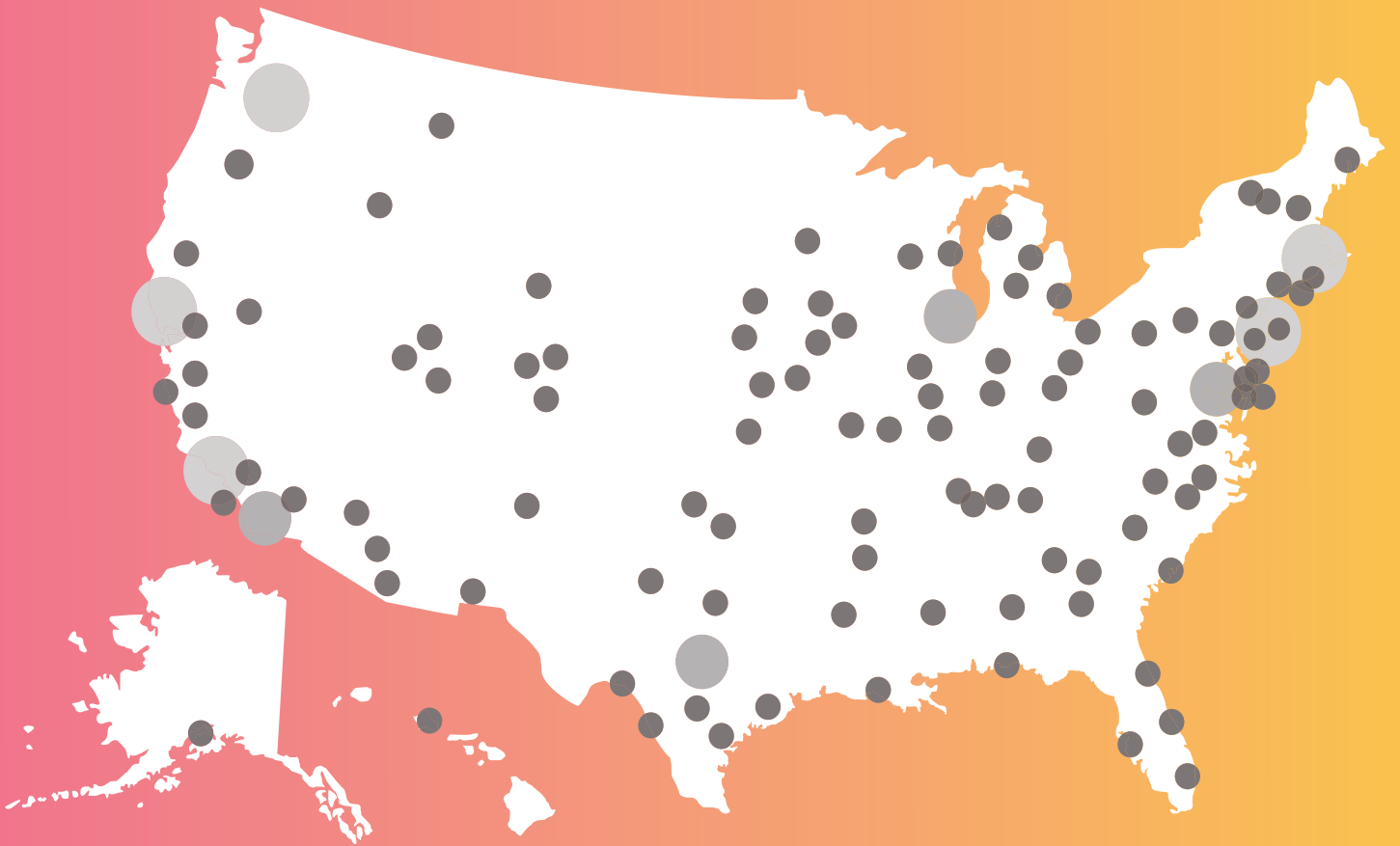


the State of the **Startup Ecosystem**



presented by





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INTRODUCTION

Startups operate in every state and every congressional district across all sectors of U.S. industry. They are impacted by policymakers' decisions across a range of issues, yet their perspective can be left out or misunderstood by policymakers—especially in debates that center around large tech companies. For example, concerns about the state of competition in the technology sector, debates about intermediary liability frameworks, or conversations about a federal privacy law can often fail to reflect the consequences of policy changes on the startup ecosystem.

Along with listening to startup voices and crafting policy with startups in mind, it is essential that policymakers are able to understand and monitor their impact on startups. Yet the data necessary to understand those impacts is missing. Indeed, there is surprisingly little agreement as to the current health of the startup ecosystem. Advocates and researchers often turn to proxies that are ultimately inadequate in the context of today's active tech policy conversations. Some advocates will cite generic business formation statistics to assess the health of startups, but this overbroad approach captures data about any newly formed business and fails to provide a crisp picture of emerging tech startups. Data highlighting trends in startup financing, growth, and exits are publicly available, but this information has not been compiled and analyzed in ways that help policymakers, researchers, and advocates consider specific questions.

Through this report, Engine seeks to narrow this knowledge gap by providing an empirical survey of the startup landscape to generate a better understanding of the health of U.S. startups and inform a range of public policy debates. The report studies startup health by evaluating trends in startup fundraising across several stages, assessing individual U.S. ecosystems, analyzing startup exits, and contextualizing the capital needs of the average investor-backed startup.

METHODOLOGY

Data presented in the report were provided by Startup Genome, a world-leading innovation policy advisory and research firm. Through partnerships and extensive survey research, Startup Genome has access to a comprehensive picture of the startup ecosystem. The main datasets integrated and consulted for this report include those from Crunchbase, Dealroom, Pitchbook, and Orb Intelligence, in addition to Startup Genome's original research and data from Forbes 2000, GitHub API, International IP Index, Meetup.com, OECD R&D Spending, Salaries Data from Glassdoor, Salary.com and Pay-Scale; Shanghai Rankings; Times Higher Education Rankings; Top 800 R&D Hospitals, Webometrics; USPTO and WIPO; and World Bank Ease of Doing Business. Funding values discussed in this report were provided by Startup Genome in nominal dollars, and they are presented as such. For consistency throughout the report we have not adjusted them. The overall trends in this report are significant compared to the small factor of inflation and do not change dramatically when adjusted. Further, doing so would confuse the discussion of individual years of funding that occurs throughout the report, but especially for the ecosystem highlights, for example. Due to the lag endemic to early-stage funding data, most trends presented in this report end with the year 2018 and present the previous ten to fifteen years. This report, therefore, does not include data that reveals the effects of the COVID-19 pandemic on the startup ecosystem. There are publications available about such effects using early data and estimates that policymakers can consult as they consider their response to the pandemic-related economic crisis. Situating the crisis in broader trends, however, will require years of not yet collected data.

The report assesses startups that are U.S.-based technology and innovation companies founded after 1995. Subsectors for analyses presented in the report were prepared by Startup Genome using the descriptions of the companies, keywords, and keyword combinations before they were run through a quality control process to clean the data. Subsectors are defined where they are discussed but are generally not mutually exclusive nor collectively exhaustive. In other words, a particular startup may be considered in multiple subsectors, while another may not be considered in any subsector discussed in this report. Subsectors that aren't discussed in greater detail in the report are presented in the appendix for policymakers and researchers to independently consider.

While the datasets drawn on for this report may be among the most comprehensive available, they are not without imperfection. For a funding round to be captured here, it must have been reported, which does not occur reliably for every

funding round, especially for smaller raises. The natural bias is toward formal and larger funding rounds, which are reported with the goal of showing momentum and driving additional investor interest. Trends for such rounds are explored in this report, including seed and angel, Series A, and venture capital. Definitions can be found in the Glossary section of this report.

Data about the smallest of funding rounds is critical for policy debates, as it is representative of the resources that the most nascent companies have at their disposal, but this data is also the least reliable. For this reason, funding rounds under \$125,000 were removed by Startup Genome in their preparation of the seed and angel funding data. Additionally, few startups overall receive venture funding—just .05 percent did in 2013, the middle year in the range considered in this report.¹ Instead, many startups exist outside of these commonly thought of funding networks and rely on other methods of raising capital, like family investment, personal loans, and bootstrapping.² It is important to view the data reported here—especially average funding amounts for the seed and angel rounds—with this context in mind. At the same time, we can be very confident that the trends observed are reflective of reality—the number of startup fundings and the total values of those deals have increased meaningfully over the past decade.

In addition to looking at trends in startup investment and exits overall, this report also examines those trends without the top five ecosystems (Silicon Valley, New York City, Boston, Los Angeles, and Seattle) and without the top nine ecosystems (the above plus Washington, D.C., San Diego, Austin, and Chicago) to reveal how startup investment has fared outside of the nation's innovation hotspots. These ecosystem groupings were suggested by Startup Genome based on their proprietary ecosystem lifecycle analysis.³ This allows policymakers to get a sense of whether startup funding and success is concentrated in a few areas or distributed across the country.

While the analyses included in this report do not seek to provide comprehensive explanations for the trends observed, they can serve as a baseline for public policy analysis and follow-on research. For example, positive trends in startup funding can provide much needed color to policy debates about competition in the startup sector, while average early-stage startup funding amounts can be used to weigh the costs and benefits of potentially onerous regulation, such as repealing current intermediary liability frameworks or dialing back measures meant to promote balance in intellectual property systems.

GLOSSARY

Accelerator

A program that is aimed at speedlining the growth of young, existing startups by providing mentorship, resources, and financial capital. For some accelerator programs, capital is exchanged for equity stake in the startup. These programs can last several months but are usually less time intensive than support provided by incubators.

Incubator

Community spaces that bring together entrepreneurs and professionals from different backgrounds to carry out the ideation process and launch startups. Individuals are provided with networking opportunities, advisors, and other resources. These programs can last for extended periods (a year or more in some cases).

Bootstrapping

The process of funding a startup with personal capital from the founder(s), their families or friends, or with revenue from the company itself.

Exit

Occurs when an investor in a startup liquidates some or all of their shares/ownership in the company. This may come in the form of cash, debt, or equity in another company.

Acquisition

An event in which a company obtains a majority—if not all—of the assets of another company and is now in primary control.

Initial Public Offering (IPO)

The first case of selling shares to the public by a previously private company in order to generate capital. After an IPO, a company would no longer be considered a true startup.

Merger

An agreement between two separate companies to combine together into one entity.

Ecosystem Value

A measure of the economic impact of the ecosystem, calculated as the total exit valuation and startup valuations over a 30-month period.

Runway

Refers to the amount of time a startup can operate before they need to raise additional capital. Often measured in months, runway can be thought of as the amount of time before a startup runs out of money.

GLOSSARY

Seed & Angel

Seed is the earliest round of formal investing, where money is exchanged for equity within the company or convertible debt. It primarily comes from the personal networks of the startup or angel investors, but some venture capital firms will invest at the seed stage as well. Angel investors are individuals or small groups of investors that provide financial capital from their own personal funds. Startup Genome combines all seed, pre-seed, angel, and pre-Series A funding rounds to report as seed/angel funding, and removes those rounds that are less than \$125,000.

Series A

A large scale investment round (usually in millions) that occurs after the seed stage of a startup. This financing can come from either venture capital or private equity firms.

Series B+

After a startup has raised its Series A round, the next investment rounds continue with lettered rounds B, C, D, etc. which are usually successively larger. Series B+ referenced in this report refers to all venture capital rounds from Series B onward. Like Series A, this financing can come from either venture capital or private equity firms.

