. Stone was displaced by a superior technology, bronze. But the pace of disruption is accelerating, particularly in recent years, with profound implications for portfolio management.

McKinsey found that the average life span of a company listed in the Standard & Poor's 500 is about 18-years. That compares with a life span of 61-years back in 1958. Put differently, in just six decades, a company's lifespan has fallen by 70%! And would it surprise you to know that since 2000, half of the companies on the Fortune 500 list have either gone bankrupt or have been acquired? Why did this happen, you might ask? I think the answer is entropy.

The Second Law of Thermodynamics tells us that all closed systems lose energy. This loss of energy is called entropy. And because closed systems lose energy, they require a continuous intake of energy just to survive.

Entropy is what typically kills large businesses. That's because as businesses grow, they typically need an increasing amount of organizational energy. Hierarchical management, centralized planning, and standardized rules, for example, are just some of the ways in which a company can quickly become inefficient, complex, and vulnerable to disruption by more nimble players. General Electric ultimately succumbed to entropy.

We continually underestimate the speed at which disruption occurs. Why? Because disruption typically follows an S-curve, which takes the form of exponential growth, while our brains are wired to think in linear terms.

Tony Seba, a respected scholar on disruption, says that the pace at which technological disruptions occur appears slow at first. That's because a new product or service will initially have a small market penetration, say 1% to 2%. But then there is a tipping point and growth accelerates into an exponential manner until the product or service reaches 80% of the market. At that point, the market becomes saturated, and growth slows.

Throughout history, the incumbent players thought that new technologies would be adopted slowly and incrementally. Investors have had a similar mindset because we are programmed to embrace our initial thesis and ignore the warning signs. But the reality is that the existing system was either drastically transformed and expanded or completely wiped out. How quickly does this typically happen? The answer is in less than 20-years.

That's been the case for centuries. Let's step back for a second to the year 1440. The big news then was that the English and French were coming to the end of their Hundred Year's War. Actually, the war wound up lasting 116 years. But around the same time, a little-known goldsmith by the name of Johannes Guttenberg invented the printing press. And while people did not immediately appreciate the power of this invention, Herr Guttenberg unleashed a printing revolution that took hold at a speed that was completely unexpected and that had profound implications for the Catholic Church and the entire world. And the same thing happened with the spinning wheel, the steam engine, the automobile, cable and streaming; all were rapidly adopted despite widespread initial skepticism.

Let's zoom in on the automobile for a second. At the turn of the twentieth century, the incumbent horse-based road transportation industry dismissed automobiles because there were no paved roads, fueling stations and manufacturing capacity. Supply chains hardly existed. In 1904, *Carriage Monthly*, a highly respected publication at the time said, "Humankind has traveled for centuries in conveyances pulled by beasts, why would any reasonable person assume the future holds anything different?"

But as Tony Seba notes, automobiles fully disrupted road transportation in less than two decades. In fact, car sales went from a base of less than 5% of the vehicle fleet in 1905 to 95% in 1925.

Disruption, by the way, is not limited to products and services. Even policy innovation can be adopted along S-curves, which in turn can have a dramatic effect on businesses and their underlying securities.

For example, as the adoption of the internal combustion engine accelerated after the release of Henry Ford's Model-T in 1908, politicians called for the tax of gasoline. Oregon was the first to introduce the tax. The amount was one cent per gallon and the year was 1919. And within a decade, all the 48 States at the time, and the District of Columbia, followed with their own tax.

So that's a general overview of what disruption looks like and why it happens.

The key point to take away here is that because people naturally think in linear terms, we constantly underestimate the pace that new technologies can take hold, particularly when there are reinforcing, causal feedback loops at play. As investors, we need to be mindful of this and cognizant of technological threats to even the most established enterprises. And we can't forget that entropy is our enemy.

The second point I'd like to make is that in an age of rapid technological change, we need to approach valuation with new eyes. Marcel Proust, the French writer who wrote the monumental novel *In Search of Lost Time*, said, "The real voyage of discovery consists not in seeking new landscapes but in having new eyes."

