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Venture Capital
An International Journal of Entrepreneurial Finance

ISSN: 1369-1066 (Print) 1464-5343 (Online) Journal homepage: https://www.tandfonline.com/loi/tvec20

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To cite this article: Martin Kenney & John Zysman (2019) Unicorns, Cheshire cats, and the new dilemmas of entrepreneurial finance, Venture Capital, 21:1, 35-50, DOI: 10.1080/13691066.2018.1517430

To link to this article: https://doi.org/10.1080/13691066.2018.1517430

VENTURE CAPITAL
2019, VOL. 21, NO. 1, 35–50
https://doi.org/10.1080/13691066.2018.1517430

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ARTICLE

Unicorns, Cheshire cats, and the new dilemmas of entrepreneurial finance

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ABSTRACT

This essay examines the implications of the evolving environment for the formation and financing of new firms in the United States. After the dot.com crash of 2000, there was a regime change in new firm formation and the number of firms that exited through an initial public stock offering. This change was made possible by the decreased cost, increased speed, and ease of market entry due to availability of open source software, digital platforms, and cloud computing. This facilitated a proliferation of startups seeking to disrupt incumbent firms in a wide variety of business sectors. The contemporaneous growth in the number and size of private funding sources has resulted in a situation within which new firms can afford to run massive losses for long periods in an effort to dislodge incumbents or attempt to triumph over other lavishly funded startups. This has triggered remarkable turmoil in many formerly stable industrial sectors, as the new entrants fueled by capital investments undercut incumbents on price and service. The ultimate result is that new entrants with access to massive amounts of capital can survive losses for a sufficiently long period to displace existing firms and, thereby, transform earlier industrial ecosystems.

KEYWORDS

Venture capital; mega-funds; unicorns; industry disruption; platform technology; winner takes all

Introduction

The purpose of this essay is to critically examine the implications of the evolving environment for the formation and financing of new firms, with specific reference to the United States. "Unicorn" became an emblem of the newly founded firm that had rapidly grown to a private valuation of a billion or more US dollars. However, questions and new dilemmas may become manifest. If the flow of funds into venture capital ever slows or reverses, many of these capital-consuming unicorns might fade remarkably rapidly like the Cheshire cat, leaving only the smile.

The background to and core arguments of the paper can be summarized as follows. After the dot.com crash of 2000, there was a regime change in new firm formation and the number of firms that exited through an initial public stock offering (IPO). This change was made possible by the decreased cost, increased speed, and

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ease of market entry due to availability of open source software, digital platforms, and cloud computing. This facilitated a proliferation of startups seeking to disrupt incumbent firms in a wide variety of business sectors. The eased market entry was accompanied by a growth in the number of private funding sources that now includes crowd-funding websites, angels, accelerators, micro-venture capitalists, traditional venture capitalists, and lately even mutual, sovereign wealth, and private equity funds – all willing to advance capital to young unlisted firms. The result has been the massive growth in the number of venture capital-backed private firms termed "unicorns" that have market capitalizations of over $1 billion. The ease of new firm formation and the enormous amount of capital available has resulted in to a situation within which new firms can afford to run massive losses for long periods in an effort to dislodge incumbents or attempt to triumph over other lavishly funded startups. The result has been remarkable turmoil in many formerly stable industrial sectors, as the new entrants fueled by capital investments undercut incumbents on price. Because the new firms intending to disrupt existing firms are venture capital-finance, they can afford to operate at a loss with the goal of eventually triumphing. Existing firms competing with the disruptors must be profitable to survive, while the disruptors need only keep their investors happy, the ultimate result is that those firms with access to capital may survive and displace earlier firms and, thereby, change their respective industrial ecosystems.

Given these dynamics, technology firms' stocks have been under political attack and, for some, their stock market valuations have suffered. Is the recent volatility in technology stocks solely the result of an overly hyped market and political attack? As such, is this simply a needed adjustment to valuations and a more sober assessment of the future of technology? Or rather, is the current turmoil in markets the result of certain basic flaws in the present dynamics of entrepreneurial firm formation and finance that are only now being revealed?

Each phase of what we have termed the "digital transformation," has resulted in massive influxes of venture capital investment predicated upon the belief that startups will capture new emerging markets resulting in enormous future capital gains (Kenney and Zysman 2016; Zysman and Kenney 2018). Sometimes, those bets are wrong, as was the case with investments in sectors, such as clean tech in the mid-2000s or individual or even groups of firms, such as was the case with Pets.com and many of the Silicon Valley e-commerce investments in the late 1990s (Hargadon and Kenney 2012; Kaplan 2002). Sometimes, they were just premature, as was case with the huge investments in bandwidth and fiber optics startups that culminated with tech stock collapse beginning in 2000. One result of the fiber optic network build-out bubble was the cheap bandwidth upon which new firms, such as YouTube (Google) and Facebook could create their firms and build their digital platforms. Many of these investments were reminiscent of the railroad bubble firms created in the 19th Century replete with watered stock and various other financial stratagems (Janeway 2012).