Startup

In this report, a startup is a U.S.-based technology and innovation company founded after 1995.

Startup Ecosystem

A network of individuals, startups, and other community stakeholders that utilize their resources and interact with one another to promote innovation within their region. Startup Genome ranks ecosystems using a number of factors including: performance, funding, market reach, talent, connectedness, and knowledge. This report analyzes trends inside and outside of the nation's top ecosystems to provide a picture of how startups are faring even outside of the top tech hubs, which are listed below.

- Top 5 Ecosystems: Silicon Valley, New York City, Boston, Los Angeles, Seattle
- Top 9 Ecosystems: The above, plus Washington, D.C., San Diego, Austin, Chicago

Venture Capital

A subset of private equity, venture capital is capital pooled together from investors and given to startup companies in exchange for equity within the company. Investors might be high-wealth individuals, foundations, pension funds, endowments, or other institutions, and they are known as limited partners. Their pool of capital constitutes a venture fund, which is managed by the venture capital firm. The general partners at the firm choose the startups to invest in, which are typically technology-based with high-growth potential.

LIFECYCLE OF A STARTUP

No two startup companies follow the same path to launch and grow. This diagram explores what that path might look like for a startup that comes to be funded by traditional venture capital.

IDEATION AND LAUNCH



Every startup begins somewhere, even if not literally in the idyllic garage. As a company is launched, any employees are typically founders or co-founders who may still have other full-time jobs or are paying themselves a minimum wage to reduce costs. Funding at this stage generally comes from bootstrapping, personal savings, friends and family, grants, or accelerator programs, and is generally under \$120,000.⁴

BUILD



As a startup builds and validates its product, the founders may expand the team, either by adding co-founders, internal employees, or independent contractors. At an average age of 22 months, startups complete their seed round. The median U.S. seed funding round was \$740,000 in 2018.

EARLY-STAGE GROWTH



As a startup takes its product to market and grows its customer base, it will raise another funding round to support these and other goals, like expanding its team—now typically numbering in the tens to hundreds.⁵ On average, another 22 months elapses before a startup raises its Series A round. In 2018, the median Series A round was \$5 million.

LATE-STAGE GROWTH



By this stage, a startup's product is likely becoming widely used, but additional funds can juice their expansion. Companies raise additional venture rounds as they continue to grow, with Series B and C raises coming an average of another 24 and another 27 months after their previous funding rounds.⁶

MATURITY



A startup is said to reach maturity when it goes through an exit event. While a venture-backed startup can exit at any stage through acquisition—which represented 92.8 percent of all exits in 2018—startups that exited through an initial public offering (IPO) in 2018 were just over seven years old on average, with a standard deviation of five years and three months. In 2018, the average value of an IPO was \$1.2 billion.

STATE OF THE AMERICAN STARTUP ECOSYSTEM: TRENDS AND TAKEAWAYS

Key Takeaways

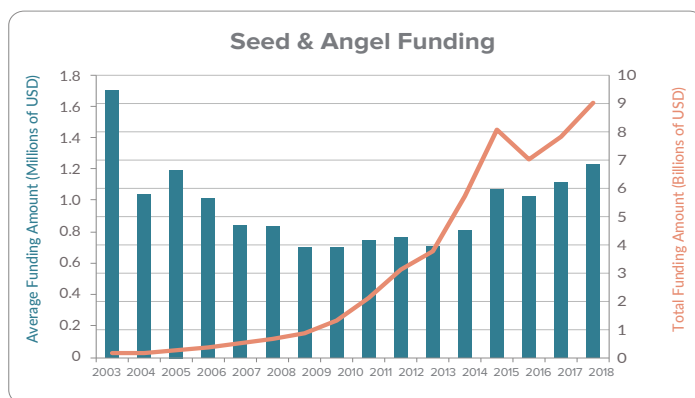
- The startup ecosystem is healthy. Both the number of startup fundings and the value of those fundings have grown meaningfully over the past decade. This positive trend is present across all funding rounds—from seed and angel rounds, to Series A, to venture capital as a whole.
- Acquisitions are a beneficial and necessary part of the startup ecosystem. Investors are able to take profit at this exit and use the proceeds to fund new investment in new startups. This is borne out by the data. There is a strong positive correlation between investment and acquisitions.
- The average seed round was \$1.2 million in 2018. While that may seem like a lot of money, it must be viewed with the context of a seed-stage startup. This is often the only money coming into the company for almost a two-year period and must cover everything from personnel to R&D. It is also important to remember that number only includes reported raises from investor-backed startups, which make up a small percentage of startups overall, so not all 22-month-old startups have these resources. Overall, with margins thin, even minor policy changes can have major cost impacts on startups.

Investment

Capital is the lifeblood of startups, the fuel needed to launch and grow. Accordingly, trends in investment can reveal much about the state and health of the startup ecosystem. This section examines trends in startup funding at seed and angel, Series A, and for venture capital overall, both within the nation's top startup ecosystems and outside of them.

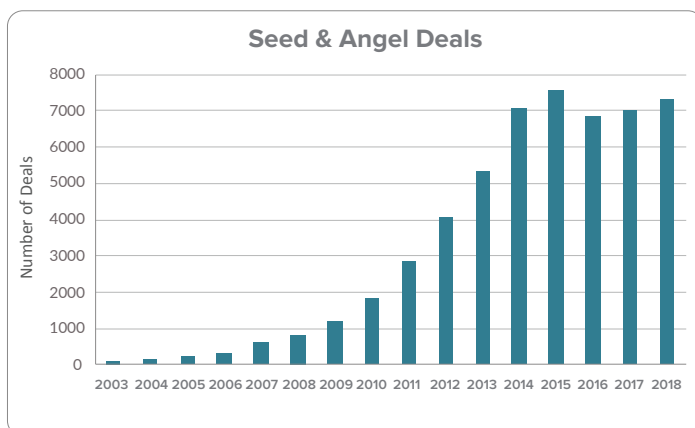
Seed & Angel

By and large, the startup ecosystem has seen more early-stage funding every year for the last fifteen years. Seed and angel funding is generally the first formal investment round in a startup, where investors exchange money for an equity stake in the company. Here, Startup Genome has combined all seed, pre-seed, angel, and pre-Series A funding rounds to report as seed/angel funding, and removed those rounds that are less than \$125,000 to prevent noise in the data.



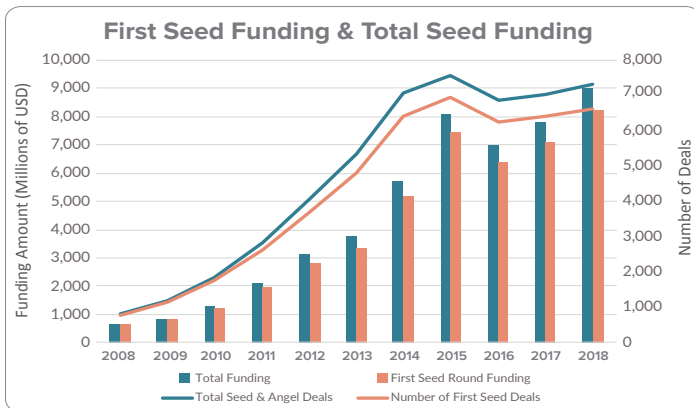
Total seed and angel funding and the number of seed and angel funding rounds have grown consistently over the past 15 years, with the exception of a correction in 2016. That correction is due to a sharp drop in the valuations of software-as-a-service (SaaS) companies in early 2016, and is called the “valuations crisis” in this report.⁷ It had ripple effects throughout the startup ecosystem, and the correction is present across all funding rounds examined in this report.

Average funding values dipped during the Great Recession, the worst economic crisis since the 1930s that reached its trough in mid-2009, to around \$700,000 in 2009-10.⁸ Average funding values have since recovered to over \$1 million for the past few years. The year 2003 had a high average funding value, but this is reflective of the very few fundings that occurred that year and a few high-value fundings shifting the numbers rather than reflecting a figure that should be held up as a high-water mark for deal values. When considering average funding values throughout this report, remember that while it is responsive to overall economic factors like recessions, it reflects the amount an average individual startup received, not necessarily the health of the overall ecosystem. Its relative consistency over time more likely reflects that companies receiving funds are of similar ages and valuations, and thus receiving similar funding amounts.



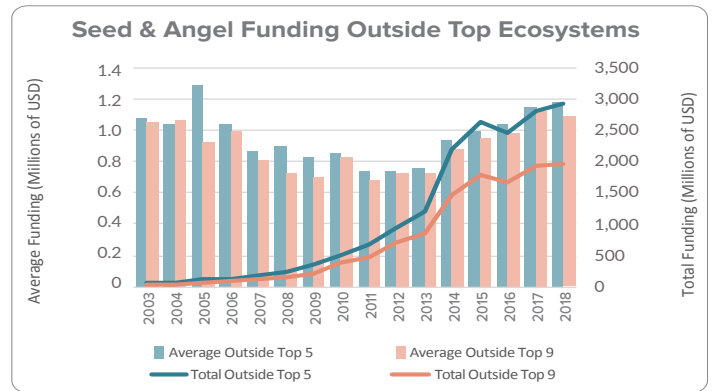
Total Seed and First Seed

The growth in seed and angel funding is likely indicative of a healthy startup ecosystem. Since some companies receive multiple seed rounds, looking deeper at this trend can help evaluate how good a proxy the number of seed and angel investments is for the number of startups earning investment. While more startups have begun to receive multiple seed rounds in the last decade, this isn't representative of most startups. The number of startups raising multiple seed fundings has grown from under 40 in 2008 to nearly 700 in 2018, but has remained small as a percentage of total seed fundings, hovering between eight and nine percent for most of the past decade. The growth in the number of startups receiving multiple seed rounds has contributed to the overall upward trend in both total number of seed fundings and total value of seed fundings. However, because it is a small contributor to that trend, it does not explain the overall growth in seed fundings. Rather, this growth is likely indicative of a healthy startup ecosystem, where more startups are receiving more investment.

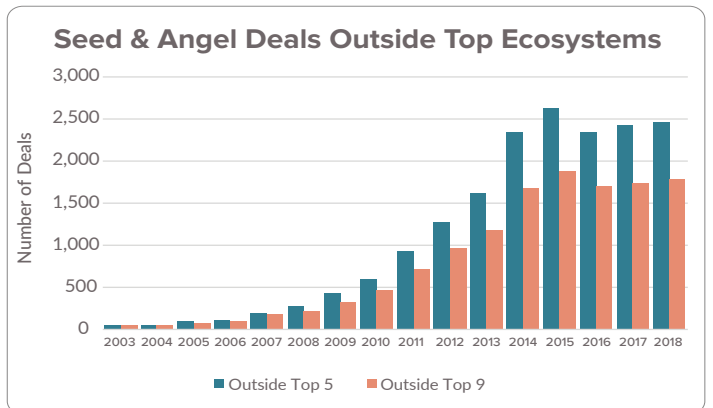


Seed and Angel Funding Across the Country

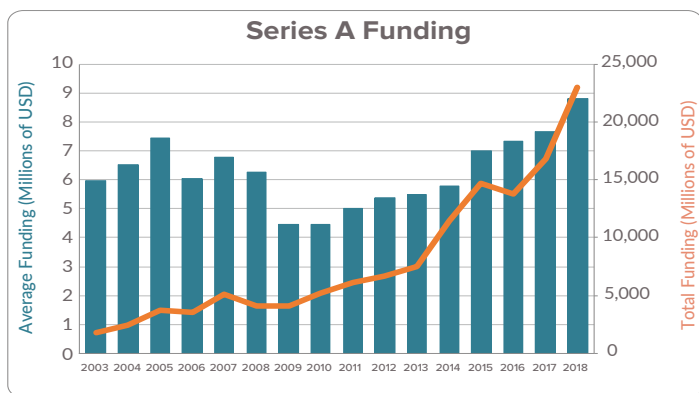
The overall upward trends indicating a healthy and growing startup ecosystem are evident even outside of Silicon Valley and other hotbeds of innovation and startup growth. Seed and angel fundings without the top five (Silicon Valley, New York City, Boston, Los Angeles, and Seattle) and top nine (the top five plus Washington, D.C., San Diego, Austin, and Chicago) ecosystems follow the same broad trends as with seed and angel across all U.S. ecosystems. Total funding trends upward over the fifteen years from 2003 to 2018, with a correction in 2016. Average funding values dip from the Great Recession before recovering. However, unlike nationwide trends, the 2016 correction cannot be seen in average funding values here, while the correction to total funding amounts is predictably less pronounced given lower concentrations of SaaS startups in these regions.



