Hosking Post

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The End of the Beginning or the Beginning of the End?

Whilst technology was changing the world at the turn of the twenty-first century, according to the late Sir John Templeton writing in August 2000, it had "not changed human nature."[1] How prescient he was. The march of disruptive technological innovations follows a well-trodden path, one that we will come to refer as the innovation cycle. It is a pattern where investment returns are front loaded early in the cycle, ahead of a period of technological maturity where society emerges as the ultimate beneficiary - disruptive innovation triumphs, but late arrival investors often lose out. A simple observation lies at the heart of this: human psychology is hardwired to extrapolate current trends. We look forward in straight lines and therefore often overestimate the impact from the adoption of a new disruptive technology. Helpfully (or unhelpfully, depending on your standpoint) there are a number of disruptive supermen and women in whose interest it is to reinforce this forward-looking bias. Recognising a psychological phenomenon called the conjunctive fallacy[2], we see the management of today's Unicorn Industry explicitly invoke the Amazon business template of losses-today-for-market-dominance-tomorrow in order to sell expensive new equity in the private markets or, increasingly, via IPO.

The Unicorn Industry is a term that has emerged to describe the c.$700bn-worth of fast growing (but not so young) technology companies with valuations of over $1bn.[3] Its chosen metric is growth and narrative is that of Blitzscaling.[4] In this world, "moving fast and breaking things"[5] is the route to a promised land of winner-take-all economics. As companies race along this path, they are shielded from the public equity market's rigorous gaze and, owing to the convenient fact they make losses rather than profits, their valuations are based not on conventional multiples of earnings or cash flow but instead on a set of subjective and self-referential assumptions. These valuations are orchestrated by a growing band of private equity/venture capital managers taking exorbitant fees as they pass companies among themselves in 'only up' rounds. It is in no one's interest for valuations to be marked down.

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[1] Taken from the foreword to Alasdair Nairn, *Engines that move markets - Technology Investing from Railroads to the Internet and Beyond* [2002]
[2] Amos Tversky, Daniel Kahneman, *Extensional Versus Intuitive Reasoning: The Conjunction Fallacy in Probability Judgment*, Psychological Review, Volume 90, Number 4 [1983]
[3] Aileen Lee, *Welcome to the Unicorn Club: Learning from Billion-Dollar Startups*. TechCrunch. AOL. [2013]
[4] Reid Hoffman, Chris Yeh, *Blitzscaling: The Lightening-Fast Path to Building Massively Valuable Companies.* [2018]
[5] Mark Zuckerberg [2009]

An examination of where we are in today's innovation cycle and the behaviours of the Unicorn Industry is instructive for investors in today's public equity markets. Through such a lens, this *Hosking Post* makes four arguments:

1. "**What's past is prologue"**: human nature condemns us to repeat past behaviours and, alas, this innovation cycle and resulting investor behaviour is no different to previous ones.

2. **An innovation cycle creates winners:** though at their current size and valuations, contemporary winners have likely become mathematical victims of their own success.

3. **The race to IPO by the Unicorn Industry is evidence of speculative blow-off:** private and public equity market valuations have become distorted by use of the conjunctive fallacy.

4. **The next set of (stock market) winners are in hiding**: the euphoria surrounding forerunners of this innovation cycle overshadows a group of lowly valued, well-established companies with compelling unit economics adopting new technology.

I – "What's past is prologue"

The emergence of the railways in the nineteenth century transformed Britain's economy, with vast fortunes made and lost along the way. As with so many innovation cycles, the hero of the upswing became the villain of the down. In this instance it was a promoter from Yorkshire by the name of George Hudson, who in his pomp became known as the "Railway King". Hudson was an early proponent of a Blitzscaling-style business strategy, over a hundred years before Linkedin founder Reid Hoffman would come to coin the phrase. Hudson's Midland Railway grew rapidly to encompass the highly profitable and (for a short time) monopolistic route between London and the industrial centre of the East Midlands. Of course, as students of the Capital Cycle might have guessed, this early financial success set off a wave of incoming competitive capital which resulted in building out to ever more peripheral and lower profit routes. Hudson's eventual fall was precipitated by his need to issue ever more shares to support his highly capital intensive projects. In order to keep the show on the road, Hudson started paying dividends out of capital – a practice we would now recognise as securities fraud.

