2017 THE KAUFFMAN INDEX

growth entrepreneurship

NATIONAL TRENDS

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EWING MARION KAUFFMAN FOUNDATION

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Foreword

By Bobby Franklin

President and CEO
National Venture Capital Association

Emerging, high-growth companies play an integral role in our economy. Young companies create an average of 3 million new jobs a year and have been responsible for almost all net new job creation in the United States in the last forty years. At the center of it all is venture capital, which has played an integral role in helping to grow some of the most iconic American companies and, in some cases, helping to create entire new industries. In addition to the innovative products and services that have transformed our society and shaped our lives, many VC-backed companies mature into large, public companies that have profound effects on the economy. In fact, between 1974 and 2015, nearly half of all companies that went public were venture-backed. Amazingly, those same companies were responsible for 85 percent of all R&D spending during that period.[1]

A misperception has taken hold that you have to be an entrepreneur living in Silicon Valley, New York City, or Boston to attract venture investment and successfully scale and grow your company. Nothing could be further from the truth. Entrepreneurship is alive in all corners of the United States, with pockets of entrepreneurial innovation sprouting up across the country at an increasing rate. In fact, entrepreneurs in all fifty states and the District of Columbia raised venture funding in 2016.[2]

California, Massachusetts, and New York attract a disproportionate share of venture capital investment, accounting for 75 percent of U.S. venture dollars invested in 2016.[3] However, if you look at it by the number of deals, the picture looks quite different, with California, Massachusetts, and New York combining for only 52 percent of venture capital deals in 2016.[4]

This is an important distinction, because all too often the strength of an entrepreneurial ecosystem is judged by the amount of capital deployed to startups in that ecosystem. This can be misleading, especially in the era of unicorns and $1 billion-plus funding rounds that drive up the total amount of capital invested. It also ignores other important benchmarks that measure the strength of an ecosystem.

As detailed in this report, the rate of startup growth in the first five years of operation is above pre-recession levels. Startups turning five years old in 2016 grew an estimated 75 percent, an increase over 2015. Interestingly, the five metros with the highest levels of growth by revenue and employment do ***not*** include Silicon Valley, Boston, or New York. Washington, D.C.; Austin, TX; Columbus, OH; Nashville, TN; and Atlanta, GA, round out the metro areas with the highest levels of growth entrepreneurship. Of the largest states for venture capital investment, Massachusetts is the only one that makes the top five ranking of states for highest levels of growth entrepreneurship, coming in fourth behind Virginia, Georgia, and Maryland, with Texas rounding out the top five. What this shows us is that, while Silicon Valley, Boston, and New York City tend to grab national headlines, other areas of the country have been flying below the radar, quietly growing their ecosystems and nurturing entrepreneurial activity in their backyards.

The spread of entrepreneurial activity isn't occurring in the United States alone. Countries

1. Gornall, W., and I. Strebulaev. "The Economic Impact of Venture Capital: Evidence from Public Companies." November 2015.

2. PitchBook-NVCA Venture Monitor.

3. Ibid.

4. Ibid.

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around the world have taken notice and are replicating our playbook to develop their own ecosystems—and it's working. Twenty years ago, U.S.-based startups attracted more than 90 percent of global venture capital investment. Ten years ago, our share shrank to 81 percent and, astonishingly, it slipped to 54 percent last year.[5] Truth be told, the pie is getting bigger, which is a good thing. But as the pie gets bigger, we want to ensure the United States' slice grows with it. That's where policymakers can play a big role and where the National Venture Capital Association works tirelessly to advocate for policies critical to ensuring the strength of our country's entrepreneurial ecosystem.

U.S. policymakers need to understand that we are in the throes of a global competition, with countries racing to develop entrepreneurial ecosystems that can serve as the backbone of their economies. To stay competitive, U.S. policymakers must consider what policy changes they can make to ensure we don't cede our leadership role.

Take tax reform, for example. For too long, discussions around tax reform in Washington, D.C., either have ignored entrepreneurship or been hostile to entrepreneurial activity. This needs to change. Policymakers need to understand how critical startups are to our economic competitiveness and consider what changes they can make to the tax code to support new company creation. Tax reform represents a huge opportunity to spur greater economic activity for the country, and critical to that will be reprioritizing pro-entrepreneurship tax policy.

Another area in which policymakers can make a huge impact in strengthening our ecosystem is through immigration policy. The ingenuity and creativity of immigrant entrepreneurs who choose to build and grow their businesses in the United States is invaluable to the American economy, making it all the more baffling that we throw up so many roadblocks in the way of foreign-born entrepreneurs who want to come to this country to start new companies. This, too, needs to change.

Immigration reform and tax reform are just two of the many areas of policy NVCA is focused on that need to be addressed for the U.S. entrepreneurial ecosystem to remain in a leadership position. Complementing the Kauffman Foundation's Zero Barriers movement, NVCA also is focused on diversity and inclusion issues. Most recently, NVCA announced the launch of VentureForward as an ongoing sustained program to 1) expand opportunities for men and women of all backgrounds to thrive in venture capital, and 2) ensure everyone who works in this ecosystem has a welcoming professional culture and safe work environment. As our efforts continue, the Growth Entrepreneurship Index and all of the other data and research tools produced by the Kauffman Foundation will serve as important tools to track and measure progress.

5. PitchBook data.

The Growth Entrepreneurship Index is a composite measure of entrepreneurial business growth in the United States that captures growth entrepreneurship in all industries and measures business growth from both revenue and job perspectives.

Growth Entrepreneurship Index Executive Summary

Growth entrepreneurship helps drive job creation, innovation, and wealth in the U.S. economy. Research indicates that high growth, particularly in young firms, is an especially significant contributor to job, output, and productivity growth (Haltiwanger et al. 2016). It is important to track the growth of new firms in order to understand the immediate economic benefits of this growth in terms of job creation, as well as the increased productivity and sharing of best practices that are also associated with growing and new firms, but are more difficult to quantify (Sarada and Miranda 2016).

The Growth Entrepreneurship Index is a composite measure of entrepreneurial business growth in the United States that captures growth entrepreneurship in all industries and measures business growth from both revenue and job perspectives. It includes three component measures of business growth: Rate of Startup Growth, Share of Scaleups, and High-Growth Company Density. These measures integrate comprehensive and timely data that covers the entire universe of the approximately 5 million employer businesses in the United States, as well as a privately collected benchmark of growth businesses.