The US venture capital system, pioneered in the 1940s, routinized in the early 1980s, and blossoming into maturity in the 1990s, is remarkable for its ability to identify promising new ventures. In exchange for equity, the venture capitalists provide entrepreneurial ventures with sufficient funding to cross the infamous "financial valley of death" where expenditures rise and income is initially too low. The resulting firms, in some cases, become not only extremely

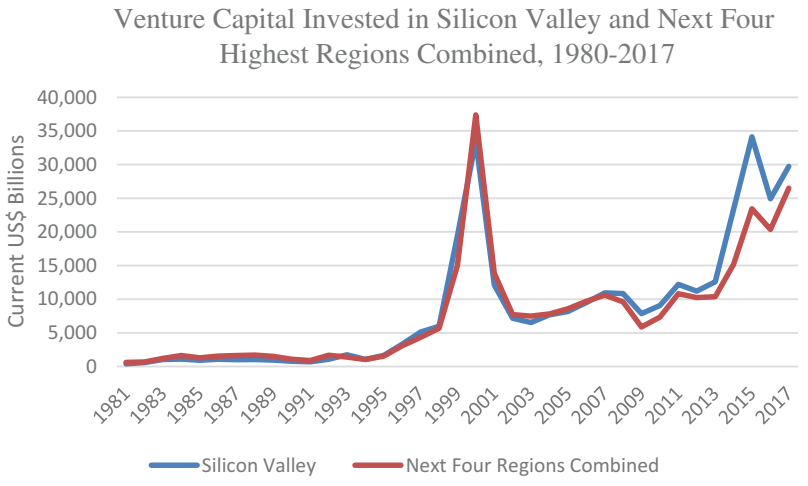

Figure 1. Venture capital invested in Silicon Valley and next four highest regions combined, 1980–2016. Source: Compiled from VentureXpert and PricewaterhouseCoopers MoneyTree

valuable firms, but, from a Schumpeterian perspective, change the political economy. This venture system reached its apogee during the dot.com bubble that came to an end in 2000, as more venture capital was invested then than ever before, an apogee that Silicon Valley reached again in 2014 (though only in current not constant dollars), while the other four regions lagged their performance in 2000. Indeed, in the aftermath of the dot.com bubble there was a collapse in venture investment followed by another smaller drop during the 2009 financial crisis. However, as Figure 1 shows, venture investing recovered in 2014 with the emergence of a remarkable number of unicorns and a massive increase in venture investing in particular in Silicon Valley (which encompasses the entire San Francisco Bay Area) that meant that it would now receive more capital than the other four largest regions (Massachusetts, Southern California, New York, and Texas) combined.

The reconstructed entrepreneurial finance system that emerged after the dot.com crash is substantially different than that prior to 2000. There are features that have untoward impact on the US socio-economic system – features that some would consider a significant flaw that must be addressed by investors, entrepreneurs, and policy makers. The change can be seen by the remarkable and persistent decline in IPOs, as can be seen in Figure 2, even in light of a resurgence in venture capital investment (Gao, Ritter, and Zhu 2013; Rose and Solomon 2016). Despite the increase in venture capital available and the passing of the Jumpstart Our Business Startups Act of 2012 (JOBS Act), which was meant to ease the pathway to IPO for small emerging growth firms, there has been a remarkable decline in the number of IPOs since the 2000 dot.com crash. Moreover, since the JOBS Act the number and percentage of biomedical firms being listed has outstripped that of information and communication technologies (ICTs). It is possible that the JOBS Act affected true entrepreneurship by allowing the higher-risk biomedical startups to go public, while the lifting of the cap on investors in pre-IPO firms allowed massive fund-raising in private markets for ICT firms, such as Airbnb, Lyft, and Uber.

First, let us note the driving features of the new era. The cost of creating startups, particularly platform-based start-ups, is exceptionally low. The low cost of entry has

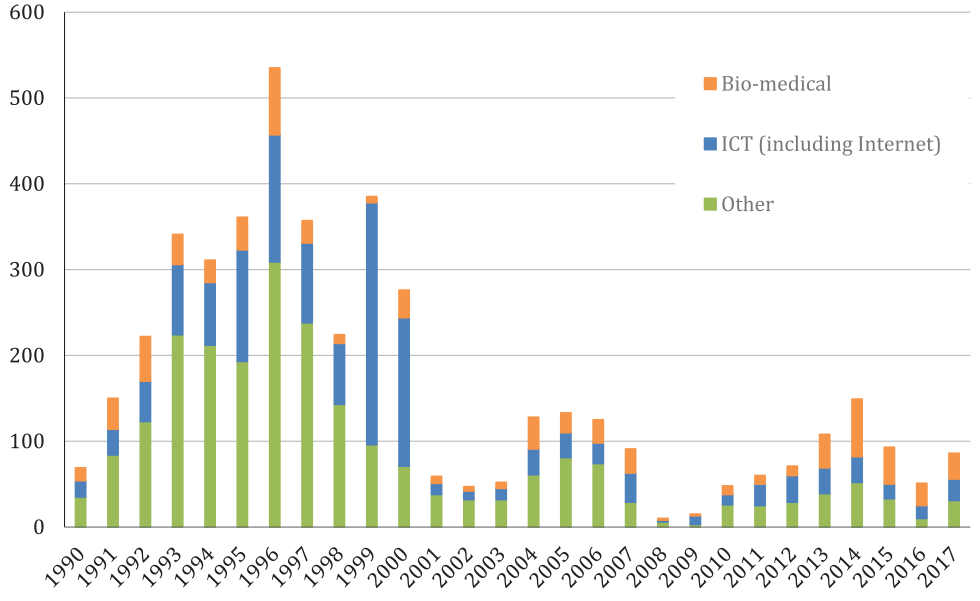

Figure 2. Emerging growth firm IPOs per year by sector, 1990–2017. Source: Kenney and Patton IPO database.