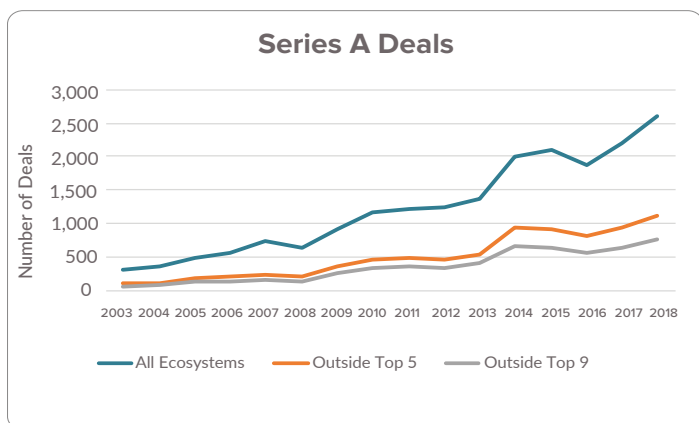
Notably, average funding values with the top five and top nine ecosystems removed do not depart widely from average funding values in all ecosystems. In 2018, the average seed round was just four percent lower when removing the top five ecosystems, and 11.5 percent lower without the top nine. For the year 2018, seed and angel deals outside the top five ecosystems represented a third of overall U.S. deals and a third of their total value. Fundings outside the top nine ecosystems represented about a quarter of overall deals and about 22 percent of their value that year. While this reflects a concentration of higher-value deals within the top ecosystems and the continuing need for geographic diversification of startup investment, it also alleviates the notion that startups only receive sufficient funding in these ecosystems. The ability of startups to succeed and receive funding outside of top ecosystems reflects the relevance of startup ecosystems spread across states and congressional districts, and policymakers should consider this finding as they evaluate the startup ecosystem as a whole.



Series A



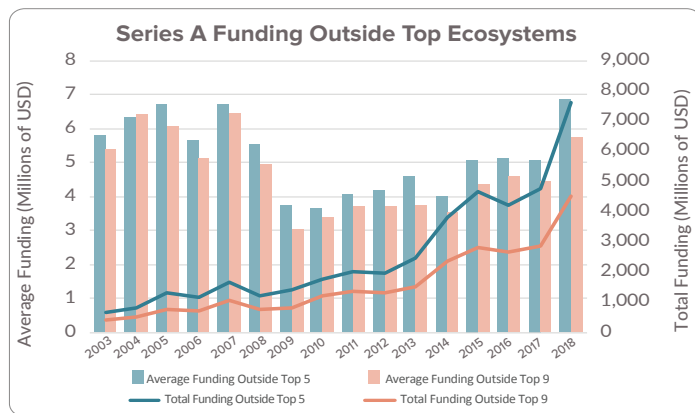
Over the last 15 years, the total amount of money going into Series A funding rounds and the number of Series A deals has increased, demonstrating the availability of investment as startups continue to grow. Series A funding is the earliest stage of venture funding and is typically the next round of funding that startups raise after their seed round. Funding amounts and the number of Series A raises in the U.S. grew significantly over the years 2003 to 2018, with total funding growing almost 1200 percent and the number of deals growing nearly 800 percent during this period. Total funding only failed to grow during 2008 and 2009 as a result of the Great Recession and in 2016 as a result of the market correction that year. Average deal values fell from around \$6 million in 2003 to a low of about \$4.5 million during the Great Recession years of 2008 and 2009, before growing 97 percent to \$8.8 million in the decade since.



Series A Funding Across the Country

As Series A funding grew over the last fifteen years, more of that growth has started to shift to areas located outside of the largest ecosystems. From 2003 to 2018, the number of Series A fundings grew faster outside of the top ecosystems as those rounds began to comprise a larger share of all Series A deals. The number of Series A rounds outside of the top five ecosystems grew nearly 900 percent, while the number of rounds outside of the top nine grew nearly tenfold. In 2003, the share of Series

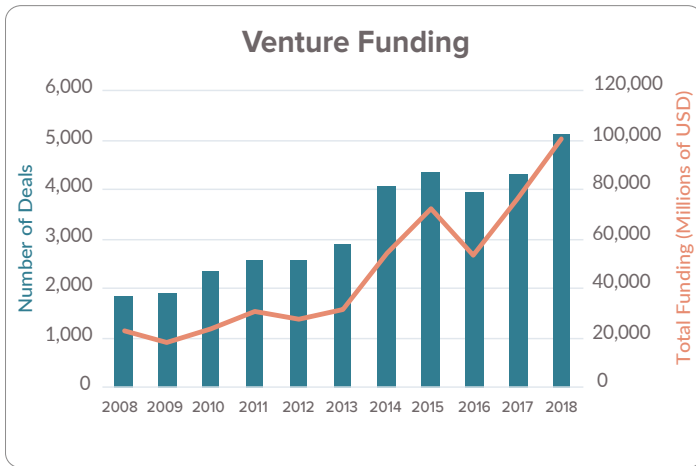
A fundings outside of the top five ecosystems was 38 percent. That share grew to 43 percent in 2018. For fundings outside the top nine ecosystems, the share of total fundings grew from less than a quarter of all fundings in 2003 to nearly a third in 2018. The increase in deal location diversity over this period reflects an increasing spread in venture capital investment across the country and less centralization of investment in areas like Silicon Valley. There is still much room for improvement though, as VC investment is still concentrated in top ecosystems.



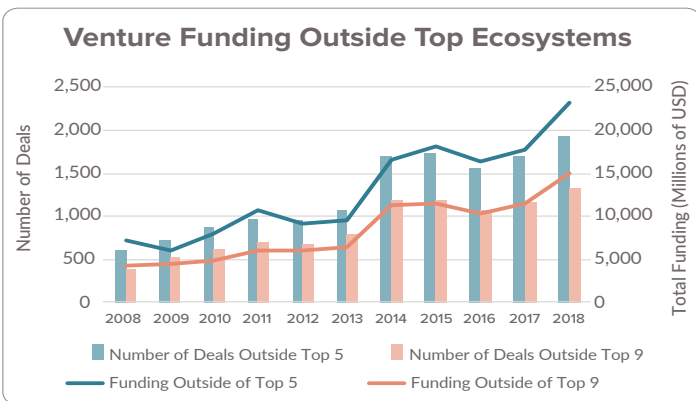
Without the top five and top nine ecosystems, Series A total funding values follow the same trend as funding in all ecosystems and show impressive growth, with total values in each growing more than tenfold over the fifteen years presented. Similar to the overall trend for Series A, average funding values dropped sharply outside of the top five and top nine ecosystems during the Great Recession, but only eclipsed their 2003 values by 18 and 7 percent respectively in 2018, despite each growing nearly 90 percent from their recession-era troughs.

The peaks and valleys within a limited range for average values should not be alarming. While impacted by overall economic conditions, like the Great Recession, an average funding value reflects what a typical funding round was in an individual company—which is responsive to factors like company age and valuation. Because company age at investment does not change widely over this period, we shouldn't expect their valuation or capital needs to depart widely either. That is to say, startups of the same age are getting similar amounts of money.

Venture

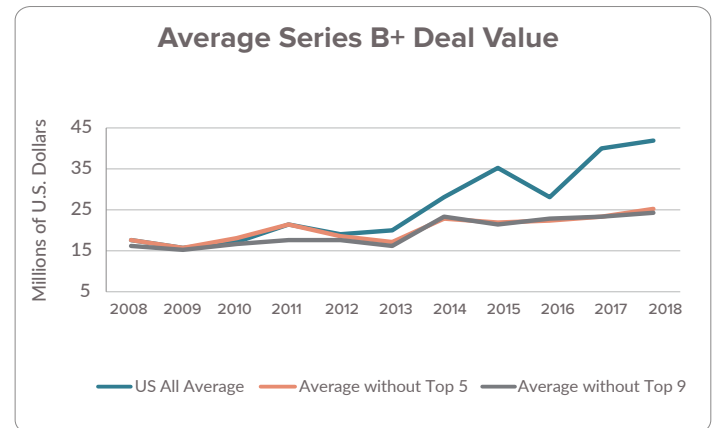


While the trends examined above of seed and angel and Series A rounds create a picture of early-stage investment in startups, it is also important to consider venture funding overall when assessing the health of the startup ecosystem. Venture funding presented here includes Series A and the lettered rounds beyond Series A—Series B, C, D, and so on. Venture funding overall grew significantly over the past decade, more than tripling, even outside of the top ecosystems. In addition to the correction visible in 2016, venture deals and deal values sagged in 2012 and 2013—something that is present but less pronounced in the Series A data examined above—as hangover effects of the Great Recession. It took longer for the later funding rounds added in here to recover than the early funding rounds. Series B and C rounds didn't recover past their pre-crisis levels until 2013 and 2014 respectively, making the sag more present here than in the above trends in early funding data.⁹



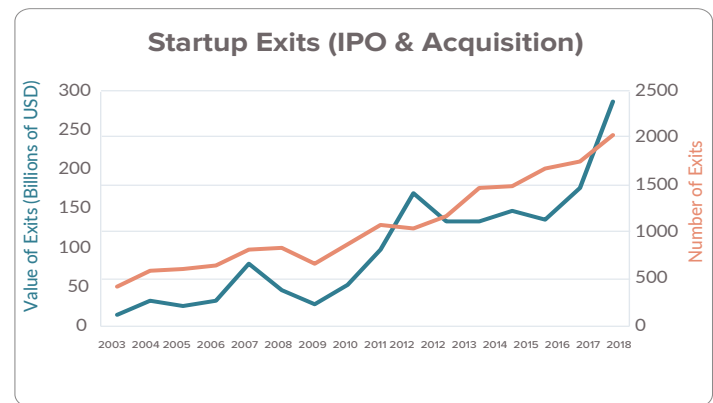
Consistent with what is observed with Series A, average deal values for venture capital investment overall show meaningful growth countrywide, while average values outside of the top ecosystems struggled to recover from the Great Recession in the same manner. Even though we see that the share of venture deals occurring outside of the top ecosystems crept up over the past decade, the departure in average deal value highlights the continued concentration of the largest-value deals in the

nation's largest startup ecosystems. By removing Series A funding, we can see clearer that the largest rounds are more prevalent and rising in the largest ecosystems. This growth is driven by the global reach of the top ecosystems.