Much of the attention and discussion around growth entrepreneurship focuses on growth inputs, such as patents, venture capital funding, and valuations. While these inputs are important, we focus on measures of outputs—growth entrepreneurship's direct contribution to the economy in terms of job and revenue growth.

In this report, we present national estimates of the Growth Entrepreneurship Index, followed by a discussion of national trends in each of the three component measures of the Index. National trends in growth entrepreneurship for specific industries also are reported, where available. Two companion reports, *The Kauffman Index of Growth Entrepreneurship | State Trend*s and *The Kauffman Index of Growth Entrepreneurship Index | Metropolitan Area and City Trends*, offer estimates of the Growth Entrepreneurship Index for all states and for the forty largest metro areas, respectively.

Key Findings

Entrepreneurial business growth has increased, rebounding from the slump across industries and geographies that followed the Great Recession. Despite this good news, however, entrepreneurial growth in the United States—especially as measured by the number of companies reaching medium size or larger in terms of employment—is largely down from the levels experienced in the 1980s and 1990s.

The Rate of Startup Growth increased meaningfully in the last year, indicating that startups are growing faster in their first five years than they did in the past. The Rate of Startup Growth was 75.6 percent. Startups began with an average of almost six employees at their founding, and businesses that survived grew to an average of more than ten employees at the end of five years of operations. This figure represents an increase of more than five percentage points compared to the previous cohort, and growth in this component largely drove the increase in the Growth Entrepreneurship Index overall. This component, however, remains low compared to its levels in the late 1980s.

The Share of Scaleups changed little in the last year, but has fallen more than 30 percent compared to the late 1980s. The Share of Scaleups was largely unchanged from last year at 1.1 percent. While this figure is high relative to the Great Recession years, it remains below the range seen through most of the 1990s and the first part of the 2000s.

High-Growth Company Density, too, remained stable in the last year. High-Growth Company Density remained flat in the 2017 Index at 79 high-growth companies for every 100,000 U.S. employer businesses. Despite this plateau in the short-term, it represents an increase from the levels seen during the Great Recession.

Tech-associated industries dominate among high-growth companies, but high tech is not a prerequisite for growth. A close consideration of the industry distribution of companies in the High-Growth Company Density component of the Growth Entrepreneurship Index indicates that tech-associated industries like IT services, software, computer hardware, and health continue to play a dominant role among high-growth firms.

Overall growth, however, comes from a large swath of industries, including food and beverage, retail, and government services. These industry distributions suggest that high tech is important, but it is not necessary for high growth. The top five industries with the most high-growth firms in the last year were: 1) IT services, 2) advertising and marketing, 3) business products and services, 4) health, and 5) software.

The prevalence of health industry companies among high-growth firms has increased since 2007. The percent of high-growth companies in the health industry increased from 4.7 percent of all high-growth companies in 2007 to 8 percent in 2016. This upward trend continued through the Great Recession, even while most other industries were experiencing declines.

The government services share of high-growth companies remains low relative to its peak in 2010. In 2010, at the height of the Great Recession and when most industries were experiencing declines in growth entrepreneurship activity, the government services industry seemed to be thriving. The number of high-growth companies in this sector increased 167 percent, from 102 companies in 2007 (2.7 percent of high-growth firms in that year) to 272 companies in 2010 (9.2 percent of high-growth firms in that year). In the last few years, however, the government services share of high-growth companies has hovered around 4.5 percent to 5.5 percent of all high-growth companies.

Venture Exits, after many years of increases, declined in both 2015 and 2016. IPOs and other types of venture exits were low in the United States in 2002, but they increased relatively steadily until they reached a fifteen-year high in 2014. The number of venture exits then declined in both 2015 and 2016. Despite the decline in the number of exits in 2016, the average dollar value of those exits increased, from about $66 million in 2015 to more than $71 million in average exit size in 2016.

About the Kauffman Index of Entrepreneurship Series: A Big-Tent Approach to Entrepreneurship

Entrepreneurship is not a monolithic phenomenon; it includes many diverse and moving parts. Creating new businesses is a different economic activity from running small businesses, which in turn is different from growing businesses. The Kauffman Index of Entrepreneurship series seeks to measure each of these phases of new business development through three annual in-depth studies of entrepreneurship in the United States: the **Kauffman Index of Startup Activity,** the **Kauffman Index of Main Street Entrepreneurship**, and the **Kauffman Index of Growth Entrepreneurship**. Each study focuses on one of these phases of entrepreneurship at the national, state, and metropolitan levels.

The Startup Activity Index is an indicator of nascent entrepreneurship in the United States, concentrating on new business creation, market opportunity, and startup density. The Main Street Entrepreneurship Index measures the prevalence of small business ownership and the density of established, local small businesses. And the Growth Entrepreneurship Index focuses on the growth of entrepreneurial businesses, in terms of both revenue and employment.

While one might expect that certain patterns of nascent entrepreneurship seen in the Startup Activity Index in a given year would be reflected in the Main Street Entrepreneurship Index and the Growth Entrepreneurship Index in future years, these studies measure fundamentally different aspects of entrepreneurship and have few direct relationships. A region, for example, can have very high startup activity, but low growth entrepreneurship, or high levels of main street entrepreneurship but low levels of startup activity. High (or low) levels of activity in any one index do not necessarily result in or imply high (or low) levels of activity in the others.

All three of these studies provide a spectrum of entrepreneurship measures from an industry-agnostic perspective and are based on data regarding entrepreneurial outputs—the results of new business activity, such as new companies, business density, and growth rates. Each study is comprised of three component measures, and there are three reports issued as part of each study: one presenting national trends, another for state trends, and the last for trends in specific metropolitan areas. Table A summarizes the component measures included in each study.

While these studies represent extensive research and are the result of a good-faith effort to present a balanced perspective on entrepreneurship measurement, we recognize that entrepreneurship is a multifaceted and evolving phenomenon, and we expect that we may continue to revise and enhance the Kauffman Index in the future. All current and past reports, as well as data for specific locales, are available at www.kauffmanindex.org.

Ultimately, these studies offer insight into the people and businesses that contribute to America's entrepreneurial dynamism. And taken together, they present a holistic and nuanced view of the complex phenomenon of entrepreneurship in America.