combined with the extraordinary availability of funds from a variety of sources to generate a plethora of competing startups for each of the array of opportunities in a remarkably broad number of industry sectors. For example, as Table 1 indicates, over 300 startups have entered various parts of the retail value chain intent upon disrupting some portion of it (CB Insights 2017). A similar pattern is playing out in nearly every industry as new entrants develop software/data analytics-based applications targeting particular segments. The abundant start-ups are each trying to ignite the winner-take-all

Table 1. Number of new venture capital-financed entrants into different segments of the retail value-chain, 2018. Source: CB Insights 2018.

Sector	Number of firms	Bay Area	NYC	Boston	Los Angeles	London	Other
Location analytics	30	5	4	1	0	1	19
Store Management/POS Systems	10	0	3	0	0	0	7
Augmented/Virtual Reality Tools	4	0	0	0	0	0	4
Guest Wi-Fi	6	3	0	0	0	1	2
Music Systems	4	1	0	0	0	0	3
Workforce Tools	12	4	0	0	0	0	8
Omnichannel Analytics	7	1	1	2	0	0	3
Pop-Ups and Kiosks	8	2	2	0	0	1	3
Smart Receipts and Ratings	4	0	0	0	0	0	4
Inventory Management	12	2	1	1	0	0	8
Shelf Monitoring	12	3	0	2	0	0	7
Packaging Tech	4	0	2	0	0	1	1
Digital and Interactive Displays	8	0	1	0	1	0	6
Shopping Cart Tech	2	1	0	0	0	0	1
Dressing Room Tech	2	2	0	0	0	0	0
Customer Loyalty	12	3	1	1	0	1	6
In-Store Financing	9	0	1	0	0	1	7
In-Store Bots and Chatbots	5	2	1	0	0	0	2
Total	**151**	**29**	**17**	**7**	**1**	**6**	**91**

(WTA) dynamics through rapid expansions characterized by breakneck and almost invariably money-losing growth, often with no, at the time, discernable path to profitability.

The result, thus far, is the proliferation of startups and, particularly, unicorns, i.e., non-public firms that at their last funding were valued at $1 billion or more. In recent years, the amount of capital available to private firms has grown immeasurably, allowing firms, such as Uber, Spotify, and Dropbox to continue to lose money and remain private far longer than previously – in the hopes apparently of going public or being acquired at even greater valuations.[1] As a result, money-losing firms can continue operating and undercutting incumbents for far longer than previously – effectively creating disruption without generating profit. Arguably, these firms are destroying economic value. This new dynamic has social consequences, and in particular, a drive toward disruption without social benefit. Indeed, in some cases, they may be destroying social value while also devaluing labor and work in the enterprise.

Getting started easier than ever; getting out ever slower

Over the past 20 years, the cost of establishing a start-up or experimenting internally has decreased dramatically (Anders 2012; Gerber 2016). As important as the cost decline, incidentally, is how the abundance of software tools and cloud-based operations speeds the time from forming the firm to actually launching a digital service (Murray 2014). The reasons for this cost decline are numerous, of which a technical one is the secular decline in the cost of computation – a long-standing tendency encapsulated in the shorthand of Moore's law but far deeper than just the dynamics of semiconductors. The economics of information technology (IT) start-ups has fundamentally changed. Previously, a start-up had to purchase and build an entire IT infrastructure, which was a capital cost and, as difficult, involved writing original software for whatever product it was introducing. However, the emergence of merchant cloud-computing offerings allows a new firm to rent server capacity from a vendor, such as Amazon Web Services or Microsoft Azure. What previously was a capital investment is now a variable cost, and capacity can be scaled up or down without any capital investment (Murray and Zysman 2011). Downloadable open-source software from firms, such as GitHub eliminate the need to write code from scratch, thereby reducing cost and time-to-market, providing opportunities for easy customization, and avoiding vendor lock-in (Northbridge and Blackduck 2016). The availability of low-cost infrastructure and open-source software dramatically decreases the cost and increases the speed of establishing a new digital business. Thus, the technical changes permit the entry of far more new firms than ever before and encourage internal experimentation in existing firms. Of course, being able to easily enter does not guarantee success – there will be many more experiments, but only a few survivors.