The United States witnessed similar patterns in the adoption of lighting, telephony and oil, and most recently in the late twentieth century the personal computer and Internet revolution proceeded along familiar lines. The fundamental observation about these innovation cycles is that technological progress is not smooth. As Schumpeter observed, the process of creative destruction[6] unleashed by entrepreneurship and the frenzy of investment that follows is lumpy. Meanwhile, and despite this, promises of the future remain a great seducer of capital! The Anglo-Venezuelan economist Carlota Perez[7] has written extensively on these phenomena and we borrow the below diagram that illustrates these cycles at work:

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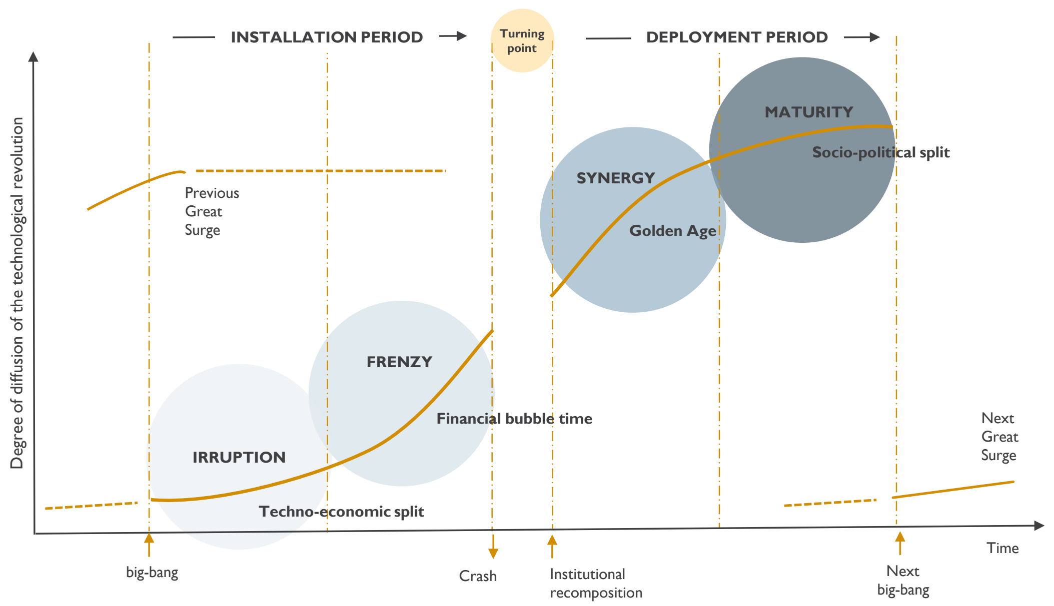
[6] Schumpeter, J.A., *Capitalism, Socialism and Democracy* [1942]
[7] Carlota Perez, *Technological Revolutions and Financial Capital: The Dynamics of Bubbles and Golden Ages* [2002]

The Innovation Cycle



Source: Carlota Perez, 2002. Technological Revolutions and Financial Capital: The Dynamics of Bubbles and Golden Ages.

If the above framework holds today, it begs questions for investors in public stock markets. Where are we in the current innovation cycle? To what extent has the stock market under- or over-discounted the impact of this cycle? Have disruptive companies seen valuation distortions that are likely to reverse? Finally, are there unrecognised beneficiaries of this cycle?

2 – Innovation cycles create winners

In many ways, the current crop of winners – most notably the US FAANGS and Chinese BATS - are classic, Buffett-style wonderful companies. Competitive moats in their core products are deep with few viable alternatives. Whilst the level of future growth of these businesses can be debated, returns on their existing asset and user bases are likely to remain high, ensuring substantial free cash flow adding to their existing cash piles. However, their market shares and capitalisations mean they now face an unavoidable law-of-large-numbers problem. At this point, current shareholders will find outsized returns mathematically challenging and for meaningful growth to occur the winners now need to attack very large but capital intensive areas of the economy. Amazon's move into food retail, with its multi-billion dollar refrigerated supply chain, is a vivid illustration of this trend. Not only will huge amounts of capital be required to grow from this point, but lower returns will be expected on this incremental capital as compared to prior capital allocation decisions. As we have argued in previous notes, the return on assets of the winners and the losers are likely to converge as these businesses move from the Internet economy into the real economy in the pursuit of growth.