Table A

Summary of Components Used Across Reports

Startup Activity	Main Street Entrepreneurship	Growth Entrepreneurship
Rate of New Entrepreneurs The percentage of adults transitioning into entrepreneurship at a given point in time	**Rate of Business Owners** The total number of business owners in a location at a given point in time	**Rate of Startup Growth** The average growth of a cohort of new startups in their first five years
Opportunity Share of New Entrepreneurs The percentage of new entrepreneurs driven primarily by "opportunity" vs. "necessity"	**Survival Rate of Firms** The percentage of firms in operation throughout their first five years	**Share of Scaleups** The number of businesses that started small and grew to employ at least fifty people by their tenth year of operation as a percentage of all businesses ten years and younger
Startup Density The number of new employer businesses, normalized by population	**Established Small Business Density** The number of businesses five years old and older with less than fifty employees, normalized by population	**High-Growth Company Density** The number of fast-growing companies with at least $2 million in annual revenue, normalized by business population

All three of these studies provide a spectrum of entrepreneurship measures from an industry-agnostic perspective and are based on data regarding entrepreneurial outputs—the results of new business activity, such as new companies, business density, and growth rates.

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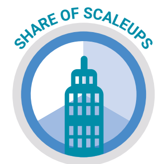
Rate of Startup Growth



Share of Scaleups

High-Growth Companies

Understanding Growing Companies: The Growth Entrepreneurship Index and Its Components

Entrepreneurship can take many forms, and businesses grow in different ways. Some grow rapidly and very publicly—think Uber or any of the prominent tech unicorns. Others grow for longer periods without drawing attention, often in industries or regions that are less visible to the general public and media. Chobani, for example, is not a stereotypical growth company, but its Greek yogurt has become a household brand and the company has more than $1 billion in revenue and more than a thousand employees. Chobani was founded in 2005 in rural New York and originally funded with an SBA loan and no external investors (Ulukaya 2013). Its founder continued to be the sole owner even when Chobani became a billion-dollar company, and it was only relatively recently that others acquired ownership stakes. There are numerous other companies that achieve similar levels of growth, create millions of dollars in revenue, and, altogether, power hundreds of thousands of jobs—even though most people have never heard of them. Entrepreneur and investor Brad Feld calls these companies the "silent killers"— companies that reach multimillion-dollar revenues, but inspire little fanfare, are absent from media reports, and often are not based in the Bay Area (Feld 2011).

Because companies take numerous different paths to growth, any measure of the phenomenon must incorporate multiple indicators. The Growth Entrepreneurship Index, a novel gauge for measuring business growth in the United States, is an equally weighted index of three normalized measures of entrepreneurial growth. Each of these components and the data sources used to calculate them are described below.

1. **Rate of Startup Growth** measures the average employment growth of a cohort of startups in the United States in their first five years. The Rate of Startup Growth captures employer businesses regardless of industry, and it calculates their average growth as a cohort of businesses during their first five years of operation—from the founding

Rate of Startup Growth

- Serves as a proxy measure of business growth and startup traction in young businesses.
- Measures the average percentage growth of a cohort of new employer firms from the year they were founded through their first five years of operation by comparing the average employment size of all startups founded in a given year to the average employment size of the surviving companies in their fifth year of operation.

  For example, if a cohort of companies in a given state had an average of 4.7 employees at the time of their founding and an average of 8.0 employees in their fifth year of operation, the Rate of Startup Growth for that state in that year would be 70.3 percent, meaning that, on average, companies in that state grew 70.3 percent between the time of their founding and their fifth year of operation.
- Includes companies in all industries.
- Calculated using data from the U.S. Census Bureau's Business Dynamics Statistics.

Share of Scaleups

- Serves as a proxy measure of how many startups become scaleups.
- Measures the prevalence of companies that start small and become medium-sized businesses or larger by their tenth year of operation.

  For example, if the Share of Scaleups for the United States were 1.1 percent, it would mean that approximately 1,100 out of every hundred thousand companies ten years old and younger started small and became medium-sized or larger businesses, defined as firms with at least fifty employees.
- Includes companies in all industries.
- Calculated using data from the U.S. Census Bureau's Business Dynamics Statistics.

year to year five. Startup businesses here are defined as firms less than one year old that employ at least one person besides the owner. The Rate of Startup Growth is calculated based on data from the U.S. Census Bureau's Business Dynamics Statistics (BDS) and is taken from the universe of businesses with payroll tax records in the United States, as recorded by the Internal Revenue Service. This dataset covers approximately 5 million companies.

2. **Share of Scaleups** indicates the prevalence of employer firms ten years old and younger that start with fewer than fifty employees and grow to employ at least fifty people by their tenth year of operation. While the Rate of Startup Growth looks at the estimated average growth of a cohort of employer firms, the Share of Scaleups focuses exclusively on firms that reach fifty employees or more. The Share of Scaleups component is based on the same BDS data used for the Rate of Startup Growth.
3. **High-Growth Company Density** represents the prevalence of fast-growing private companies that have at least $2 million in annual revenue and 20 percent annualized growth over a three-year period, which compounds to 72.8 percent after the three years. The calculations regarding high-growth firms in this component of the Index use Inc. 500|5000 data on the fastest-growing private companies in America in terms of revenue growth. These data include firms from a wide range of industries, including some high-growth companies that have multibillion-dollar revenues and explosive growth rates over the three-year period. Data used for the total number of employer firms in this calculation is from the BDS. While the other two components of the Index measure growth in terms of employment, the High-Growth Company Density component measures growth in revenue, an important factor to consider when analyzing growing firms because the relationship between employment growth and revenue growth is complex and is not always directly linked across industries.

The aggregation of these three distinct components into a single Growth Entrepreneurship Index statistic allows for a balanced and comprehensive measure of business growth that can be tracked over time.[6] The Methodology and Framework section at the end of this report provides more detail regarding the datasets used and the calculations for each component and for the Growth Entrepreneurship Index overall.

The Growth Entrepreneurship Index may be used by local and national entrepreneurs, entrepreneurship supporters, and policymakers to understand growth in their geographies. It improves over other possible measures of growth entrepreneurship in its timeliness, its dual approach of capturing both employee and revenue growth, its coverage of both young companies and more established private firms, and its inclusion of all types of business activity, regardless of industry.

High-Growth Company Density

- Measures the prevalence of high-growth companies. High-growth companies are defined here as private businesses with at least $2 million in annual revenue and 20 percent annualized revenue growth over a three-year period.

  For example, if the High-Growth Company Density for a metropolitan area were 84.7, it would mean that for every 100,000 employer businesses in that metro area, there were 84.7 high-growth firms.
- Includes companies in all industries.
- Calculated using data from the Inc. 500|5000 private dataset of fastest-growing companies in the United States and the U.S. Census Bureau's Business Dynamics Statistics.