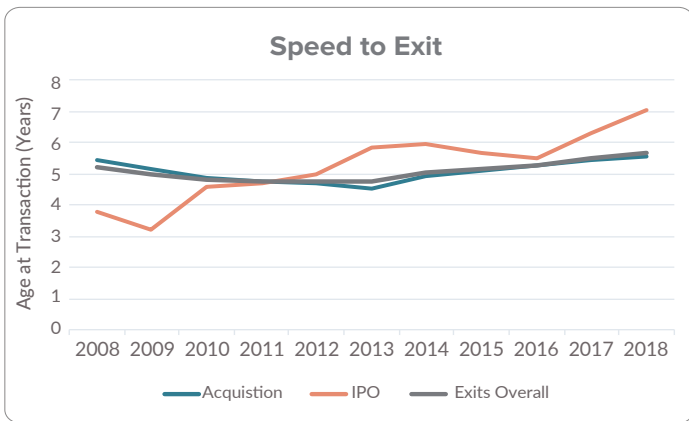


Exits

Exits are an important moment in the lifecycle of a startup and an integral part of the innovation ecosystem. Startup founders are focused on putting one foot in front of the other as they grow their businesses, but they think about long-term goals too, including their exit strategy, or how they make money for themselves and their investors. In a 2019 survey, for example, 50 percent of startup executives listed acquisition as a long-term goal, while 18 percent said initial public offering (IPO) was their long term goal.⁹ This section explores startup exits over the past decade, trends in the two principal types of exits, and their relationship with startup funding.

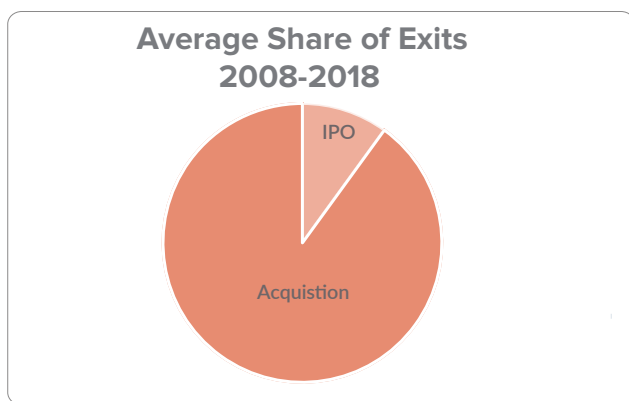
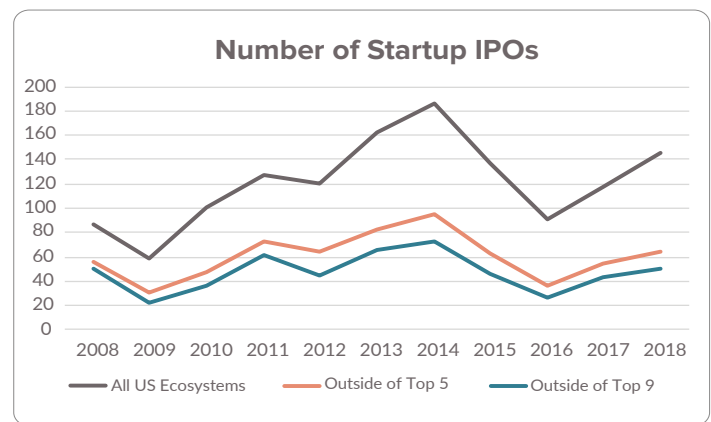
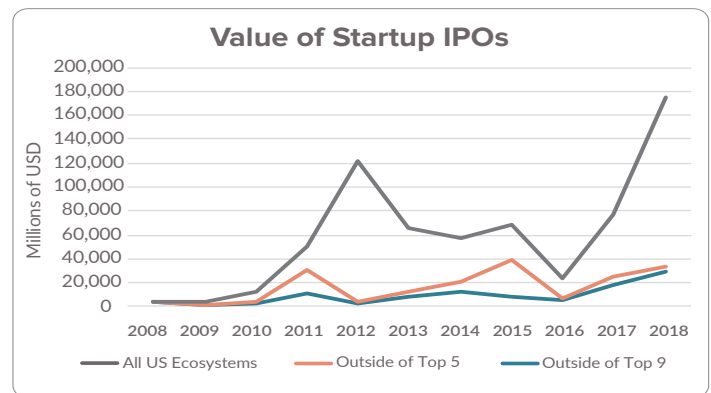


Overall, startup exits have increased in number and value by 383 percent and 1847 percent respectively from 2003 to 2018, evincing the growth in the amount of successful and maturing startups. Familiar troughs experienced during the Great Recession and valuations crisis that we observe in the funding trends section above are also present here.



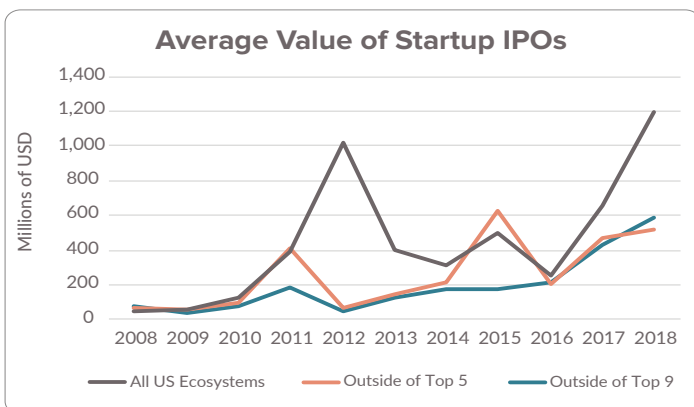
Coupling the fact that there are fewer IPOs with their comparative higher value helps the average value of an IPO to bounce around a lot. In other words, the average IPO value is easily influenced by a few large deals occurring in any given year. Consider, for example, 2012—when Facebook raised \$16 billion by going public—the overall number of startup IPOs dipped, but the overall and average value peaked. Whether a company decides to go public in a given year is also subject to greater influence of investor sentiments and conditions in public markets when compared to acquisitions, further contributing to this noise. Regardless, whether looking at the moving average or a trendline, the number and value of startup IPOs has grown over the past decade, spelling success for startups and providing an incentive for further innovation.

The speed to exit—the average age at which a startup is acquired or goes public through an IPO—has remained relatively steady over the past decade, ticking up slightly from five years and three months to five years and eight months. The standard deviation from the average speed to exit is relatively large—around three years for acquisitions and four years for IPOs, meaning there is quite a bit of variance from that average. The speed to exit overall tracks very closely with the average age at which companies are acquired—the speed to exit via acquisitions—reflecting the greater number of exits through acquisition than through IPO. In fact, over the eleven years from 2008 to 2018, 90 percent of startup exits were via acquisition.

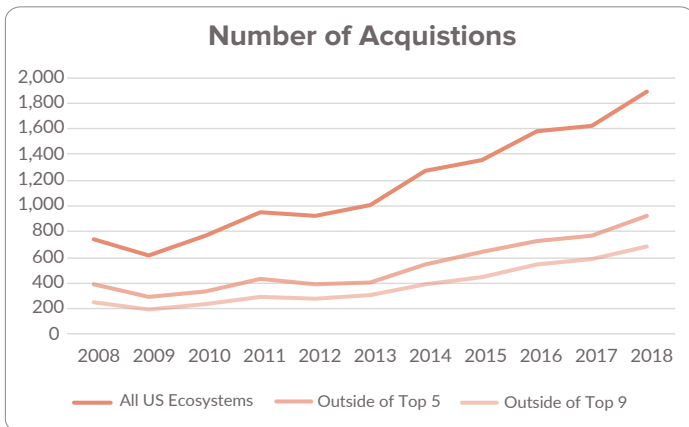
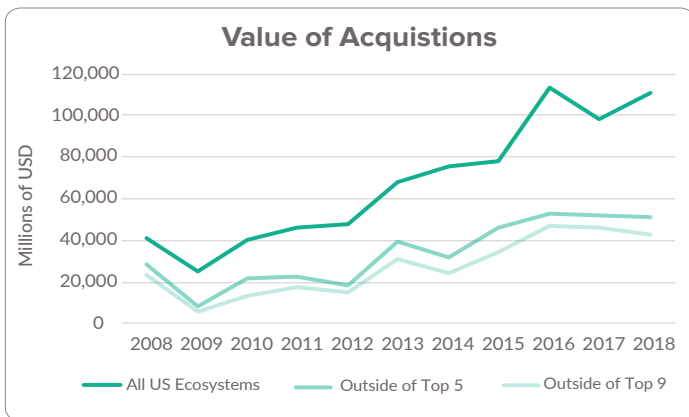


IPO

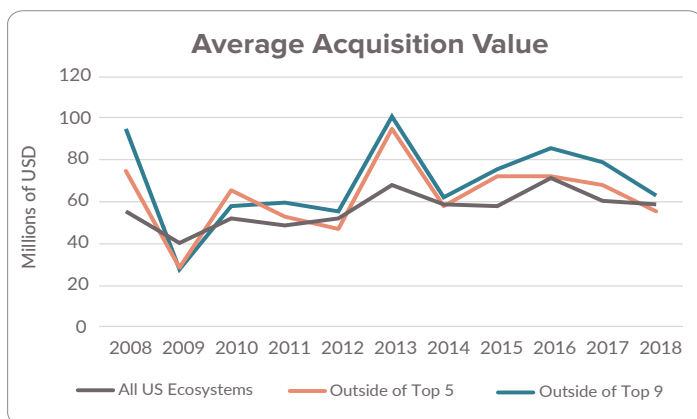
Acquisitions



Acquisitions are a more common method for startups to exit, and this makes the growth in the number and overall value of acquisition steadier. The growth in the number and value of acquisitions—156 percent and 170 percent respectively over 2008 to 2018—indicates a healthy ecosystem where entrepreneurs are rewarded and investors and entrepreneurs are able to fund new ventures with their profits, incentivizing and supporting additional innovation.



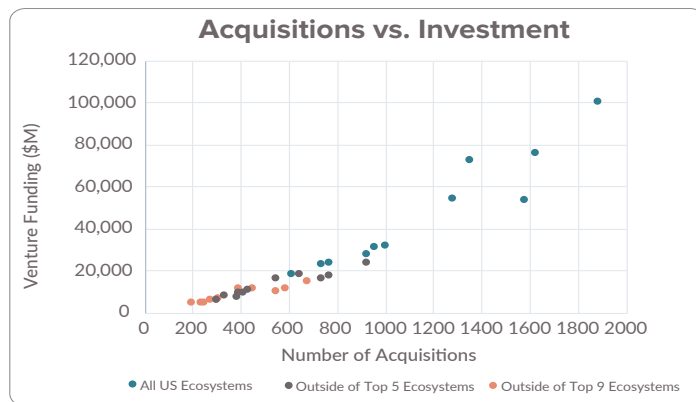
The average value of a startup acquisition remains essentially flat over this time period, showing that the increase in the overall value of acquisitions is primarily driven by the increasing number of acquisitions year-over-year. This isn't really cause for concern for two reasons. One, more acquisitions is a good thing, as discussed above. Two, the average age at which a company is acquired hasn't moved much. That the dollar value of the average acquisition is also flat means valuations of companies of the same age stayed about the same. For example, if company A and company B were both five years old and valued at \$60 million dollars at the time of acquisition, we expect them to have been acquired for about the same amount, regardless that company A was acquired in 2012 and company B in 2017.



This is opposed to the case of IPOs, where the age of a startup going public increased and average IPO value increased—as we should expect—because companies that are older should have higher valuations. Both average acquisitions value and average IPO value are influenced when deals are few in number or are outsized deals involving ‘unicorns,’ leading to the sharp fluctuations observed.