But there is a twist. While the costs of launching software-based startups has fallen dramatically, the cost of instantiating a dominant platform into an existing economic sector has risen dramatically, as has the time and cost required to establish the dominant position. As a rough proxy, in the current round of platform competition, time from legal inception of a startup to a significant exit (defined as IPO or significant acquisition) has increased significantly. In 2017, the venture capital consulting firm,

Pitchbook, found that time to exit had increased to 8.2 years for an IPO and five years for acquisitions or buyouts, the highest levels recorded in the last decade (Bowden 2017).

The abundance of funding

The belief that many industries are poised for disruption because of developments in ICT (such as big data, machine learning, new classes of computers – such as smartphones, and the Internet of Things) and the development of new business models have convinced investors that start-ups offer the potential for enormous capital gains. This has resulted in an unprecedented flow of capital in a variety of forms, into private equity, of which venture capital is one type. It is not well understood how much of this flow of capital was triggered by the JOBS Act of 2012. As can be seen in Figure 3, after the JOBS Act passed it appears as though commitments to VC increased significantly and now are higher than prior to the financial crisis. However, it is unclear as to whether the JOBS Act was responsible or whether this was the result of an emerging surge in available funds that would have been deployed in any case.[2]

Fund sizes and total capital under management by established institutional venture capital investors have both grown compared to past decades, as has the variety of players in the venture funding ecosystem – angels, small venture capitalists, mainstream venture capitalists, PE and hedge funds that invest in startups. Thus, not only is the sheer amount of capital available remarkable, but also the variety of start-up funding mechanisms (Arrington 2010). Let us begin with conventional venture capital firms. Before the internet bubble that began in the mid-1990s, traditional venture capital firms were the predominant funders of successful technology startups (Kenney 2011). As the elite venture capital firms became more successful, many of

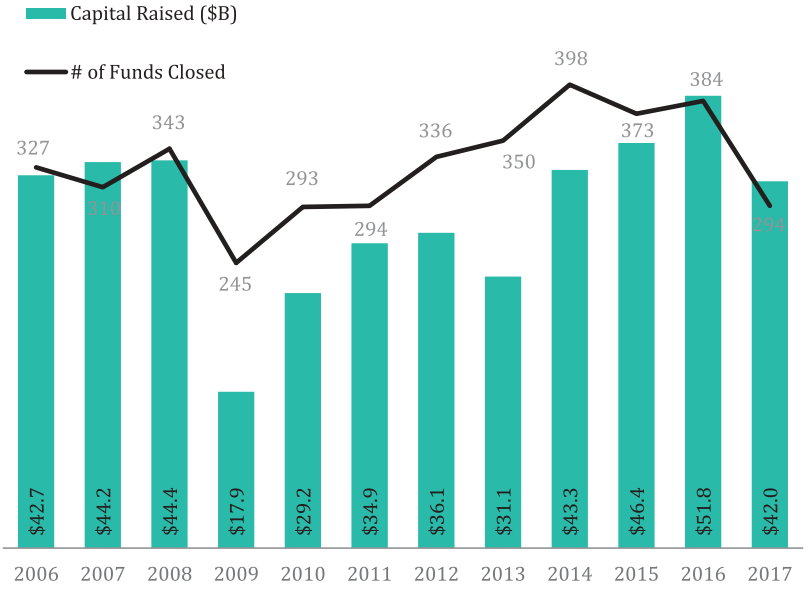

Figure 3. Venture capital raised and number of funds closed 2006–2017. Source: https://pitchbook.com/news/reports/2017-annual-pitchbook-pe-vc-fundraising-report.

them raised and managed mega-funds with $1 billion or more in assets. However, even this was not sufficient. In 2018, Sequoia Capital, a premier Silicon Valley venture capital fund, raised an $8 billion fund (Marinova 2018). Given their size, these firms can no longer invest in early-stage firms, where an appropriate investment is $1 million or less, as the management time commitment needed to ensure the investments was prudent was no longer feasible. Remarkably, some of these Silicon Valley giants have raised seed funds as large as $180 million in size. The race to gargantuan size has continued as Masayoshi's Softbank raised a $100 billion (Schleifer 2018). In response, a number of micro-funds were established that specialized in smaller investments and these became important parts of the formal VC industries raising between 40% and 50% of all venture capital raised from 2006 through 2017 (Pitchbook 2017).[3] One result of all of this money is increased pressure to put large sums "to work." In 2018, the *New York Times* reported that some Bay Area startups were offered far more capital than they initially sought, as venture capitalists bid up their equity price (Griffith 2018).