6. Please note that our methodology for calculating the Growth Entrepreneurship Index was updated in the last year. In the 2016 Growth Entrepreneurship Index, the first year in which this study was conducted, we had data from several different years and, therefore, we created an aggregate measure and assigned the most recent data point to 2016, the year of its publication. This year, we were able to create forecasts for the Rate of Startup Growth and Share of Scaleups such that we had data for each component for 2016. With this more consistent data, it made sense to change the Growth Entrepreneurship Index so that the data for each year reflects the underlying data for the components in that year. More information about this change is presented in the Methodology and Framework section.

National Trends in Growth Entrepreneurship

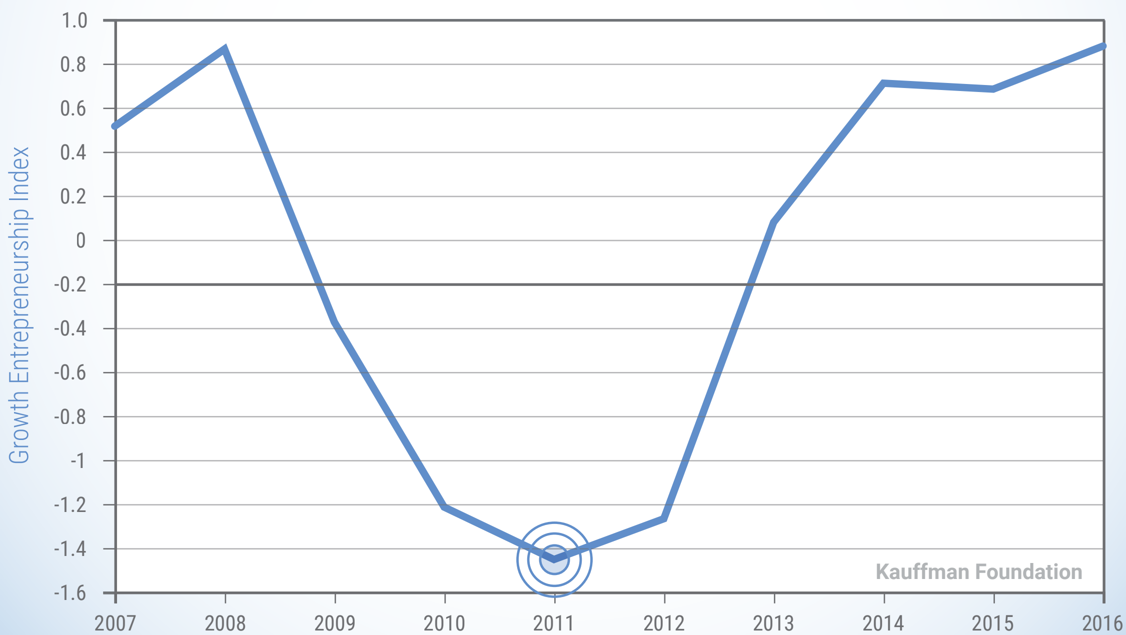
The Growth Entrepreneurship Index rose in 2016, reaching pre-Recession levels. Over the past decade, the Growth Entrepreneurship Index generally has followed the business cycle. Growth entrepreneurship was high leading up to the Great Recession and then fell for some time after the business cycle began to recover, reaching its lowest level in 2011. Figure 1 (below) and Table 1 (in the Appendix) present results for the Growth Entrepreneurship Index between 2007 and 2016.

These data indicate that entrepreneurial growth remains a rare phenomenon—most companies do not grow. The increase in the Growth Entrepreneurship Index in 2016, however, was large and indicates that we are seeing a broad-based return to growth among firms in the United States.

Growth entrepreneurship was high leading up to the Great Recession and fell for some time after the business cycle began to recover—with its lowest level of activity measured in 2011.

Figure 1

Kauffman Index of Growth Entrepreneurship (2007–2016)



SOURCE: Kauffman Index of Growth Entrepreneurship, calculations from BDS and Inc. 500|5000.
For an interactive version, please see: www.kauffmanindex.org.

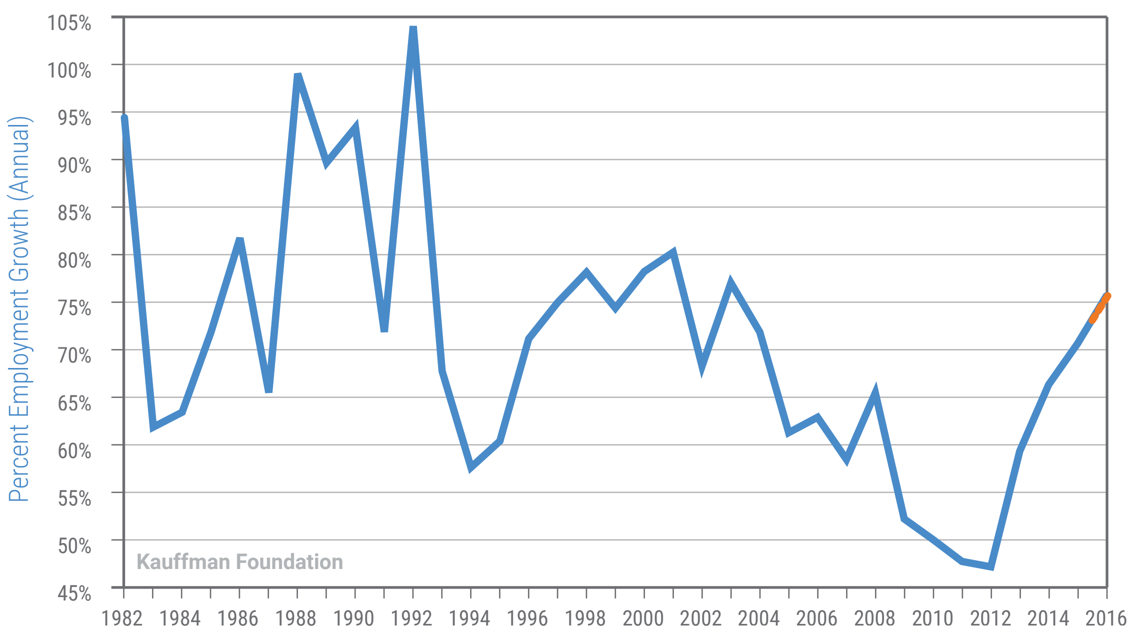
National Trends in Rate of Startup Growth

The first component of the Growth Entrepreneurship Index, the Rate of Startup Growth, captures the average employment growth of a cohort of startup businesses in their first five years of operation. Business dynamics during these early years of a new business are messy. Of the approximately 400,000 new employer businesses that have been created annually in the United States in recent years, only about 45 percent survive their first five years of operation; the remaining 55 percent cease operations or are absorbed into other businesses. Researchers describe entrepreneurs' efforts to find their markets and certain businesses' continued operation and expansion as a process of experimentation (Kerr, Nanda, and Rhodes-Kropf 2014).