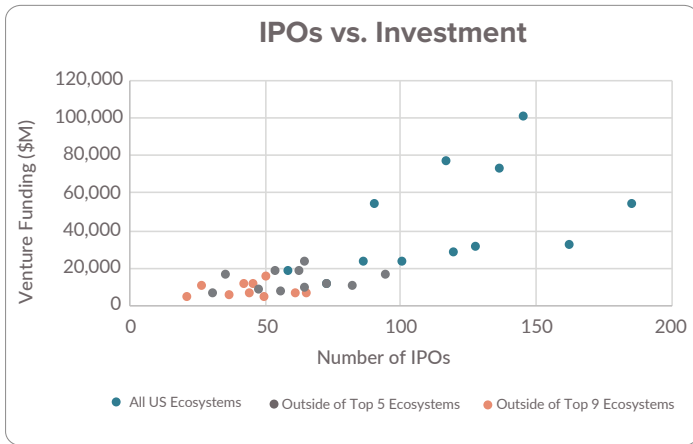
Exits and Their Relationship to Investment

While exits via IPO and acquisitions both reward founders and investors and provide incentives to innovate, acquisitions have a stronger, more positive relationship to investment in startups, making them a necessary component of the startup ecosystem. Plotting venture investment against the number of acquisitions reveals a strong positive correlation, with a linear regression coefficient of determination, $R^2 = .899$. This confirms the model often relayed anecdotally—investors and entrepreneurs are able to take profit at this exit and use the proceeds to fund investment in new startups. Acquisitions are also especially valuable to startups outside the nation's largest hubs. From 2008 to 2018, the average value of an acquisition was greater outside the top nine ecosystems for ten of those eleven years. As policymakers consider changes impacting the ability of companies to complete mergers and acquisitions, they must grapple with the ripple effects that changes could have throughout the startup ecosystem.



IPOs and investment, on the other hand, have a very weak association, $R^2 = .185$. This association is less positive and deteriorates further when the largest five ecosystems are removed, to $R^2 = .049$. The weak relationship between IPOs and investment might be explained by a few factors. Due in part to global competition for capital and higher regulatory burdens, there are comparatively few IPOs each year, meaning fewer overall opportunities for an investor to turn around and reinvest their profits into a new venture. The method in which the return is delivered might also impact this relationship. Rather than receiving cash like an investor might in an acquisition, going public means the investor has to liquidate stock to ‘cash out.’ They might not do so all at once or near

the time of transaction, meaning any reinvestment in other startups that occurs will not be associated with the IPO event.



IPOs not only have a weaker relationship to investment outside of larger ecosystems, but also are less valuable. The average IPO was only more valuable outside of the top five ecosystems three out of the eleven years from 2008 to 2018. IPOs of companies located outside the top nine ecosystems were more valuable than those in the top ecosystems just once—in 2008. Encouraging more IPOs through policy reforms is a positive change to seek, but they should not be considered perfect substitutes for other methods of exit, like acquisitions, especially when considering smaller ecosystems.

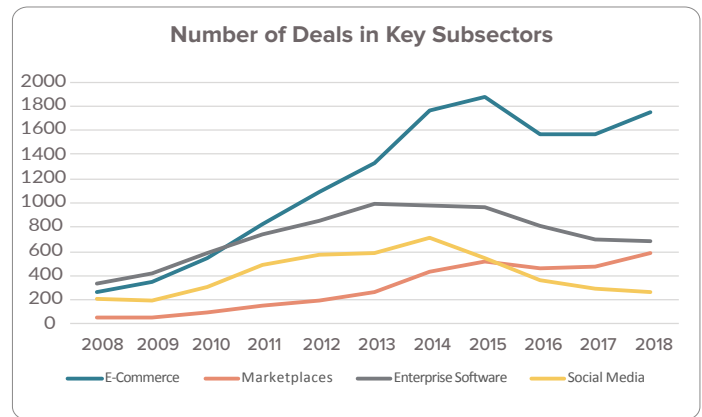
KEY SUBSECTORS

Just as tech startups are not ubiquitous when it comes to the type and amount of funding they receive, trends in the number and value of investments in startups vary by industry subsector as well. This section looks at four key subsectors: e-commerce, marketplaces, enterprise software, and social media. There are certainly many more subsectors in which technology enabled startups operate—too many to reasonably fit in this space. Instead, information about those several subsectors—from AI and AgTech to GovTech and life sciences—is presented in the appendix of this report for policymakers and researchers to scrutinize and explore further.

Each of these subsectors might bring to mind an archetype of the kind of company that fits into each, but these classifications are defined by Startup Genome.

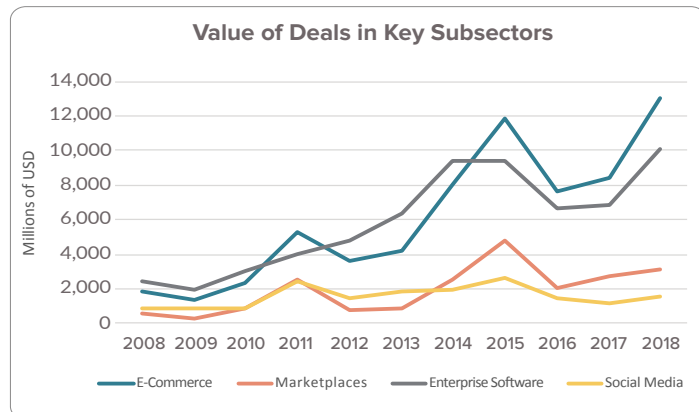
- E-commerce includes software that provides the engine behind the scenes of an online store, making it possible to easily manage inventory, add or remove products, calculate taxes, and everything else required to operate a website and fulfill orders.
- Enterprise software is computer software used to satisfy the needs of an organization rather than individual users—like businesses, schools or governments, for example. Enterprise software would include HR tools or customer relationship management software, for example, but does not include FinTech or HealthTech software solutions, as those each have their own subsector.
- Marketplaces are two-sided platforms where transactions are carried out by multiple users, where some are buyers and some are sellers.
- Social media is a technology that facilitates the sharing of ideas—such as photos, files, and videos—through an electronic medium. This, by design, enables people and communities to share electronic content via electronic devices.¹¹

The number and value of investments in each of these subsectors—e-commerce, marketplaces, enterprise software, and social media—grew over the past decade. Still, not all subsectors grew at the same rate. The number of fundings seen by marketplace startups increased 895 percent—from just 59 percent in 2008 to 587 percent in 2018—while social media startups saw a 27 percent increase over the same period. Total funding grew 80 percent for startups in the social media sector—from \$879 million in 2008 to nearly \$1.6 billion in 2018. For e-commerce startups, the sum of deal values went from \$1.9 billion to \$13 billion over that period—a 592 percent increase. Each of these subsectors saw overall investment drop in 2016, to varying extents. This is likely reflective broader market trends related to the valuations crisis discussed earlier.



Startup fundings in the social media sector appear to lag behind others, and the number of fundings in enterprise software startups similarly appear to have plateaued in recent years, but it is important to consider unique traits of each sector when explaining this trend. Subsectors entering the maturity phase of their lifecycle where the presence of large incumbent firms have increased may hold some explanatory power, but that does not tell the whole story. For example, Facebook's acquisitions of Instagram in 2012 and WhatsApp 2014 are often cited as innovation-harming, but investment in social media startups actually increased in the year following each of those deals. In fact, between 2012 and 2015, investment in social media startups rose 84 percent—from about \$1.4 billion in 2012 to about \$2.6 billion in 2015. Criticism of these deals does not seem to line up with the trends we see in investment, and such criticism probably does not help us fully explain the trends we see.

These sectors, especially social media, are frequently critiqued for consolidation, despite the fact that the data bears out growth in these spaces. They lend themselves to such consolidation

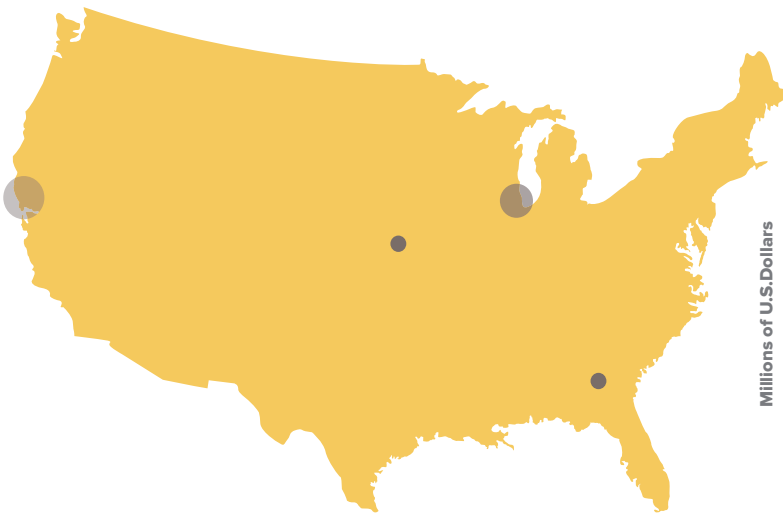


through a few factors. Social media is characterized by network effects—the idea that a platform becomes more valuable to a user when more people use it—which leads to a natural consolidation and few large firms. Similarly, switching costs—the costs borne to switch to a new service—can lead users to stick with their existing firm, meaning naturally fewer enterprise software startups. The presence of these factors may help markets to reach maturity faster. Despite those factors, startups are still able to operate, earn investment, and succeed in these industries.

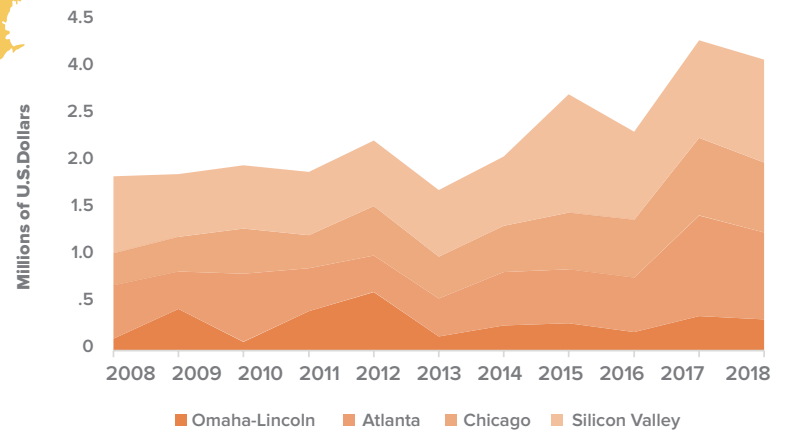
We would also be remiss to not consider some of the more recent developments in subsectors like social media, even if we do not yet have full data coverage due to data-lag, especially in earlier rounds. Though not an American startup, TikTok was the fastest social media company to reach a billion monthly active users, and has since become a household name.¹² In the fall of 2020, when considering a sale to an American technology partner, the company was valued at \$60 billion.¹³ More recently, audio-based social media startups have taken off in popularity. Clubhouse jumped from 2 million users in January 2021 to 10 million in February.¹⁴ The company is currently seeking funding at a \$4 billion valuation, four times its valuation in January.¹⁵ To compete with Clubhouse, Sweden-based Spotify recently acquired Betty Labs, the company behind the live sports app Locker Room.¹⁶ And entrepreneur and serial investor Mark Cuban is a co-founder of a similar app called Fireside, expected to launch later this year.¹⁷ The introduction of video shorts and audio-based social media, the rise of new apps, and adoption of similar features by competitors underscores how the social media sector continues to be dynamic and evolve. It remains to be seen what kind of impact these developments will have on startup funding in the social media sector overall, but early data for 2019 indicate an increase in funding for social media startups, spelling the potential for future success stories.