The market gap created by the emergence of mega-funds evoked six ecosystem responses. *First*, angel groups or syndicates, and on occasion individual "super-angels", emerged that were easily able to invest up to a few million dollars in a firm's early stages, particularly in Silicon Valley (Manjoo 2011). Many of these angels were successful entrepreneurs that had already started a company that had been sold yielding sufficient capital gains so that they could now invest in a new generation of entrepreneurs. *Second*, accelerators, of which YCombinator is the icon, that accept aspiring entrepreneurs have proliferated. Normally, these provide small amounts of capital and significant amounts of coaching in return for a small tranche of equity. Their goal was to assist in the growth of the entrepreneurs' idea to the point that they could "graduate" and form a proto-firm, able to raise money from angel groups or venture capitalists (Radojevich-Kelley and Hoffman 2012). *Third*, a wide variety of digital platforms for crowdfunding have been established ranging from Indiegogo and Kickstarter – where funds are contributed to a project, but the funders receive no equity – to other platforms, such as AngelsList – where only certified investors invest in return for equity (Belleflamme, Lambert, and Schwienbacher 2014). *Fourth*, a proliferation of smaller, seed-stage VC firms have created a functional segmentation of the VC industry. *Fifth*, open-ended mutual funds and sovereign wealth funds are making massive late-stage investments. For example, as Chernenko and colleagues show, initially Uber was funded by angels and venture capitalists, but, in the later stages, where it secured massive tranches of capital, it was mutual funds and sovereign wealth funds that committed capital (Chernenko, Lerner, and Zeng 2017). *Finally*, there is the perplexing emergence of Initial Coin Offerings based on block chains to raise capital. Whether this is a significant innovation that will impact startup funding, or a new form of blue-sky financing with promises of great returns, but also an even higher likelihood of resulting in complete losses, is uncertain. What seems certain is that significant fortunes will be made by the promoters. Ultimately, investors are more likely to own snippets of code than to own financially valuable assets. For us, the most important observation is that the current period of torrid investment may simply be the excesses typical of stock market bubbles.

Effectively, a complex ecosystem of funding organizations and networks has emerged and provides funds for a burgeoning number of entrepreneurial experiments all

facilitated by, but also reinforcing, the significance of the technological changes reducing the cost of starting an ICT firm. With the reduction in the capital necessary to enter a market and the increased number of channels for securing seed capital, more firms can be established, thereby increasing the number of experiments, as remarked already. If these experiments experience initial success, as signified by rapid adoption measured by the number of users or the extent of use and not necessarily by revenue, access to far greater pools of capital is likely. This is because, as we note, investors believe that these digital markets have WTA characteristics. For the startup, it is imperative to grow as quickly as possible to occupy the space before other start-up competitors or an established firm can introduce a competitive product.[4] During this phase, profitability is not as important as growth that captures the market. At this stage, success demands even more capital as the start-up grows and expenditures out-strip revenue growth. At some point, angels and incubators can no longer provide the capital necessary to support such growth, and thus the expanding start-up must secure much larger investments from the largest VC firms and, enormous sums are available – and must be invested.

The drive to expand and the emergence of the unicorns

What is particularly interesting is that the current financial euphoria is concentrated on funding platform economy firms. One of the characteristics of digital platforms is that they exhibit powerful network effects that often lead to WTA outcomes (Eisenmann, Parker, and Van Alstyne 2006; Gawer and Cusumano 2008). It is the WTA outcomes that allow the young firm to outpace larger competitors and, if successful, often are able to establish monopolies or near-monopoly positions. Most readers know the story, but do recall the position of Google in search, maps, YouTube, and a variety of other services, Amazon in online retail, Facebook in social networks and instant messaging, eBay in online auctions, LinkedIn in professional networks, Yelp! in online reviews, OpenTable in restaurant reservation services, and the like.[5] In each case, the dominant firm captured nearly the entire market and became difficult to dislodge, unless the new entrant could create a new value proposition.

The start-up process in such WTA environments assumes that the startup will initially be cash-flow negative as it grows and competes against other startups and incumbents that are also seeking to restructure the new business space that the technology's progress has made possible. Such startups begin by "bleeding" money: Investors are wagering upon the firm establishing a powerful market position – or what could be termed a "proto-monopoly." These firms are not expected to win via early and sustained operating profit, but by absorbing operating losses during their growth phase financed by venture investment with the aim of driving incumbents and other new entrants out of the market. Investors are increasingly comfortable with absorbing the exceptional losses, if convinced that it will be possible to lock in a position to generate quasi-monopolistic profits and, by extension, enormous capital gains.[6]

The current technological and financial environment has created remarkable dynamics. For any given platform or Internet-related idea, low-entry cost and plentiful capital results in very low entry barriers. As a result, there are an enormous number of entrants. Because of this and because many of these markets will have WTA characteristics, the competition ignites an equity-capital consuming race to establish market

leadership. The result is that ever-increasing amounts of capital must be raised. With the WTA opportunity beckoning, these startups have been able to raise ever-larger amounts of money at ever higher private valuations. The result is the "unicorn" phenomenon – private companies valued in excess of $1B in their last funding round.

This growth-at-all-costs dynamic is reinforced at each stage of the capital-raising process (post-seed) for venture-backed companies because the metrics used by each investment stage to determine investment potential is growth – growth in users, engagement, and conversion for consumer-focused startups or monthly growth in customer acquisition and revenues. As long as the growth metrics are accepted by investors as proxies for value, then valuations can increase. Paradoxically, a sustainable business may not be the objective and may not matter, if earlier investors, founders, and management can sell their stakes in the business at higher valuation multiples to later-stage investors or through an IPO or trade sale before the actual unit economics and profit-generating potential of a company are clarified through repeated performance. The present entrepreneurial finance logic with low startup costs, emphasizes on disruption that will result in a new WTA industrial organization and abundance of finance, that not just encourages, but demands, a drive to breakneck expansion. In fact, a startup that does not grow as quickly as possible is soon overwhelmed by the startup with more capital and more reckless investment.