We present the Rate of Startup Growth from 1982 to 2016 in Figure 1A (below) and Table 1A (in the Appendix). The Rate of

Figure 1A

Rate of Startup Growth (1982–2016)



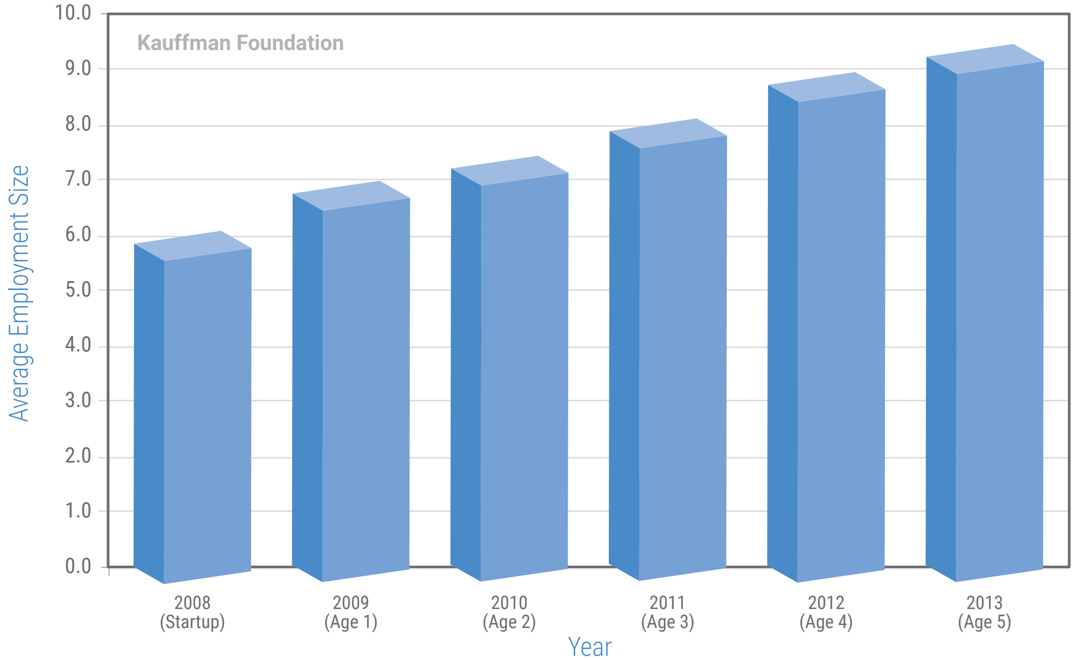
SOURCE: Kauffman Foundation calculations from BDS. Yearly measure.
For an interactive version, please see: www.kauffmanindex.org.

Startup Growth for 2016 was 75.6 percent, indicating that the cohort of U.S. startups that began in 2011 grew from an average of 5.8 employees at their founding in 2011 to an average of 10.2 employees in 2016 after five years of operation (Figure 1B). This figure represents an increase from the Rate of Startup Growth in the previous year. However, this figure remains low relative to the approximately nearly 90 percent Rate of Startup Growth we saw during some of the 1980s, the first decade for which data are available. The rate has decreased in volatility and trended downward since at least 2003.

Note that the Rate of Startup Growth is a yearly measure calculated from the U.S. Census Bureau's Business Dynamics Statistics (BDS). Because the latest data available to calculate this indicator only go up to 2015, we created an estimate of Rate of Startup Growth for 2016. For more information on the creation of these nowcast estimates, please see the Methodology and Framework section of the report.

Figure 1B

Average Size of Surviving Business by Number of Employees for Startups Founded in 2008 and Turning Five in 2013



SOURCE: Authors' calculations using the BDS.

National Trends in Share of Scaleups

The second component of the Growth Entrepreneurship Index, the Share of Scaleups, looks at the percent of all employer firms ten years old and younger that are scaleups—companies that start with fewer than fifty employees and grow to employ at least fifty people in their first ten years. While the Rate of Startup Growth measures the average employment growth of a whole cohort of young firms, the Share of Scaleups focuses only on the firms that reach a certain scale, as measured by employment size.

Researchers such as Dan Isenberg (2012) and practitioners such as Brad Feld (2013) have highlighted the importance of scaleups in addition to startups. While measuring scaleups is difficult and there is no consensus on methodology, work in this area focuses on capturing growth after the startup process and emphasizes the importance of growth within the broader concept of the entrepreneurial process.

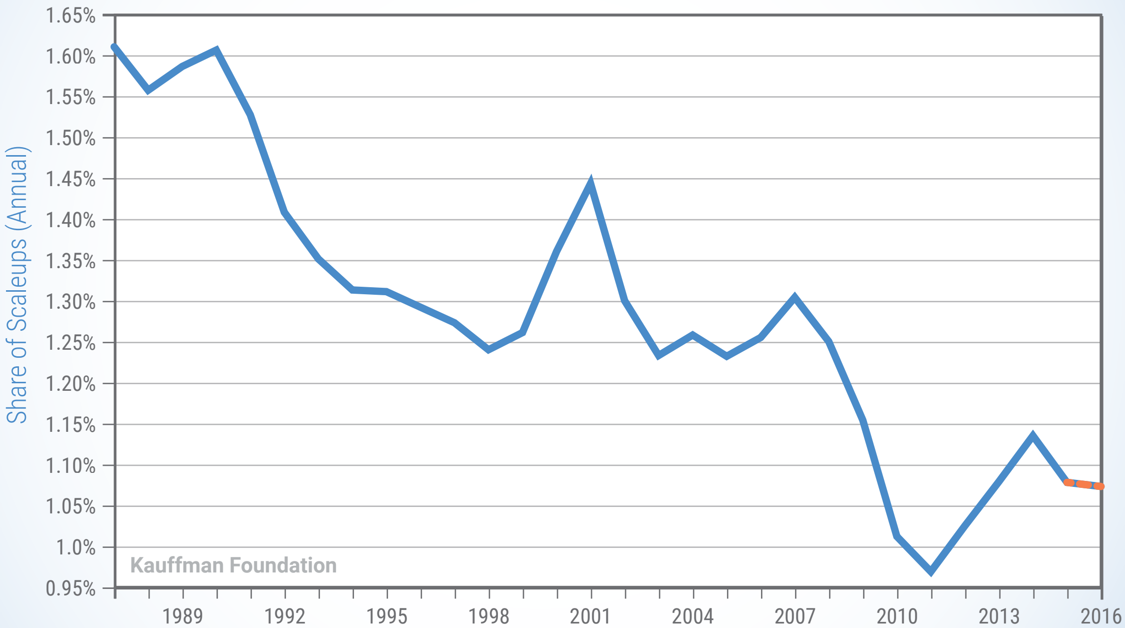
In 2016, the Share of Scaleups remained largely flat, at just under 1.1 percent, meaning that approximately 1,100 companies out of every 100,000 firms that are ten years old and younger started small and reached a scale of more than fifty employees.