ECOSYSTEM HIGHLIGHTS

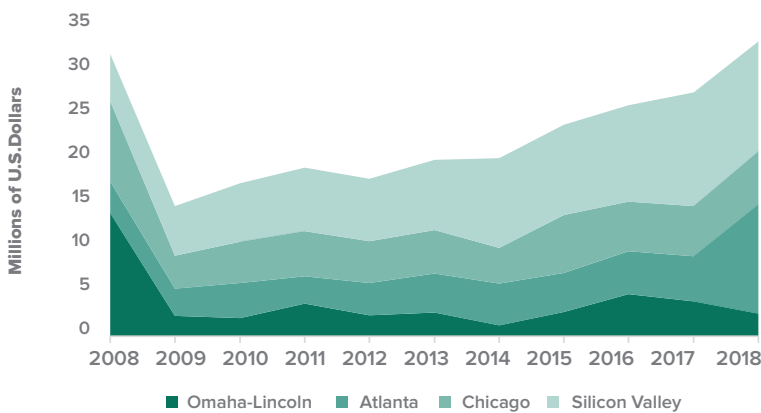
Looking at broad, national trends can make it easy to forget that we're talking about real people and real startups in real communities across the country. This section highlights four startup ecosystems from across the country—Silicon Valley, Chicago, Atlanta, and Omaha-Lincoln—that represent not only varying locations, but also varying stages of ecosystem development. Silicon Valley is the world's leading and most developed ecosystem, producing more than 96 'unicorns'—startups valued at more than \$1 billion—through year-end 2019. At the other end of the spectrum, the Omaha-Lincoln ecosystem is regional and still gaining startup experience as it grows.



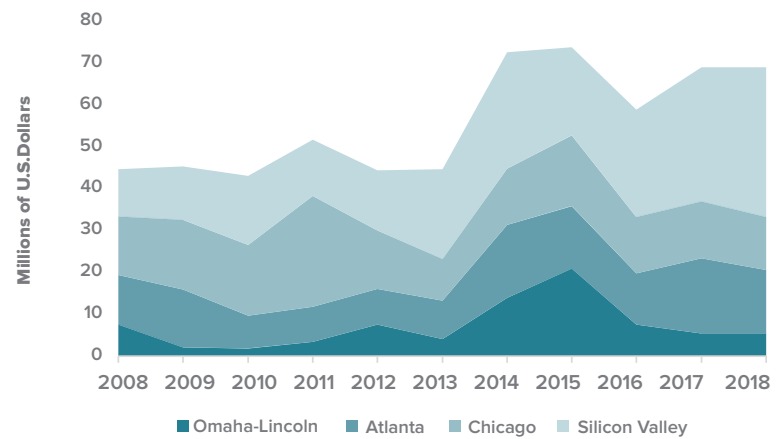
Average Seed Round Value



Average Venture Round



Average Venture Round Value



ECOSYSTEM HIGHLIGHTS



Silicon Valley

Ecosystem Value: \$677 billion

- Average Software Engineer Salary: \$122,586
- During the years 2008-2018, the median seed round ranged from \$500,000 (2011) to \$1.05 million (2017).
- The median series A round ranged from \$3.2 million (2009) to \$9 million (2018).
- The median series A+ ranged from \$7.2 million (2008) to \$16 million (2018).
- Startups closed their seed round at an average age of 18-and-a-half months in 2018. The youngest was eight-and-a-half months (2011) and the oldest was 19 months (2017).
- Startups in Silicon Valley exited at an average age of five years and a month in 2018, its oldest average age at exit during the years 2008-2018. The youngest was four years and four months (2013).



Chicago

Ecosystem Value: \$21.4 billion

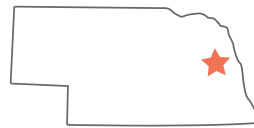
- Average Software Engineer Salary: \$80,774
- During the years 2008-2018, the median seed round ranged from \$200,000 (2008) to \$750,000 (2017).
- The median series A round ranged from \$1.5 million (2011) to \$4.7 million (2008). In 2018 it was \$4 million.
- The median series A+ ranged from \$2.6 million (2009) to \$9 million (2008). It was \$6.1 million in 2018.
- Startups closed their seed round at an average age of 21-and-a-half months in 2018. The youngest was 11-and-a-half months (2011) and the oldest was 22 months (2017).
- Startups in Chicago exited at an average age of five years and 10 months in 2018. The youngest was three-and-a-half years (2011) and the oldest was six years and two months (2014).



Atlanta

Ecosystem Value: \$16.4 billion

- Average Software Engineer Salary: \$79,681
- During the years 2008-2018, the median seed round ranged from \$250,000 (2012) to \$1.15 million (2008). It was \$500,000 in 2018.
- The median series A round ranged from \$1.9 million (2009) to \$4.2 million (2018).
- The median series A+ ranged from \$3.5 million (2011) to \$10 million (2008). It was \$7.4 million in 2018.
- Startups closed their seed round at an average age of 20-and-a-half months in 2018. The youngest was 13 months (2012) and the oldest was 26 months (2008).
- Startups in Atlanta exited at an average age of six years in 2018. The youngest was four years and two months (2011) and the oldest was six years and four months (2017).



Omaha-Lincoln

Ecosystem Value: \$595 million

- Average Software Engineer Salary: \$74,763
- During the years 2008-2018, the median seed round value bounced around from \$25,000 (2008) to \$1 million (2012), reflecting both overall economic conditions and few deals in the area.
- The median seed value has since settled and was \$300,000 in 2018.
- The median series A round ranged from \$750,000 (2014) to \$13 million (2008). In 2018 it was \$2 million.
- The median series A+ ranged from \$1.4 million (2009) to \$7.1 million (2014). It was \$3.1 million in 2018.
- Startups closed their seed round at an average age of 25 months in 2018. The youngest was seven-and-a-half months (2011) and the oldest was 35 months (2017).
- Startups in Omaha-Lincoln exited at an average age of five-and-a-half years in 2018. The youngest was 18 months (2015) and the oldest was nine years (2011).

MICRO ANALYSIS

To draw useful policy-related conclusions from these funding trends and data, it is essential to put them in the proper context. In 2018, the average startup that successfully closed a seed round raised just over \$1.2 million, and the median startup seed round that year was \$740,000. Depending on one's perspective, that could seem like a lot of money. But that sticker-based reaction fails to account for the capital needs of startups related to personnel and product development, for example. Accordingly, this section attempts to contextualize the capital needs and pressures facing investor-backed startups as they seek to grow and thrive.

Startups are often pre-revenue, need to show growth, and must account for the time that will elapse before they raise their next round. In addition, many startups were caught off guard by the pandemic-related crisis and may decide to build in a longer runway to protect against future economic uncertainty. If startups are distracted from these core activities by the possible existential threat of frivolous litigation or uncertainty due to policy debates playing out in Washington or state capitals, the capital allocated to them is further diluted. Startup funding is pulled in so many directions, and even tweaks around the edges of policies could have a substantial impact.

It is also critical to remember those dollar figures above only reflect startups that raised funds through conventional, formal means, and do not include startups relying on earlier or other methods of financing, like personal loans or bootstrapping. Those companies generally have fewer resources but face similar business and policy pressures.

A seed-stage startup has a number of goals to accomplish—like expanding its team, developing its product, and acquiring customers. And it must do all of this with the investment it has earned before it can successfully raise its next round, which will come an average of 22 months later.¹⁸ Putting the average seed-stage startup's total \$1.2 million raise into monthly flows, they are working with about \$55,000 a month, or about \$655,000 a year. Yet it has to accomplish a lot with that money. Core startup activities, like customer acquisition and product development, require spending on marketing and hiring employees or contractors. Teams are expensive. In Silicon Valley, it can cost over \$120,000 a year to hire a software engineer. Even outside of the top ecosystems, software engineer salaries hover around \$80,000 annually. To stretch every dollar, some founders even pay themselves minimum

wage (or forgo a salary altogether). Capital isn't free either. Considerable time is spent preparing and pitching, and, while low—around 0.5 percent to one percent—there are legal costs associated as well.¹⁹ The margin for error for startups at this stage is small, making external threats from onerous regulation or frivolous litigation loom large.

For example, there are patchworks of regulations taking shape across the country and the globe which set disparate standards or create competing obligations in the areas of privacy, digital services taxes, content moderation, and more. These patchworks impose barriers not just in the substance of the regulations themselves, but in the different requirements startups have to decipher to operate in different locations. This takes time and resources and can alter the growth strategy for a startup. The Internet is borderless, but variance in regulation can steer where it is easiest for a slim-resourced startup to operate. Larger, established, more-resourced competitors have the capacity to better navigate such regulatory environments, spelling implications for competition and innovation.

In addition, law and policy influence when and how often startups are sued in even frivolous cases. Changing the law in ways that increase the cost and risk of litigation, or make it harder to predict and avoid lawsuits, can impose additional costs and depress innovation and competition. For example, in the context of intermediary liability lawsuits, companies that host user-generated content—like product reviews or message boards—can be sued based on the activities of their users. But such suits are relatively rare because startups can use frameworks like Section 230 of the Communications Decency Act or Section 512 of the Digital Millennium Copyright Act as part of their defense. Even under the current law, however, it can cost \$15,000 to \$80,000 to get a meritless suit dismissed. And proceeding just to summary judgment can cost over \$500,000.²⁰