Unicorns or Chesire cats – considering the entrepreneurial consequences of the new finance dynamic

Traditionally unicorns were mythical beasts – horses with a single horn protruding from the forehead. One financial analyst concluded that the probability of a venture investment creating a billion-dollar valuation had increased from .07% (seven hundredths of one percent to .14% in 2015. She coined a term "unicorns" for firms that had reached a billion-dollar valuation.[7] This term, which evokes the idea that such a mythical unlikely and improbable valuation had been achieved. It is difficult to predict whether most of these mythical valuations actually are justified. This can only be tested in the public market. More recently, a number of studies have questioned these valuations and suggested that some of them are structured to make the firm appear to be worth more than $1 billion, when in fact this is not the case (Gornall and Strebulaev 2017; Fan 2016). An ever greater concern than over-valuation is that many of these firms will never be profitable and thus may collapse completely. It may ultimately be the case that these Unicorns may turn out to be a very short-lived breed, such as the Cheshire Cat – the fictional cat from Lewis Carroll's *Alice in Wonderland* that had a distinctive mischievous grin, but whose greatest distinguishing feature was that its body would disappear and all that would remain was the iconic grin.

Some of the financial Unicorns have become significant corporate entities, stepping out from the mists of myths. Some have just vanished, leaving a grin – for the investors who got out an amused grin, but for those left in to bear the pain, perhaps a grimace or a tight bemused smile. Of course, admittedly, so far most have not crashed, but the question remains regarding whether many have a viable business model.

In light of the excessive expansion, the growth at-all-costs mentality has decided impacts on the governance of the firms themselves, which can make the Unicorn birth, growth, and bust cycle more likely. Fast-growing startups whose value in each investment increases allow their venture capital investors to mark-up the value on their books facilitating the raising of new and even larger funds upon which they can charge their management fees of three percent of the capital raised. Not only have the venture capitalists benefited, but so have their pension fund managers as they are competing against other investment options for capital. The upshot of these dynamics is an ever upward spiral of valuations, all of which will be vindicated, if the startups can be sold to either the public or to other investors. Notice during this entire cycle that rather than making money, the firm's sole task is to capture market share driving competitor startups and/or incumbents from the market segment by undercutting them even as the aggressor startup loses money – the capital investments subsidize the losses. These startups are, of course, capital hungry and financiers are inventing ever more exotic "innovations" to raise money as has been demonstrated by the Initial Coin Offerings where bitcoin-like vehicles have been introduced as mechanisms for securing capital.[8] Ultimately, when the capital is exhausted, or the market turns and investors are no longer willing to subsidize the losses, the startup will close and investors that have not exited will be forced to recognize their losses.[9]

Second, financing losses as a way of overcoming existing systems via social disruption and long-term operating losses forms a treacherous environment for incumbents that are judged by the profits they make. To illustrate, in 2017 (last annual report) Walmart had $486 billion in sales and operating income of $23 billion, while its greatest competitor Amazon in 2016 (last annual report) had $136 billion in sales and operating income of $4.1 billion. Though Amazon has grown significantly in the last year, it still trails Walmart in both profits and especially in income. And yet, as of March 2018, Amazon had a stock market valuation of $608 billion, while Walmart had half the valuation at $301 billion. Effectively, the stock market valued the much faster growing Amazon, which of course has the remarkably profitable AWS, twice as high as Walmart, despite Walmart having five times greater income. This stock market valuation allows Amazon to make far less profit and plow revenues into expansion and undercutting incumbent retailers (even though they have websites) that are forced to generate profits to satisfy investors.

The aggressive expansion of Amazon leveraging its enormous internal Amazon Marketplace "partners" and its Prime subscriptions have resulted in consumers searching Amazon for their needed products – in 2018 Amazon handled approximately 44% of all US online retail (Thomas 2018). This expansion threatens Google as those searches increasingly bypass it. This has resulted in a commonality of interest between Google and incumbent retailers. As a riposte, Walmart and a number of its brick-and-mortar brethren (including Costco, Target, and others) whose websites have been unable to slow Amazon's advance, have joined a Google service that will list products from their websites in response to searches (Kraus 2018). The point is that the ferocious competition from Amazon drove these powerful retailers into an alliance with Google, as it can route customers to them.

Finally, because many startups sustain operating losses over long periods, it is possible to question the economic, as much as the social, benefit. Are the

disruptions, if they are driven by extended losses, welfare generating? These firms are structured to pursue growth at all costs as they endeavor to achieve market domination. In one sense, this appears as predatory, but it is also a natural outcome in many of these markets. For example, would the economy have been better off with 10 different incompatible personal computer or smart phone operating systems? Similarly, would the economy be better served with 10 search engines – moreover, technically in the case of search, there is learning from each search so *ceteris paribus* a search engine that attracts more searches is likely to enter a virtuous circle of improvement that is impossible for laggards to overcome. Importantly, operating losses with the goal of market dominance may also encourage business strategies of transgressing established marketplace and social rules, because locking in a winning position is everything. This is roughly summed up in the Silicon Valley mantra of "move fast and break things" (Taplin 2017). The changing character of competition is important not only for investors but also for the entire society. How firms compete can determine how much of what kind of labor is needed, who will deploy that labor, and where.