Figure 1C (below) and Table 1C (in the Appendix) present this indicator from 1987 to 2016. The Share of Scaleups has decreased over time, suggesting a downward trend in the number of young businesses that grow to be at least medium-sized. The measure has experienced highs during times of economic expansion, however, reaching its peak over the past twenty years in 2001, at the height of the internet bubble. The Share of Scaleups fell steadily during the Great Recession, reaching its lowest point in 2011 at 0.97 percent.

Like the Rate of Startup Growth, the Share of Scaleups is a yearly measure calculated from BDS data. As with the Rate of Startup Growth, we created an estimate of the Share of Scaleups for 2015 and 2016 using other data because the BDS data have a lag of about two years and, therefore, 2014 is the latest year for which BDS data are available. For more information on the creation of these estimates, please see the Methodology and Framework section of this report.

Figure 1C

Share of Scaleups (1987–2016)



SOURCE: Kauffman Foundation calculations from BDS. Yearly measure.
For an interactive version, please see: www.kauffmanindex.org.

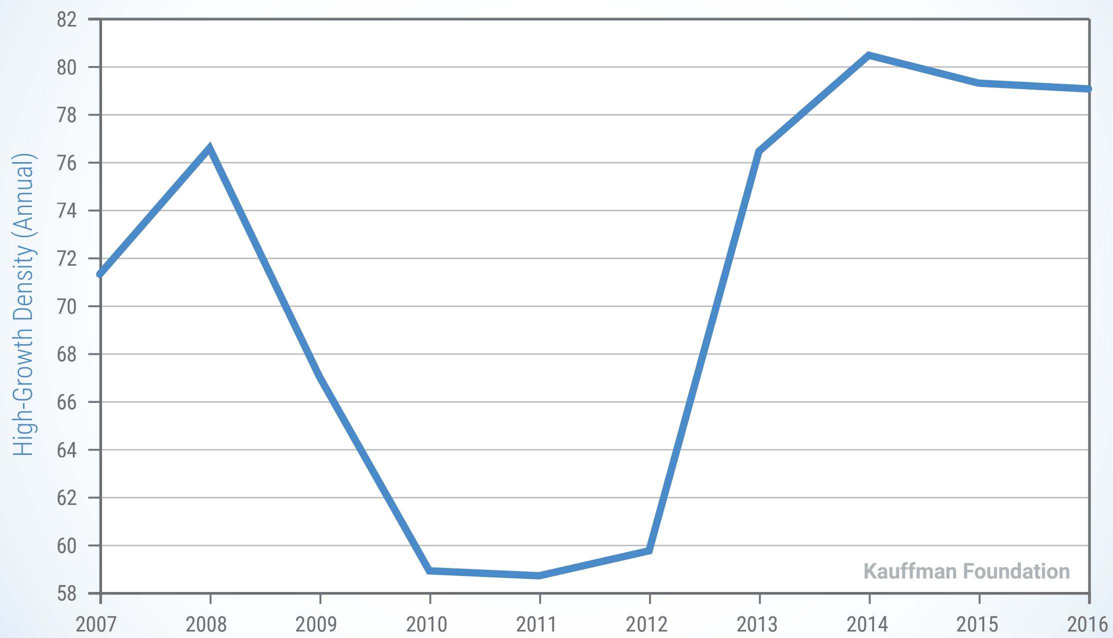
National Trends in High-Growth Company Density

The third and last component of the Growth Entrepreneurship Index, High-Growth Company Density, assesses the prevalence of high-growth private companies in a geographic area, defined as those that achieve at least $2 million in annual revenue and at least 20 percent annualized growth over a three-year period. While the Rate of Startup Growth and the Share of Scaleups focus on employment-based growth indicators, the High-Growth Company Density is a revenue-based measure. Furthermore, it is distinct from the Share of Scaleups in that it does not include an upper-bound restriction on firm age. While all firms included in this measure are at least three years old, there is a wide range in the ages of these high-growth firms. Data indicate, however, that the firms skew young: more than 30 percent of these high-growth companies are between five and seven years old, and approximately 60 percent are ten years old or younger.

Figure 1D (below) and Table 1D (in the Appendix) report results for High-Growth Company Density between 2007 and 2016, the latest year for which the data are available. This indicator fell sharply in the aftermath of the Great Recession, and then increased for two years in a row starting in 2013 before it plateaued in 2015 and 2016 at 79.1 high-growth companies for every 100,000 employer businesses in the United States. This measure is calculated using data from the Inc. 500|5000 list of the fastest-growing private companies in America and BDS data.

Figure 1D

High-Growth Company Density (2007–2016)



SOURCE: Kauffman Foundation calculations from BDS and Inc. 500|5000. Yearly measure.
For an interactive version, please see: www.kauffmanindex.org.

A Look at Venture Exits in the United States

Venture exits, including initial public offerings (IPOs), acquisitions, and buyouts, are one of the possible outcomes of entrepreneurial growth. Each of these events represents a liquidity milestone for growth companies.

While venture exits are a clear indicator of growth companies, this metric is difficult to integrate into the Growth Entrepreneurship Index comprehensively due to the relatively small number of exits in the United States in any given year. As a result, we present statistics on business exits here as a supplement to the Growth Entrepreneurship Index.

We made these calculations using data from the National Venture Capital Association and the data platform Pitchbook through a partnership with the Kauffman Foundation. As such, the exits represented here are limited to those of venture capital-backed companies.

Figure 2 presents trends for U.S. venture exits density between 2002 and 2016—calculated as the number of venture-backed exits in a year per every 100,000 employer businesses in the country. Venture exits density was low in 2002, but it increased relatively steadily until it reached a fifteen-year high in 2014. Venture exits density then declined in both 2015 and 2016. Despite the decline in venture exits density in 2016, the average dollar value of these exits increased from about $49 million in 2015 to more than $66 million in average exit size in 2016.