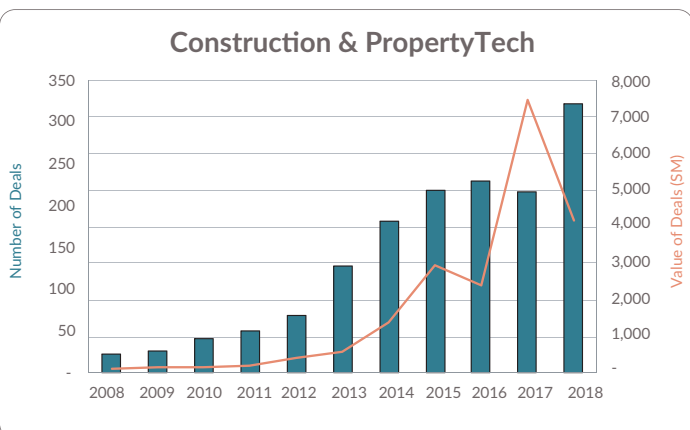
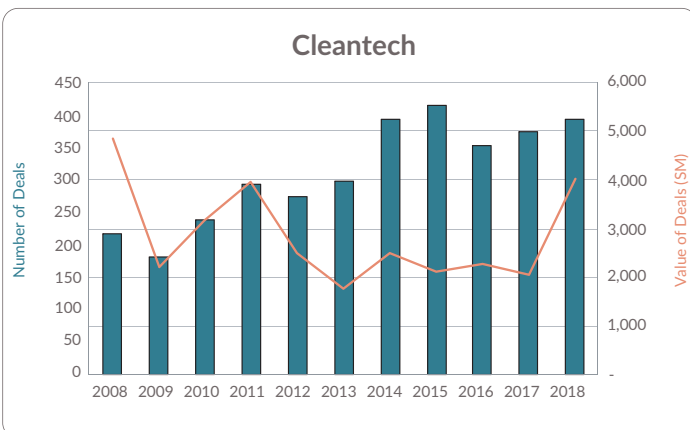
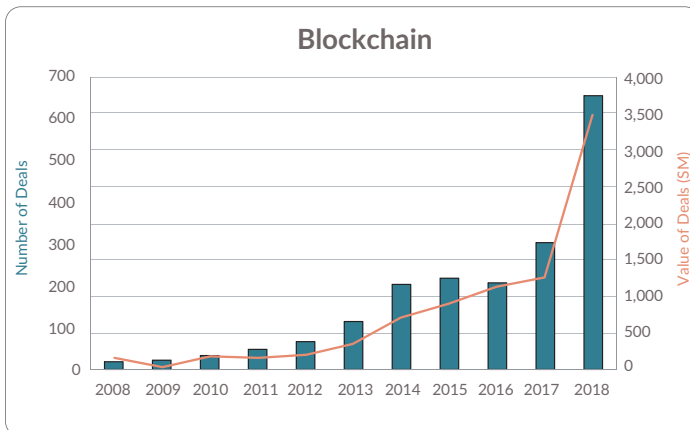
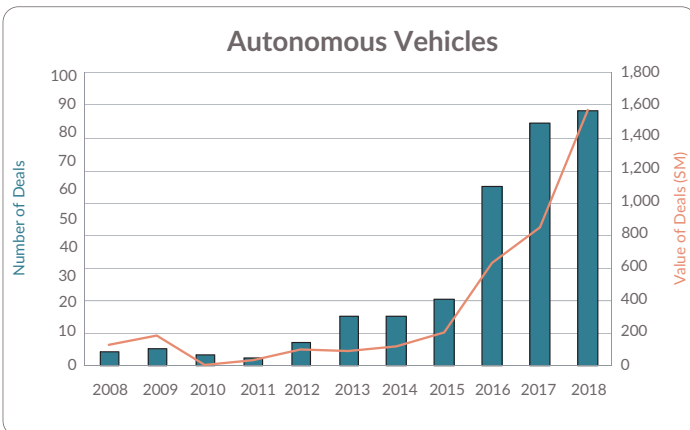
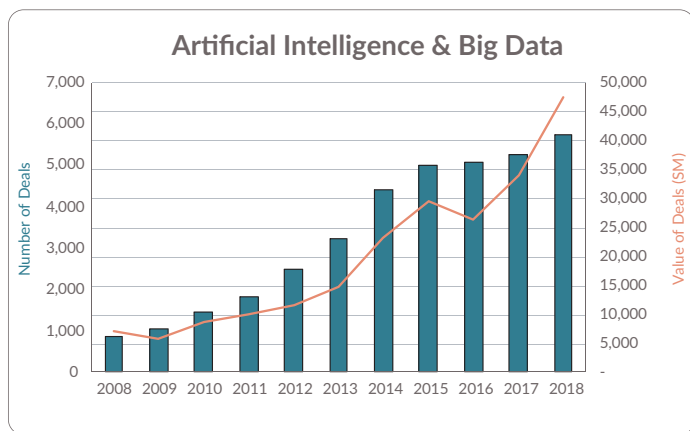
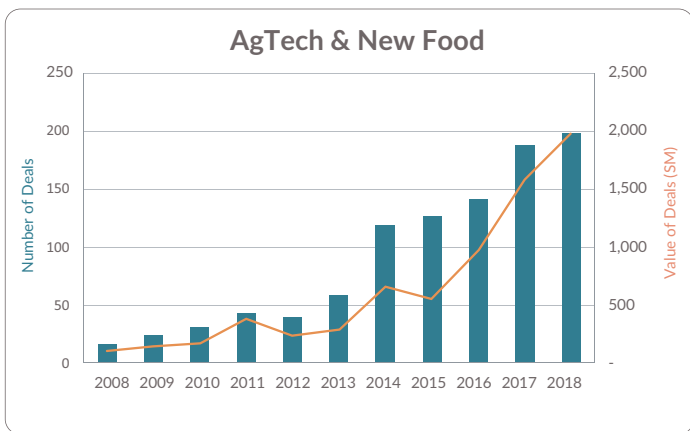
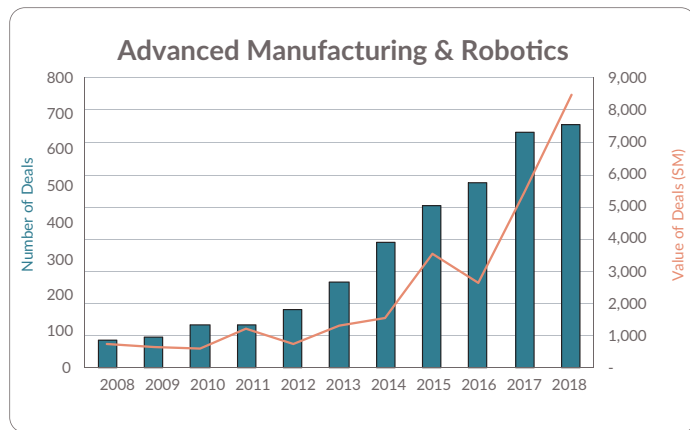
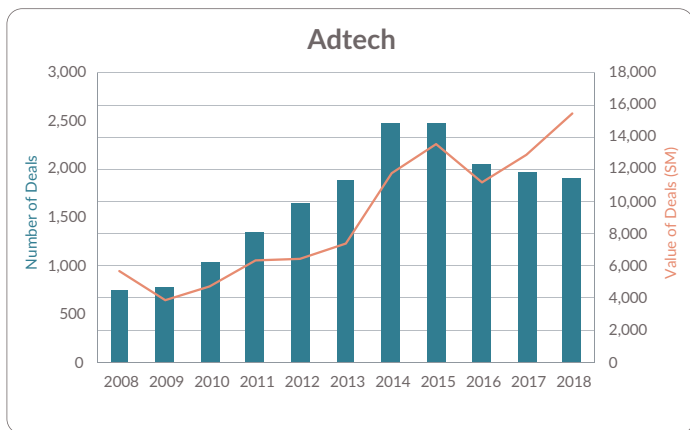
Without frameworks like Section 230 and Section 512, we could expect suits to be filed against intermediaries more often and come at an even higher cost. Even if intermediaries are likely to win on the merits—for example, avoiding liability for user speech on First Amendment grounds or based on a finding of no copyright infringement—legal defense could cost an order of magnitude more. For an investor-backed, seed-stage startup with \$55,000 a month, such suits could be ruinous. The situation would be more dire for companies that do not or

have not yet raised formal funding rounds. In either scenario, changes in the law that increase the cost or rate of litigation would mean only the largest companies would be able to operate in these spaces.

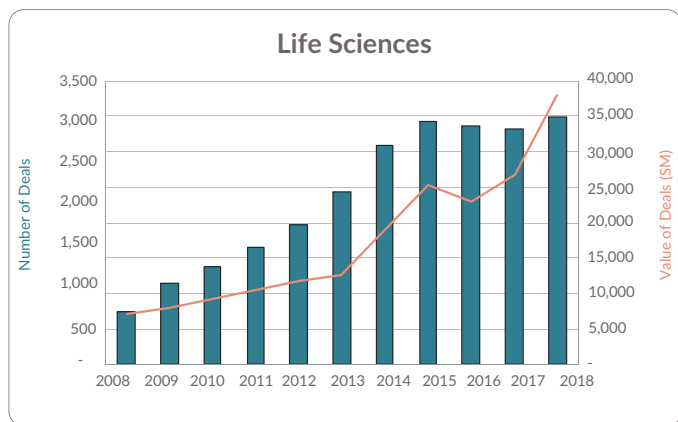
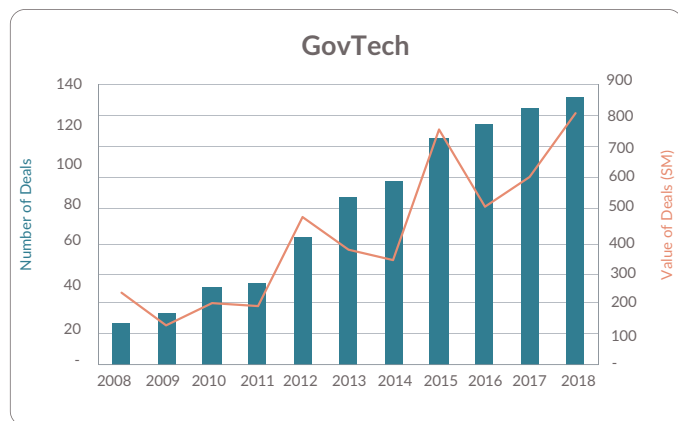
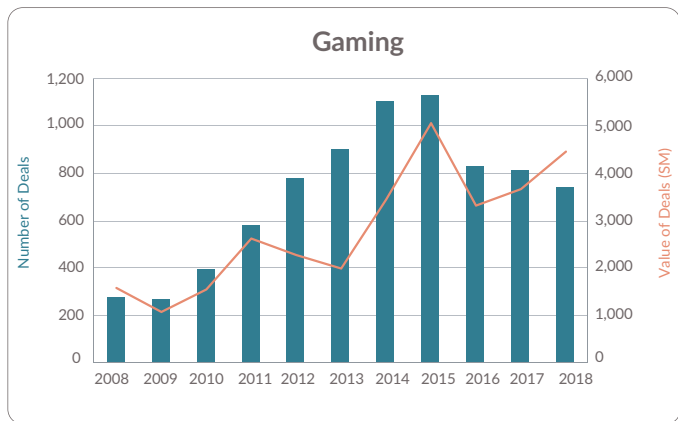
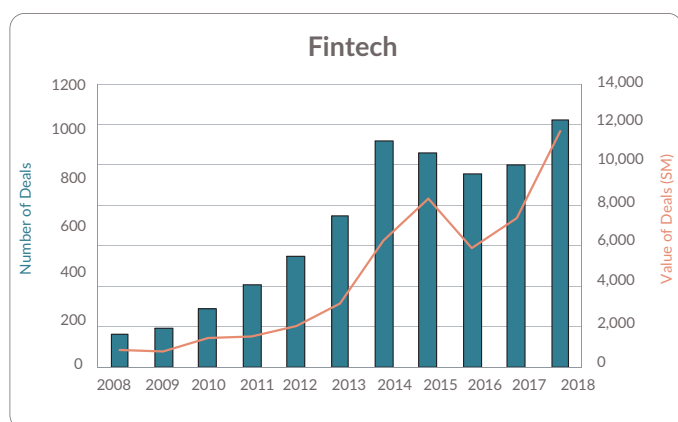
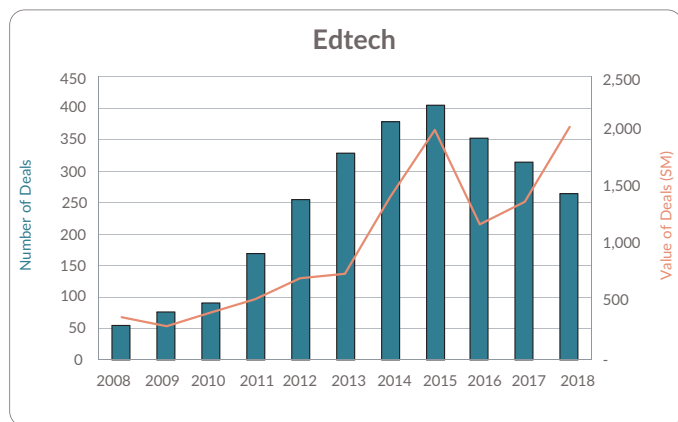
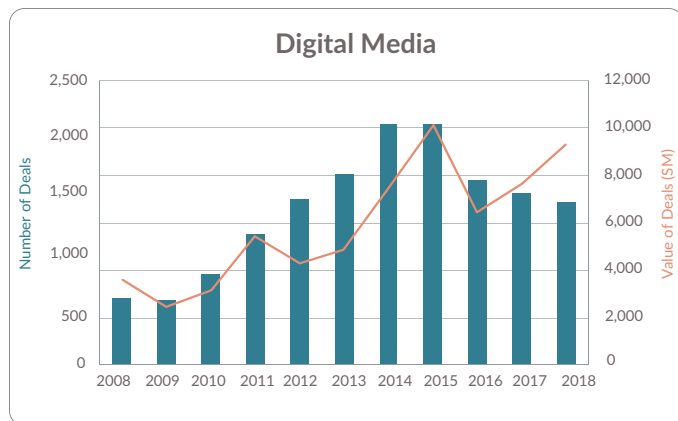
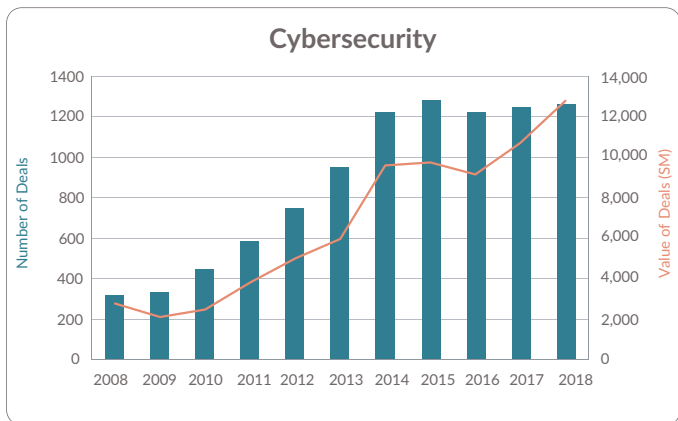
Similarly, frivolous patent suits filed against startups by patent assertion entities (PAEs) highlight how resource strapped even investor-backed startups can be. In a practice also known as patent trolling, PAEs sue or threaten to sue, seeking to enforce low-quality patents and leverage high court costs to extract nuisance-value settlements from startups. Some PAEs target startups that have recently publicized successful funding rounds, and both the amount in controversy and associated legal costs usually rise with company size.²¹ Even for smaller patent cases where less than \$1 million is at stake, it can still cost a startup \$25,000-\$40,000 just for initial case management, and \$750,000 to defend at trial.²² While settling for less than that is often an option (and the PAE's goal), some startups would rather pay their lawyers than settle an abusive case.²³ These costs are burdensome, and time wasted dealing with frivolous litigation rather than focusing on a startup's core goals of growth and product development is equally damaging.