The winners: a market cap problem?

Growth in market cap	Company	Market Cap now (US$bn)	Market Cap 2022 (US$bn)
15%	Google	811	1,322
15%	Apple	878	1,433
15%	Microsoft	966	1,575
20%	Amazon	921	1,744
20%	Facebook	532	1,006
25%	Netflix	155	339
	Total	**4,263**	**7,419**
	US GDP	**19,390**	**20,782**
	% of US GDP	**22%**	**36%**

The combined FAANG + MSFT market cap = US$7.4tr = 1/3 US GDP

Source: Bloomberg, FactSet, Hosking Partners estimates. Market cap now is 15 May 2019.
The securities identified are some of our holdings and do not represent all of the securities purchased or sold. Further details of the calculation methodology and a list showing every holding's contribution to overall performance during the period is available upon request.

In the above table, we set out what might be regarded as implied growth rates in the share prices of the current winners if today's valuations assume the continuation of historic growth rates. The end market capitalisations of this exercise are jaw-dropping, with the combined values of the five companies equating to over one third of forecast US GDP in 2022. Observers of the stock market capitalisation-to-GDP ratio (incidentally Warren Buffett's preferred measure of stock market valuation) generally observe that the entire stock market is fair value at around 75% of GDP and significantly undervalued at below 50%. The latter is a level associated with the low point of a bear market.

There is, of course, a scenario in which expectations for growth are disappointed from here. In the chart below, we also sketch out a scenario where rather than quadrupling earnings – as currently implied by consensus Bloomberg forecasts – Netflix only manages to treble earnings. If, after such a heroic feat, the shares then trade at 20x earnings, the multiple currently applied to Facebook, Netflix shares would lose half their value.

Netflix grows EPS 3x but stock halves?

Euphoria Scenario (consensus now)

Year	EPS
2018	$3
2022	$13
EPS CAGR	45%
P/E 2022	30x
Share price return	13%
Share price return CAGR	3%

Mild Euphoria Scenario

Year	EPS
2018	$3
2022	$9
EPS CAGR	31%
P/E 2022	20x
Share price return	-50%
Share price return CAGR	-17%

Source: Company accounts, FactSet, 31 Dec 2018. Hosking Partners estimates as at 14 May 2019. Note: NFLX has c.$140m subs which have grown at c. 25% CAGR since 2014 where as content asset of 20bn have grown at 42% CAGR. Horizon Research.

3 – The race to IPO by the Unicorn Industry is evidence of speculative blow-off

Whilst the probability of winners hitherto being outstanding investments from here may be low, the probability of many of the Unicorn IPOs being poor investments is high. Alongside recency bias boosting perceptions of earning prospects in the winners, potential investors in the Unicorn Industry must be hyper vigilant against falling for the conjunctive fallacy. The most famous illustration[8] of this concept is the case of Linda the bank teller, a distilled version of which can be found below:

Which is more probable?

Linda is 31 years old, single, outspoken, and very bright. She majored in philosophy. As a student, she was deeply concerned with issues of discrimination and social justice, and also participated in anti-nuclear demonstrations.

1. Linda is a bank teller.

2. Linda is a bank teller and is active in the feminist movement.

Source: Amos Tversky, Daniel Kahneman, *Extensional Versus Intuitive Reasoning: The Conjunction Fallacy in Probability Judgment,* Psychological Review, Volume 90, Number 4, October 1983.

[8] : Amos Tversky, Daniel Kahneman, *Extensional Versus Intuitive Reasoning: The Conjunction Fallacy in Probability Judgment*, Psychological Review, Volume 90, Number 4, October 1983.