Establishing and contributing to the growth of start-ups and internal firm experimentation by investors willing to incur long-term operating losses poses a variety of questions. Rapid growth strategies by platform economy firms have, by implication, raised questions for government regulators in a wide variety of sectors, in practice there has been a profound assault on regulatory boundaries – from taxis and lodging to privacy and competition, even as the labor platforms place wage pressure on parts of the workforce. Current strategies seem to suggest less attention is being given to developing the talents and capabilities of forming structures that support workers. The implications are profound.

Consider Uber and Lyft that combine Google Maps, a set of pricing and dispatching algorithms, and a smartphone app to build an application that has transformed citizen drivers with limited knowledge of a locale into "contracted" transportation providers creating a compelling service.[10] These new Uber drivers, freed from the constraints of a taxi being a public conveyance, put downward pressure on prices for all. Unfortunately, there is no single narrative here except for the ineluctable fact that platforms and intelligent tools are shifting the grounds upon which all economic activities are undertaken. By extension, this suggests the two fundamental conditions in a capitalist society – labor and competition – are experiencing changes in their operations. Beyond knowing that these two conditions and everything built upon them will shift, the implications are contingent and continue to evolve.

The consequences for labor will vary dramatically depending upon activity and the evolution of the technology, and this will vary across applications and market segments, and, indeed, among firms. What appears common to all is that, loss-driven market domination strategies, which generate capital gains without attaining even mid-term market sustainability, appear to encourage strategies that will treat labor as a commodity, whose cost is to be minimized rather than seen as an asset whose value can contribute to long-term competitive advantage for the firm and superior social outcomes.

The original meme of disruption or Schumpeterian creative destruction has generally seen this as an unalloyed good. Previous waves of creative destruction certainly resulted

in new industries that, despite severe and not-to-be-underestimated dislocation for many, employed more workers and delivered remarkable benefits in terms of living standards. The point is not to dismiss the enormous value that digital technologies and platform-based business have created. Rather, it is to interrogate the enthusiasm for backing entrepreneurial start-ups, losses or not, and for seeking to turbo-charge their growth to the point that they become the so-called "unicorns."

Conclusion: unicorns, Cheshire cats, and the new dilemmas of entrepreneurial finance

In sum, this essay examines the implications of the current environment for the formation and financing new firms. After the dot.com crash of 2000, there was a regime change in new firm formation and the number of firms that exited through an IPO. This change was made possible by the decreased cost, increased speed, and ease of market entry due to availability of open source software, digital platforms, and cloud computing. This facilitated a proliferation of startups seeking to disrupt incumbent firms in a wide variety of business sectors. The eased market entry was accompanied by a growth in the number of private funding sources that now include crowd-funding websites, angels, accelerators, micro-venture capitalists, traditional venture capitalists, and lately even mutual, sovereign wealth, and private equity funds – all willing to advance capital to young unlisted firms. And, in particular, after 2013 there was a massive growth in the number of venture capital-backed private firms termed "unicorns" that have market capitalizations of over $1 billion. The ease of new firm formation and the enormous amount of capital available has resulted in to a situation within which new firms can afford to run massive losses for long periods in an effort to dislodge incumbents or attempt to triumph over other lavishly funded startups. The result has been remarkable turmoil in many formerly stable industrial sectors, as the new entrants fueled by capital investments undercut incumbents on price.

It is difficult to be certain which of the changes we describe are permanent and which are transient. The power of incumbent integrative platforms, such as Google and Facebook to both block entry and scoop up new applications is evident. That said, the technical changes that are easing entry could be a part of a permanent environmental change that facilitates the entrance of narrow and specific platform-based applications. Platform tools can be quite powerful for many purposes. But, will the new entrants be able to challenge the integrative platform giants directly or avoid being absorbed into their ecosystems through either acquisition or dependence. It seems likely that the preponderance of these new entrants will be subsumed into the platform giant's ecosystem and thus face constrained growth opportunities. Exactly what the ultimate balance will be is difficult to predict and, of course, this presumes no radical changes in the funding environment due to unexpected financial market events.

While, the technological changes and the tensions between eased entry and platform power to control ecosystem complementors can be expected, the changes in the financial sector are far more opaque. For example, if there is a financial crisis, such as those in either 2000 or 2008, which types of financial intermediaries can continue to fund startups? Will angels and accelerators still have sufficient capital, and, if as is likely, only the best ones survive, what will be the implications for the enormous number of

startups currently operating? Even more uncertain is whether the organizations that have been providing funding for the later growth phases, where large sums of capital are required, will continue their support. The situation would become particularly precarious if the IPO and acquisition markets were to freeze up simultaneously, as these private investors would be called upon to commit capital at the very time when they were experiencing a capital squeeze. From a political economic perspective, because in most of these firms the assets are largely software and data, liquidations are likely to be nearly total with little residual value remaining.