Figure 2

Venture Exits Density per 100,000 Employer Businesses (2002–2016)

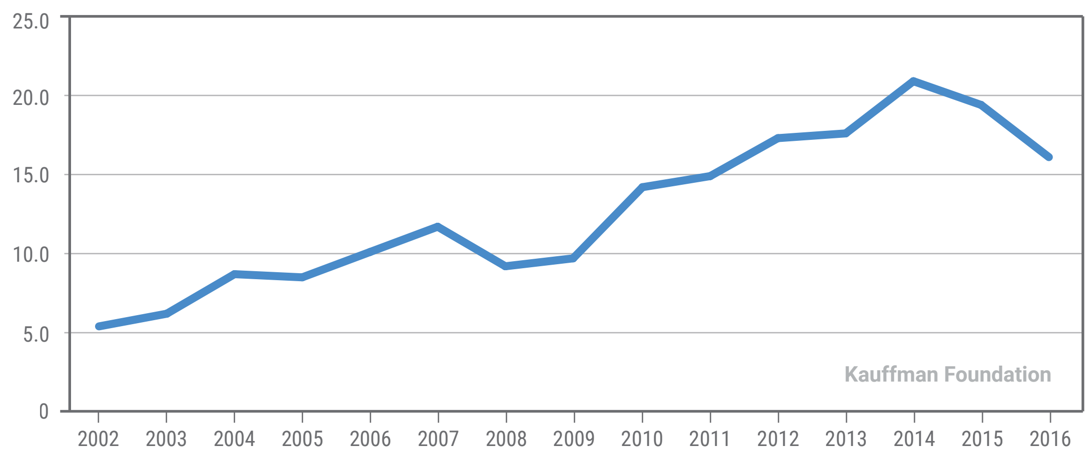
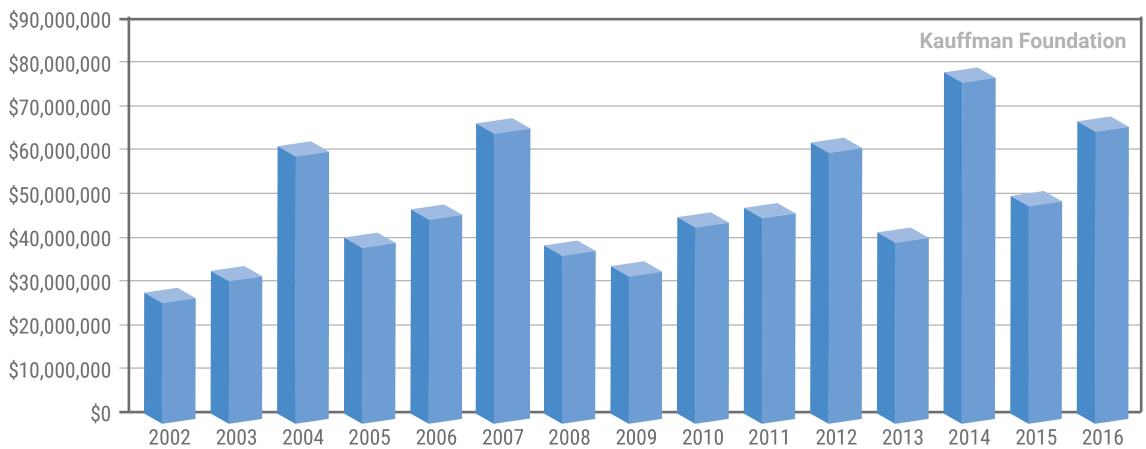


Figure 3

Average Size, Venture Exits (2002–2016)



SOURCE FOR BOTH FIGURES: Authors' calculations using National Venture Capital Association and Pitchbook data and the BDS.

Industry Trends for High-Growth Companies

The detailed industry data in the Inc. 500|5000 list allow us to explore industry trends for high-growth companies, including the industries with the largest shares of high-growth companies and select industry profiles over time. Table B (below) presents the top five industries with the largest shares of high-growth companies in 2016.

Significant numbers of high-growth firms were in tech-associated industries in 2016, with IT services, health, and software all among the top five industries with the highest shares of high-growth companies. The industry distribution for growth businesses, however, is wide, and it includes sectors not always associated with fast-growing businesses, such as food and beverage, retail, and government services. Table C (below) illustrates this range, presenting a complete list of industries with high-growth companies in 2016.

Table B | Top Five Industries with Highest Share of High-Growth Companies (2016)

Rank	Industry	High-Growth Companies	Share (%)
1	IT Services	524	13.1%
2	Advertising & Marketing	404	10.1%
3	Business Products & Services	350	8.8%
4	Health	320	8.0%
5	Software	280	7.0%

Table C | Industries by Share of High-Growth Companies (2016)

Rank	Industry	High-Growth Companies	Share (%)
1	IT Services	524	13.1%
2	Advertising & Marketing	404	10.1%
3	Business Products & Services	350	8.8%
4	Health	320	8.0%
5	Software	280	7.0%
6	Construction	221	5.5%
7	Government Services	218	5.5%
8	Financial Services	198	5.0%
9	Consumer Products & Services	190	4.8%
10	Real Estate	164	4.1%
11	Human Resources	141	3.5%
12	Retail	135	3.4%
13	Food & Beverage	120	3.0%
14	Logistics & Transportation	105	2.6%
15	Manufacturing	104	2.6%
16	Energy	80	2.0%
17	Telecommunications	71	1.8%
18	Security	62	1.6%
19	Education	60	1.5%
20	Insurance	58	1.5%
21	Media	50	1.3%
22	Engineering	48	1.2%
23	Travel & Hospitality	41	1.0%
24	Environmental Services	29	0.7%
25	Computer Hardware	25	0.6%