The cold towel of probability base rates should lead us towards 1 (the correct answer) but humans are hard-wired to make casual conjunctions and are bad at discerning prior probabilities. Indeed, the majority of participants polled (postgraduate students at a prestigious university) opted for answer 2, which may instinctively feel more likely at a first glance. This feature of the brain's makeup is successfully exploited by the leaders of the Unicorns, as your author found out at a recent launch event (in the ballroom of Claridge's no less!) for Uber's IPO. Hundreds of investors were treated to a presentation where Uber was proclaimed to be the "Everything Store of Transport". With apologies to Kahneman and Tversky, we have updated the case of Linda the bank teller with a contemporaneous example:

Which is more probable?

Unicorn INC is a blitzscaled, two-sided network providing scalable services to a global community of users. Unicorn Inc's addressable market is 10 trillion dollars and it's recent 100% 5 yr growth CAGR augurs well for future growth.

1. Unicorn Inc is a highly priced IPO

2. Unicorn Inc is a highly priced IPO that will follow a similar return pattern to Amazon.

Source: Hosking Partners.

We question the extent to which Amazon is a relevant template here: between 1995 and 2002 Amazon burned through $0.8bn[9] before turning free cash flow positive and becoming self-funding. In contrast, Uber lost $0.8bn[10] in the first quarter of 2019 alone. Amazon's business philosophy was, as we can now see in hindsight, methodically rolled out over a quarter of a century: Jeff Bezos started in easy sectors such as books (non-perishable products with low shipping costs), slowing rolling out his fly-wheel to other more challenging verticals.

Meanwhile, unlike Amazon, Uber has begun by attacking one of the most capital and labour intensive sectors – transport – despite not having any discernible embedded competitive advantages such as employees or its own physical assets. When Amazon confronted the physical world it very quickly discarded its original "no warehouses, no stock, no shipping" capital-light mantra and built all manner of physical assets. There is a good chance that Uber will be forced to go through a similar pivot, but at a

[9] Amazon company filing
[10] Uber company filing

rather different state of cash flow. Public markets are unlikely to be as kind as the private ones... In the private world, prices of these unicorns have been aided and abetted by the venture capital industry who have layered on opaque valuation methodologies to hugely complicated financial structures[11] to businesses they pass between themselves in 'only up' rounds. In this manner, the venture capital industry now sustains many thousands of companies, some now over a decade old, that have failed to generate meaningful levels of profitability. It is no surprise that some need to resort to creative accounting measures as they bid for public financing (WeWork and its community-adjusted EBITDA measure which flipped a $1.4bn[12] GAAP loss to a $725m[13] profit springs to mind!).

4 – The next set of winners are in hiding

One of the paradoxes that characterises the current euphoric stage of this innovation cycle is that it rewards companies who follow loss-driven market domination strategies with high valuations, even where the end-state levels of profitability would deliver little terminal value. In some respects, this is the great achievement of the Unicorn Industry and their Future Inc. visionaries: using Amazon as a template for short-term profit suppression, an array of winner-take-all strategies have been deployed across the Unicorn Industry. When one uses a wider lens – and shakes off an Amazon anchored conjunctive fallacy – the losses in Future Inc. become all the more stark, particularly when compared with investment opportunities available in other parts of the market.

By way of example, despite attracting very different valuation methodologies, the current unit economics of the US airline networks appear to be vastly superior to that of the ride share companies. In the ten years that Uber and Lyft have been operating, they have raised $30bn[14] and burned through c.$15bn[15] of capital cumulatively. Over the same period, the US airline industry has reported net income of $77.2bn[16] and returned $39bn[16] to shareholders via buybacks and dividends (as well as investing billions in fleet renewal). What is fascinating here is the market's implicit low terminal value (7-9x earnings multiple) ascribed to the larger customer bases of the airline industry.