When I think about markets and businesses, I'm reminded of Proust. Our voyage, as investors, necessitates that we constantly view the world with new eyes. We need to be dynamic and not get trapped using models that may no longer align with reality. If your model of the world is wrong, you're not going to understand why something is happening, and you're going to make mistakes.

While we have to be cautious around new business models and high-multiple, growth companies, we should not immediately dismiss a potential investment just because the multiple appears high, or worse, start working on a short thesis. As John Kenneth Galbraith said, "Faced with the choice between changing one's mind and proving there is no need to do so, almost everyone gets busy on the proof."

My late father, Gerald Tsai Jr., had a long and distinguished history on Wall Street, most notably as an investor, the first Chinese-American CEO of a Dow Jones Industrial company, and as a philanthropist. While we disagreed on investment strategy, I learned so many wonderful lessons from him. For example, I learned that often you have to go against your own feelings and reverse your head with your stomach. After all, some of the best investment opportunities exist when sentiment is most negative. And I learned not to dismiss a potential investment just because, on the surface, it might look expensive.

Like my friend and mentor Ron Baron, my father was critical of heuristics like price-earnings ratios because he believed they are sometimes misleading, particularly with rapidly growing businesses that are reinvesting so much back into growth. "Do the work," he said. In his camp, there were no shortcuts to uncovering value. Then you might ask, what was his north star? He encouraged me to focus on the top line, the present value of future cash flows, the quality and profitability of a business, and importantly, a company's unit economics.

At last year's Graham and Dodd Annual Breakfast, Todd Combs of Berkshire Hathaway echoed that view, mentioning several times how important it is to first look at a company's unit economics before tackling valuation. Let me be clear, however. I am not talking about customer acquisition costs. I am not talking about lifetime value. I'm referring specifically to profit per unit. Those unit economics could be for a restaurant, a bottle of soda or a car. It doesn't matter. But ultimately, I try to get a sense of profitability and what's behind net income per unit per share. That's my starting point.

Let's look at GEICO for a second, a company that has been highly disruptive to traditional auto insurance companies. Shortly after Warren Buffett purchased GEICO, he increased the company's marketing spend. He did so because the unit economics of the business were so strong. But did that mean the company was suddenly worth less because expenses increased, and profitability temporarily dropped? Absolutely not. GEICO, in fact, became more valuable because the investment in marketing enhanced the present value of future cash flows. Of course, the investment would not have been accretive to intrinsic value had the economics of onboarding new customers been poor.

So, how should we think about valuation in an age of disruption?

I think this question can be answered by turning to Apple, specifically in 2007.

The iPhone was released that year because that's when all the technologies that were necessary to launch the iPhone converged including touch screens, sensors, processing power and energy dense lithium-ion batteries. In other words, the iPhone was born through technological convergence. Victor Hugo had it right when he said, "Nothing is more powerful than an idea whose time has come."

Apple, as we now know, was a major disruptor. Nokia's market share fell from 51% in the fourth quarter of 2007 to less than 3% five years later. Sales plummeted by 75%. But despite a rapid uptake in market share, there was no shortage of short sellers as Apple's market value continued to grow. How many times have we seen this kind of movie?

That's because, as the German philosopher Arthur Schopenhauer said, "All truth passes through three stages. First, it is ridiculed. Second, it is violently opposed. Third, it is accepted as being self-evident."

The cognitive biases of commitment and consistency, incentive super-response tendency, sunk cost fallacy and anchoring bias all underpin Schopenhauer's wisdom. In business, the incumbents don't want to kill off their existing products but want to believe that new technologies will be adopted slowly and incrementally. And they want to protect what they have because they are locked into existing business models, thought processes, cultures and incentive structures. That's why disruptions almost always come from outside the core market.

Not long after the iPhone was released in 2007, Apple's market value exceeded the market value of Nokia, Palm and Research in Motion (Blackberry) combined. The argument in our community that Apple was overvalued was widespread. Countless value investors said, "that number or valuation makes no sense." And lending confirmation bias to the naysayers, Steve Ballmer, the Chief Executive Officer of Microsoft at the time, said, "There's no chance that the iPhone is going to get any significant market share. No chance."