As lawmakers weigh potential costs of policies in the technology sector, it is important to appreciate the resource constraints of startups. A million dollars may seem to be a lot of money to some, but in reality the margin for extra costs is small. That margin is even smaller for startups that aren't investor-backed or within typical funding channels. A lawsuit could quickly evaporate a startup's runway. And additional or overly burdensome regulation without respect to the realities facing startups can add cost and shorten how far that money can go, threatening the vitality of startups and innovation in the technology sector.

APPENDIX



APPENDIX



NOTES

¹ Laura Entis, “Where Startup Funding Really Comes From,” *Entrepreneur*, 20 Nov 2013. <https://www.entrepreneur.com/article/230011>.

² *Ibid.* See also “Access to Capital,” *Engine*, 2020. <https://static1.squarespace.com/static/571681753c44d835a440c8b5/t/5f46ce831ec937212292ee0e/1598475908955/2020Access+to+Capital.pdf>, and “Capital Access and Founders of Color,” *Engine*, 2020. <https://static1.squarespace.com/static/571681753c44d835a440c8b5/t/601972a9523cbf6f0ca52288/1612280489760/Capital+Access+and+Founders+of+Color.pdf>.

³ “Ecosystem Lifecycle Analysis,” *Startup Genome*, 2020. <https://startupgenome.com/article/ecosystem-lifecycles>.

⁴ Alejandro Cremades, “How Startup Accelerators Work,” *Forbes*, 10 Jan 2019. <https://www.forbes.com/sites/alejandrocremades/2019/01/10/how-startup-accelerators-work/?sh=5075343544cd>. See also Patrick Riley, “What Accelerators Look Like in 2019,” *GAN*, 23 Jul 2019. <http://www.gan.co/blog/accelerators-look-like-2019/#:~:text=0n%20average%2C%20accelerators%20give%20%2438%2C000,for%20going%20through%20their%20program,> and “Startup Funding Infographic,” *Fundable*. <http://www.fundable.com/learn/resources/infographics/startup-funding-infographic>.

⁵ Based on author review of such sized companies on *Crunchbase*.

⁶ See “106 Must-Know Startup Statistics for 2021,” *Embroker*. <https://www.embroker.com/blog/startup-statistics/>.

⁷ Valuations in SaaS companies fell 21 percent in just the first four weeks of 2016. On February 5, 2016, shares of LinkedIn and Tableau dropped nearly 50 percent as investors reacted. These events had ripple effects across the investment ecosystem, though the sector as a whole recovered by the end of the year. See e.g., Tomasz Tunguz, “The 57% Drop in SaaS Valuations,” *TomTunguz.com*, 7 Feb 2016. <https://tomtunguz.com/depression-in-saas/>, and “A Year in Review: Despite Challenging 2016, SaaS Isn’t Out of Gas,” *InsightSquared*. <https://www.insightsquared.com/blog/despite-challenging-2016-saas-isnt-out-of-gas/#:~:text=For%20one%20day%20in%202016,also%20fell%2010%25%20that%20day>.

⁸ Robert Rich, “The Great Recession,” *Federal Reserve Bank of Cleveland*. 22 Nov 2013. <https://www.federalreservehistory.org/essays/great-recession-of-200709>.

⁹ Gené Teare, “Lessons From 2008: How The Downturn Impacted Funding Two To Four Years Out,” *Crunchbase*, 24 Mar 2020. <https://news.crunchbase.com/news/lessons-from-2008-how-the-downturn-impacted-funding-two-to-four-years-out/>.

¹⁰ See “US Startup Outlook 2019,” *Silicon Valley Bank*, 2019. https://www.svb.com/globalassets/library/uploadedfiles/content/trends_and_insights/reports/startup_outlook_report/us/svb-suo-us-report-2019.pdf.

¹¹ Subsector definitions come from *Startup Genome*. For a list of the industries included on one of their data sources, *Crunchbase*, see “What Industries are included in *Crunchbase*?” <https://support.crunchbase.com/hc/en-us/articles/360043146954-What-Industries-are-included-in-Crunchbase>.

¹² Anna Nicolaou, “How to become TikTok famous,” *Financial Times*, 8 Nov 2019. <https://www.ft.com/content/dd7234e8-fcb9-11e9-98fd-4d6c20050229>.

¹³ SCMP Reporters, “Here’s what you need to know about Oracle’s deal to buy TikTok in the US from China’s ByteDance,” *South China Morning Post*, 19 Sep 2020. <https://www.scmp.com/tech/big-tech/article/3102144/>

heres-what-you-need-know-about-oracles-bid-buy-tiktok-us-bytedance. ¹⁴ Brian Dean, “How Many Users Does Clubhouse Have? 40+ Clubhouse Stats,” *Backlinko*, 22 Feb 2021. <https://backlinko.com/clubhouse-users>.

¹⁵ Katie Roof, “Clubhouse Discusses Funding at About \$4 Billion Value,” *Bloomberg*, 6 Apr 2021. <https://www.bloomberg.com/news/articles/2021-04-06/clubhouse-is-said-to-discuss-funding-at-about-4-billion-value>.

¹⁶ Ashley Carman, “Spotify is launching its own Clubhouse competitor,” *The Verge*, 30 Mar 2021. <https://www.theverge.com/2021/3/30/22356993/spotify-locker-room-clubhouse-launch-acquisition>.

¹⁷ Ashley Carman, “Mark Cuban is co-founding a podcast app where hosts can talk to fans live and monetize their conversations,” *The Verge*, 8 Feb 2021. <https://www.theverge.com/2021/2/8/22272148/mark-cuban-fireside-podcast-app-launch-creator-conversations>.

¹⁸ See “Startup Statistics.”

¹⁹ Murray Indick, “So What’s It Going to Cost: Legal Expenses for a Startup Business Raising Early-Stage Venture Financing,” *VC-List*, 4 Dec 2019. <https://vc-list.com/legal-expenses-startup-business-raising-venture-financing/>.

²⁰ Evan Engstrom, “Primer: Value of Section 230,” *Engine*, 31 Jan 2019. <https://www.engine.is/news/primer/section230costs>.

²¹ Colleen Chien, “Patent Assertion and Startup Innovation” *Santa Clara Law*, 2013, p. 11. <https://digitalcommons.law.scu.edu/cgi/viewcontent.cgi?article=1858&context=facpubs>. See also “AIPLA Report of the Economic Survey 2019,” *American Intellectual Property Law Association*, Sept 2019, p. 50-52. <https://www.aipla.org/detail/journal-issue/2019-report-of-the-economic-survey>, and Michael Pham, “The Cost of Defending Against Patent Trolls,” *Winstead*, 24 Jul 2014, <https://www.wintechblog.com/2014/07/the-cost-of-defending-against-patent-trolls/>.

²² See “AIPLA Report.”

²³ See e.g., Nathan Lindfors, “Using Technology to Improve Health Outcomes,” *Engine*, 30 Oct 2020. <https://www.engine.is/news/startupseverywhere-bloomington-minn-theratec>, and Connie Loizos, “Cloudflare beat a patent troll. What now?” *TechCrunch*, 5 Nov 2019. <https://techcrunch.com/2019/11/05/cloudflare-beat-a-patent-troll-what-now/>.



Engine was created in 2011 by a collection of startup CEOs, early-stage venture investors, and technology policy experts who believe that innovation and entrepreneurship are driven by small startups, competing in open, competitive markets where they can challenge dominant incumbents. We believe that entrepreneurship and innovation have stood at the core of what helps build great societies and economies, and such entrepreneurship and invention has historically been driven by small startups. Working with our ever-growing network of entrepreneurs, startups, venture capitalists, technologists, and technology policy experts across the United States, Engine ensures that the voice of the startup community is heard by policymakers at all levels of government. When startups speak, policymakers listen.



For more than five decades, Charles Koch's philanthropy has inspired bold new ideas to improve American lives. Inspired by a recognition that free people are capable of extraordinary things, the Charles Koch Institute supports educational programs and dialogue to advance these principles, challenge convention, and eliminate barriers that stifle creativity and progress. We offer educational programs, paid internships, and job placement assistance to students and professionals, and encourage civil discussion about important issues like free speech, foreign policy, and criminal justice reform. In all of our programs, we are dedicated to identifying new perspectives and ideas that help people accomplish great things for themselves and others.



With more than 100 clients across six continents in 40+ countries to date, Startup Genome is the world-leading research and policy advisory organization for public and private agencies committed to accelerating the success of their startup ecosystem. Our mission and impact are rooted in more than a decade of independent research with data on 1.5 million companies over 250+ cities. Learn how Startup Genome accelerates global startup ecosystems by contacting Adam Bregu at adam@startupgenome.com and on startupgenome.com, LinkedIn, Twitter.