Oddly, our conclusion is contradictory. The powerful transformative forces currently at work driven by the move to a platform-centric economy appear to be inexorable. And yet, the funding necessary to nurture many of these transformative firms is dependent upon a robust flow of capital, particularly since as we demonstrated, IPOs as exits have declined markedly and for ICT firms did not recover significantly despite the passage of the JOBS Act. These alternative sources of capital are interesting because the goals of nearly all of them are the same not to own the firm for a long period of time, but to invest in and then exit the investment for a capital gain. However, as valuations have increased remarkably, but many of the firms remain unprofitable, exit options become ever more difficult, as potential purchasers in public or acquisition markets, balk at the price. If the flow of private capital slows or is no longer available and the public capital markets are closed, then the startups that do have significant potential will be forced to either sell themselves to the platform giants or fail outright – a common occurrence after the collapse of the dot.com bubble. The implications are that the incumbents will be able to purchase the firms that Schumpeter suggested would replace the existing firms.

It is symbolic of global acceptance that the Silicon Valley model for innovation and entrepreneurship exemplified by its capture by one dominant form of entrepreneurship, the venture capital-backed Unicorn, is believed to be the best type of firm to be supported and that such entrepreneurship is a path equally available to all. This model is embraced by both local governments and educational institutions as an optimal economic development goal. The result has been a proliferation of accelerators, incubators, entrepreneurship courses and programs, etc. that themselves lower start-up entry barriers, thus reinforcing the phenomenon of competitive commoditization. This narrative advances the view that the venture capital-backed startup – in reality, a narrow class of startups that can quickly grow to a large scale over a decade or less – is the most desirable model. This essay calls those conclusions into question. It also suggests that those who seek entrepreneurial innovation-based growth may not be able to spawn many or many successful venture capital-funded firms. They may consider whether it is preferable to search for or envision distinctive growth models specific to their own context, resources and possibilities.

Notes

1. There was a surge in venture capital funds globally, so it may have been part of a more general global trend.
2. The JOBS Act had a number of provisions that were meant to increase the capital available to small and fast-growing firms. The JOBS Act had many different components that affected new firms' ability to raise capital. First, it eased restrictions on crowdfunding and there has been a significant increase in crowd funding for fledgling firms. Moreover, JOBS Act eased

reporting requirements for small firms going public, thereby saving money. However, the decrease in information led to greater underpricing at IPOs. In other words, investors compensated for receiving less information by offering a lower price for the firm's stock (see, e.g., Chaplinsky, Hanley, and Moon 2017). The JOBS Act increased the number of investors a private firm could secure without having to file company reports with the SEC, thereby allowing the firm to raise more rounds of capital and include new investors. It also allowed unlisted firms to tout their publicly stock, thereby increasing their ability to raise capital. Remarkably, despite all of these changes, as of 2015, there was no evidence that more emerging growth firms were going public compared to the years prior to the JOBS Act (see, e.g., Berdejó 2015.)

3. We are indebted to Michael Borrus for pointing this out.
4. For the incumbent firm in an industry being assailed by the new entrants, the challenge is daunting. Each of the entrants is likely to have a somewhat different business model. Thus, the incumbent faces not a single entrant with a single model, but multiple entrants, each of which may have a different model or which may attack a different portion of the incumbent's value chain. If any of these models shows any promise of success, then the venture capitalists will provide further funding for its growth. It is these multiple experiments/challenges that contribute to making the current environment so treacherous for incumbents. The challenge is that the new entrants will not attack the incumbent across its entire business, but, normally only specific aspects of its business model. The new entrants often aim to capture a chokepoint where that they can use to extract value from the entire chain. Often the goal is to transform the incumbent into a commodity producer in the same way as Microsoft and Intel turned personal computers into a commodity.
5. We have seen similar dynamics in earlier digital industries with Microsoft in the personal computer operating system and office productivity software; Intel in personal computer microprocessors; Cisco in computer networking, and Oracle in relational databases.
6. Current antitrust/competition policy is completely unprepared to address the types of business strategies these small entrepreneurial firms use.
7. International Business Times's Salvador Rodriquez in the September 3 2015 issue attributed this to Aileen Lee. The data is from that article.
8. ICOs are a method of crowd funding that involves issuing a bitcoin-like financial instrument that provides equity in a firm. These are now under investigation by the Securities and Exchange Commission (see Liao 2018; Shin 2017)
9. We are indebted to Michael Borrus for these observations.
10. Uber platform uses the APIs from the Google Map platform. Maps thus became a resource easing the creation of Uber, Lyft, Sidecar and other entrants. Of course, the taxi firms can also use the Map APIs. Similarly, Airbnb initially leveraged the data available on Craigslist to leverage its room rental service. The use of an existing internet service to build a customer base, is termed as a "growth hack." For discussion of the Airbnb case, see Rosoff (2011).

Acknowledgments

The authors gratefully acknowledge the support of the Ewing Marion Kauffman Foundation. The authors are solely responsible for all of the data and conclusions. They acknowledge the helpful comments of Michael Borrus and Donald Patton.

Disclosure statement

No potential conflict of interest was reported by the authors.

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