Donella H. Meadows, the late American environmental scientist and writer, wrote a fantastic book called *Thinking in Systems.* I would not have known about this book had my friend, Josh Tarasoff, not sent it to me. Meadows has certainly shaped how I think about our investments. If you're interested in systems and feedback loops, this book is for you.

Meadows says, "When a system thinker encounters a problem, the first thing he or she does is look for data, time graphs, the history of the system. That's because long-term behavior provides clues to the underlying system structure. And structure is the key to understanding not just what is happening but why."

If we look at a stock, for example, and its price doesn't make sense, we need to think about the system structure. There's a good chance that its market value does indeed make sense – just not to us – because we don't yet understand the underlying system structure.

Indeed, with the benefit of hindsight, Apple's market value relative to the incumbent players did make sense. Apple was creating powerful network effects that would lead to the disruption of the incumbent players. And in an industry where winners take all, or most of the market, it was logical that Apple was valued as highly as it was.

The underlying system structure was changing and Apple's business model itself was changing. To properly evaluate the company as a potential investment, one had to look at Apple with new eyes.

It's so convincing when someone says that a company's market value does not make sense because it exceeds the market value of all its competitors combined. That sounds so rational, right? But if you look at history, that argument is often misguided.

Logically, whoever makes this argument is in effect saying that the market value of A, as stated in the numerator, should not exceed the market value of the competition B plus C plus D plus E, as stated in the denominator. But why not?

We know that a company's market value should approximate the present value of future cash flows. Well, if a business is being disrupted, its future cash flows are likely to decrease while the cash flows of the disruptor are likely to increase.

And if you think about it this way, that means as the cash flows of the disruptor continue to grow, and the market value reflects that growth, the disruptor will be worth not just 1X the denominator but 2X, 3X and so forth as the incumbent players go out of business. After all, fractions increase exponentially as the denominator trends toward zero. Indeed, Apple was cheap in 2007 when its market value was just 1X its competitors combined.

Investing in an age of disruption means that, more than ever, we need to think forward as opposed to backwards and ask, "Where is the world ultimately heading?" We need to break free from a "this makes no sense" snap judgement and approach valuation with new eyes, particularly as GAAP (Generally Accepted Accounting Principles) accounting often does a poor job of representing the underlying economic reality of rapidly growing businesses. Put differently, we need to do deep work and not dismiss a seemingly high valuation without understanding the economics of the business and the underlying system structure. To do anything less is arguably irresponsible.

The last point I'd like to make is on portfolio diversification.

Tsai Capital has a 23-year track record. In the early days, we owned about 20 businesses. However, over time, we trimmed that back to around a dozen high-quality companies.

More recently, though, we increased our diversification and own about 20 businesses again. The pendulum has therefore swung back to where it was many years ago. We've embraced greater diversification because I came to the conclusion that a rapidly innovating world – in combination with a deep market selloff – offers us the ability to use diversification to play defense as well as offense. What do I mean by this?

Today, there are about 4,000 publicly traded companies in America alone. And there are so many new companies that are born each year that are disrupting the incumbents. Many of these companies will go on to become multi-baggers. Why not play some offense by planting a few more seed in fertile ground?

I prefer businesses that are benefiting from one or more positive feedback loops, require little capital, and can reinvest at high rates of return in a durable manner. And when they have pricing power too, they can be wonderful investments to own in an inflationary world. Some of the businesses that we own are what I call platform companies.

Platforms use technology in order to create an architecture that allows users to connect from both sides of a trade. And they offer many economic benefits. For example, platforms, like Uber (which we don't own), increase asset utilization, reduce transaction costs and act as catalysts by bringing new users into the marketplace at a near zero marginal cost. I love these types of businesses because they are more likely than others to achieve exponential growth and disrupt the incumbent competition.

The architecture of a platform business is fascinating. The way we see it, modular components are developed, arranged, and modified over time on top of a static architecture that is governed by basic design rules. This design structure, or architecture, provides platforms a desired combination of stability and variability.

If you think about it, platforms share similarities with multicellular organisms. The significant phenotypic variation in multicellular organisms is obtained by means of conservation of the central metabolic processes inside cells, just as the dynamic quality of platforms, which stems from the development, arrangement and modification of modular components, is obtained by means of a static architecture of basic design rules.