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[11] For an example of the complex valuation methodologies deployed by the venture capital industry, Square Inc's IPO is a fascinating. Those interested can read further on this in Gornall and Strebulaev, *Squaring Venture Capital Valuations with Reality* [2018]

[12] The Cash Cost of WeWork's global expansion, FT [2019]

[13] WeWork Q1 2019 Earning call for bond holders, FactSet

[14] Uber Funding Rounds (2019), Lyft Funding Rounds (2019), Crunchbase

[15] Uber company filings, Lyft company filings (Note Lyft cash burn was $3.6bn from 2016 to 2018)

[16] A4A Industry Review (2018), U.S. Airline Industry Review: Allocating Capital to Benefit Customers, Employees and Investors

Ride Share vs Airlines unit economics

LYFT/UBER	LYFT	Uber	Rideshare
Revenue per mile (¢)	0.57	0.43	0.50
Cost per mile (¢)	0.82	0.55	0.69
Operating profit per mile (¢)	-0.26	-0.12	-0.19
EV (US$bn)	18	73	91
Implied value per passenger $	968	798	883

US Airlines	Delta	United	American Airlines	Airline*
Revenue per mile (¢)	0.18	0.16	0.18	0.17
Cost per mile (¢)	0.15	0.14	0.15	0.15
Operating profit per mile (¢)	0.03	0.03	0.03	0.03
EV (US$bn)	51	34	40	125
Implied value per passenger $	637	427	393	486

Source: 2018 Company data, FactSet, 31 Dec 2018. Hosking Partners estimates as at 23 May 2019 based on assumption of 2 flights per year. * Average/sum of of Delta, United and American Airlines. The securities identified are some of our holdings and do not represent all of the securities purchased or sold. Further details of the calculation methodology and a list showing every holding's contribution to overall performance during the period is available upon request.

The above analysis does not account for the substantial acquisition value inherent within airlines' loyalty and credit card businesses. On top of this, the airline industry – for years plagued by labour and over capacity issues – is going through something of a silent technology and productivity innovation cycle itself. In 2000, there were c.520,000 full time employees in the US aviation industry, compared with 440,000 today – yet over that period the industry has seen revenue passenger miles (RPMs) increase from 525 billion to over 1 trillion today[16].

A similar situation exists in the US banking industry, where the adoption of digital and mobile banking is enhancing productivity. Since the GFC, Bank of America has shuttered nearly 2,000 branches,[17] despite increasing its deposit base by an average of $43bn per year.[17] This means that for the big incumbent banks the cost to serve a customer – as measured by non-interest income divided by number of customers – has fallen from $1,000 in 2009 to under $800 today. The gradual repair of industry profitability both in airlines and banking is to no small extent down to the incorporation of new technology pioneered by the current winners of this innovation cycle, which is, to borrow a phrase from tech, a fast-follower strategy.

[17] Bank of America company filings

Conclusion

In an echo of the advent of the railways in the nineteenth century, the most profitable routes of this innovation cycle – search and social - have been monopolised first. The remaining routes, for both the stock market winners and their upstart Unicorn Industry cousins, will require very substantial amounts of capital. As Benedict Evans has pointed out, getting a consumer a hot meal in half an hour is a different logistical challenge from a Harry Potter book sent using the US Postal Service over a two-day period![18]

It seems to us that those in the Unicorn Industry aiming to exploit the Amazon conjunctive fallacy are, at best, guilty of excessive optimism and at worst are modern-day George Hudsons. Yet herein lies great opportunity for the patient investor. All this froth is drawing attention away from profitable businesses and industries, many of which are incorporating new technology whilst remaining subject to an altogether different valuation paradigm. The positive and durable unit economics of the vast customer bases of established sectors such as food retail, the airline industry and the large US banks are overlooked. Commentary on companies here is focused on traditional valuation metrics which, conveniently, cannot be applied to the Unicorn Industry. In this context, the underperformance of value versus growth has become as long as any on record. The coming years will likely see further technology diffusion as this cycle matures and with it a reassessment of the valuation disconnect between today's crop of winners and losers. If history rhymes, the snap back of this elastic will be hard.

Django Davidson

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[18] https://www.ben-evans.com/

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Contact details

Hosking Partners

2 St James's Market

London SW1Y 4AH

Tel: +44 (0)20 7004 7850

info@hoskingpartners.com