This kind of structure, that is, the architecture that is exhibited in multicellular organisms and platforms, produces a flexible – and at the same time – robust system that is well suited for adaptation to changing environments. In business, this can mean substantial margin improvement and greater efficiency in product development and design, since the need to start from scratch with each new product or service is circumvented by the flexibility of the architecture.

We just went through – or are perhaps still in – a rather significant bear market. But despite being painful, bear markets provide us with the opportunity to diversify and provide added protection against unknown variables without necessarily having to sacrifice upside. That's because in bear markets valuations get compressed and there are consequently lots of attractive opportunities in which to deploy capital.

There is massive asymmetry in certain names and sectors today. Some of these opportunities can be found in platform-type businesses. Think of software, where winner take all or winner take most dynamics are at play. Software is the infrastructure of the economy today, just like railroads were the infrastructure of the economy during the time of James Hill, Jay Gould and Cornelius Vanderbilt. Why would we want to limit our ability to own some of these businesses?

I define *circle of competence* as having deep fluency about what's really going on. For those of you familiar with Max Planck, the German theoretical physicist, and the story about his chauffeur, I'm talking here about Planck knowledge – not chauffeur knowledge. And personally, within what I believe to be my circle of competence, I prefer to plant just a few more seeds in order to position our investors to benefit from the asymmetry that currently exists in businesses that are leading, as opposed to being disrupted by change.

Moreover, diversification, particularly across different types of businesses, also increases the probability of successfully navigating through turbulent times. Charlie Munger said, "The first rule of compounding is to never interrupt it unnecessarily." It's therefore critical to be positioned so that you can withstand rough waters and continue unscathed on the journey of compounding capital over the long-term. The preservation of capital is the first priority.

I would have realized much earlier the benefits of owning more than a dozen companies had I just paid attention to my father who embraced diversification, at least to a point. But like my twin daughters, I'm sure I rolled my eyes when he was trying to explain to me why Peter Lynch had so many positions and instead thought, "How much longer is this going to take?"

I do remember, though, on a fishing trip on Long Island Sound, I cast my rod into the wind, and dad said, "Christopher, you can't do that! You must position yourself with the wind at your back, just like in investing." That was great advice, and advice he got from my grandmother, Ruth.

Ruth Tsai, incidentally, was a pioneer for women in China during her time. She was the first woman to trade shares on the floor of the Shanghai Stock Exchange from 1939 until 1941 when Japanese troops invaded the Shanghai International Settlement and trading was abruptly halted. From what I was told, she made a killing. And Ruth was a feisty woman. She once stripped the valuable topsoil off her land the night before she was ordered to hand over her property to the Communist authorities. And while my father was admired for his deal making and being ahead of the times, many of the moves he made were because of my grandmother's suggestions.

But I think when it comes to investing, the investor Shad Rowe said it best, "As I've gotten older, I more clearly see the value of being on the right side of trends, the right side of great people, the right side of tremendous ambition, and the right side of very scalable, salable, useful technology."

And by inversion, I conclude that we can't afford not to be aligned with the future. To ignore a growth company because its valuation lacks the precision of physics and might make us uncomfortable is arguably irresponsible. That's why we build in a margin of safety to begin with. Within our circle of competence, we just have to get used to dealing with probability and shades of grey. That's the key to investing in an uncertain world.

A friend recently introduced me to the music of Bill Evans. He was an American jazz pianist and composer. In an interview entitled "The Creative Process and Self-Teaching", Evans said, "You could be too cautious. You could be cautious to the point where you never discover anything. I think you have to have a certain adventurous spirit." He was talking about music, but what he said is true of investing as well.

In conclusion, let's not be dissuaded from investing in businesses that are at the forefront of change. Rather, let's embrace the fact that disruption has the power to rapidly reshape entire industries and create, or destroy, billions, if not trillions of market value.

On our journey, let's avoid the traps that can come with heuristics by tackling valuation with new, and always, critical eyes. And let's plant a few more seeds that could sprout into multi-baggers. As I often tell my daughters, be cautious out there but remember there's a whole world around us just waiting to be explored.

Thank you, everyone

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