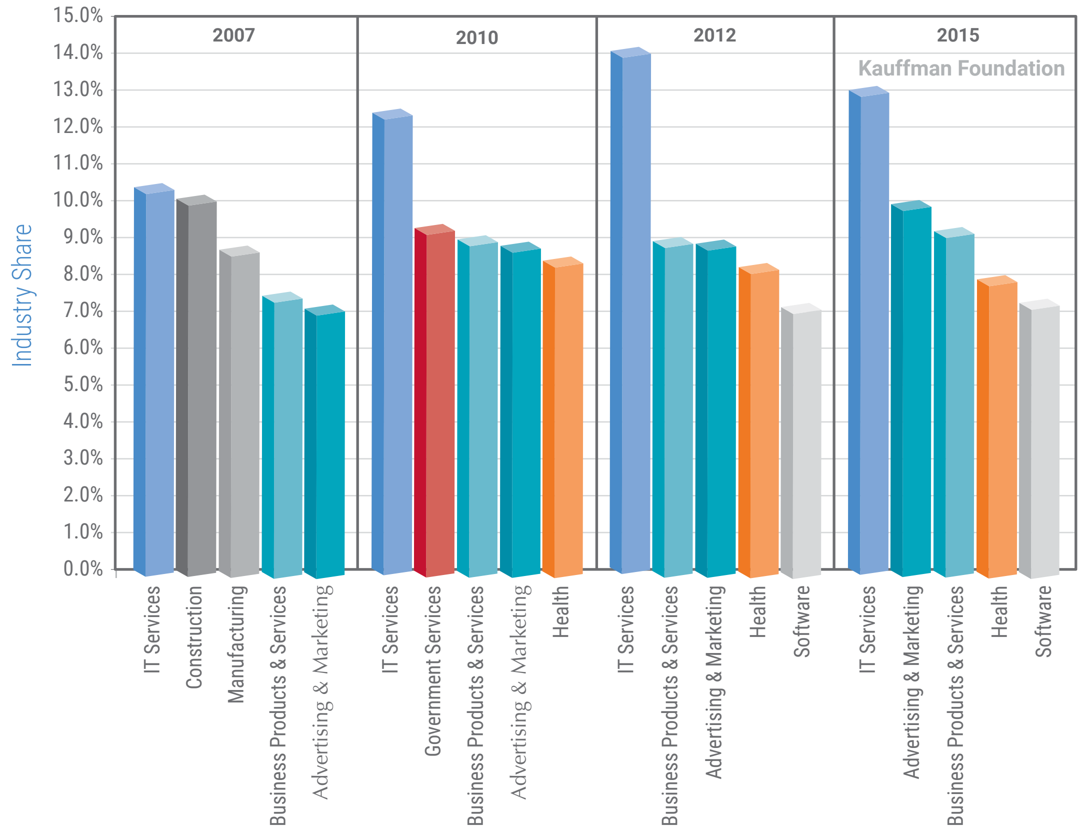
SOURCE: Authors' calculations using Inc. 500|5000 data.

Changes in Industry Distribution of High-Growth Companies

The industries with the highest shares of high-growth companies have changed over time, with especially pronounced changes during the Great Recession and its aftermath. At the height of the Great Recession, in 2010, for example, most industries were experiencing declines in growth entrepreneurship while the government services industry seemed to be thriving. The number of high-growth companies in this sector increased 167 percent between 2007 and 2010 (Figure 10–Industry Profile). Because this sector was growing while others were contracting, the rise in its share of high-growth companies was even more pronounced, increasing 2.4 times and making the government services sector the industry with the second-highest number of

Figure 4

Top Five Industries with Highest Share of High-Growth Companies (2007, 2010, 2012, 2015)



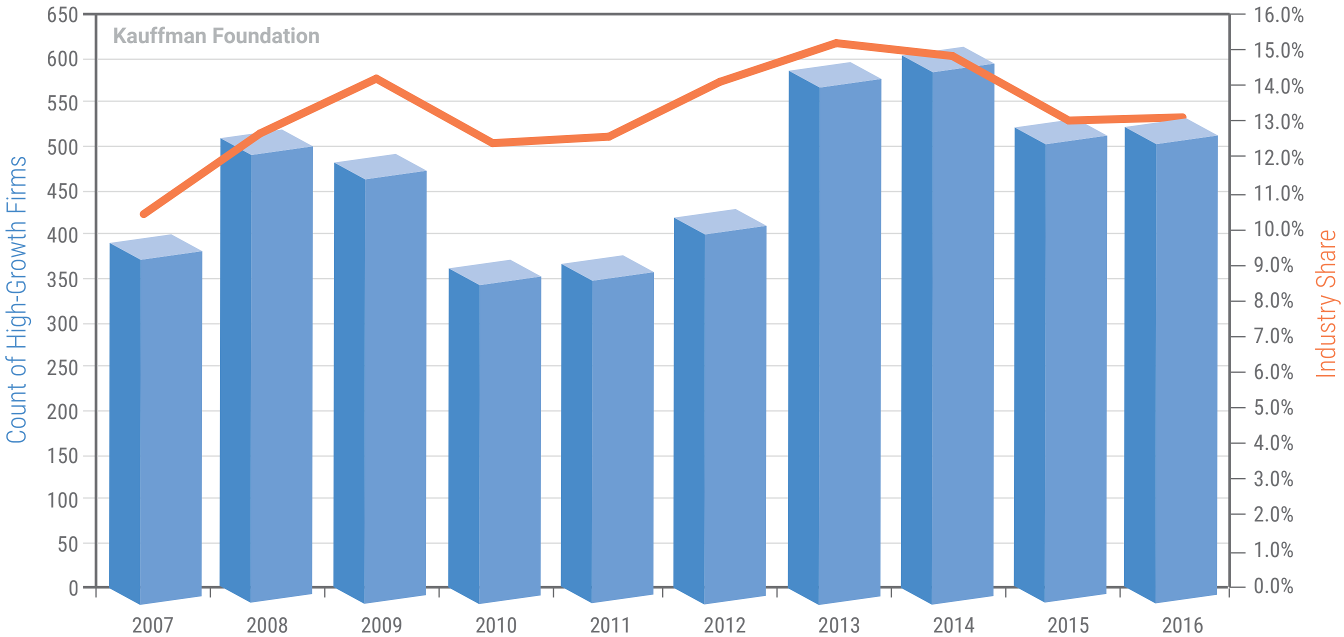
SOURCE: Authors' calculations from Inc. 500|5000 data. For an interactive version, please see: www.kauffmanindex.org.

high-growth companies in 2010 (Figure 4–2010). The number of high-growth companies in this sector decreased, however, after its peak during the Great Recession.

The top five industries with the highest shares of high-growth companies have been consistent since 2012: 1) IT services, 2) advertising and marketing, 3) business products and services, 4) health, and 5) software. Of these five industries, IT services, advertising and marketing, business products and services, and software have performed well virtually every year, albeit with cyclical ups and downs. Health is the only industry in this group that has consistently experienced increases almost every year, including during the Great Recession. These changes and others can be seen in the select industry profiles in Figures 5–10.

Figure 5

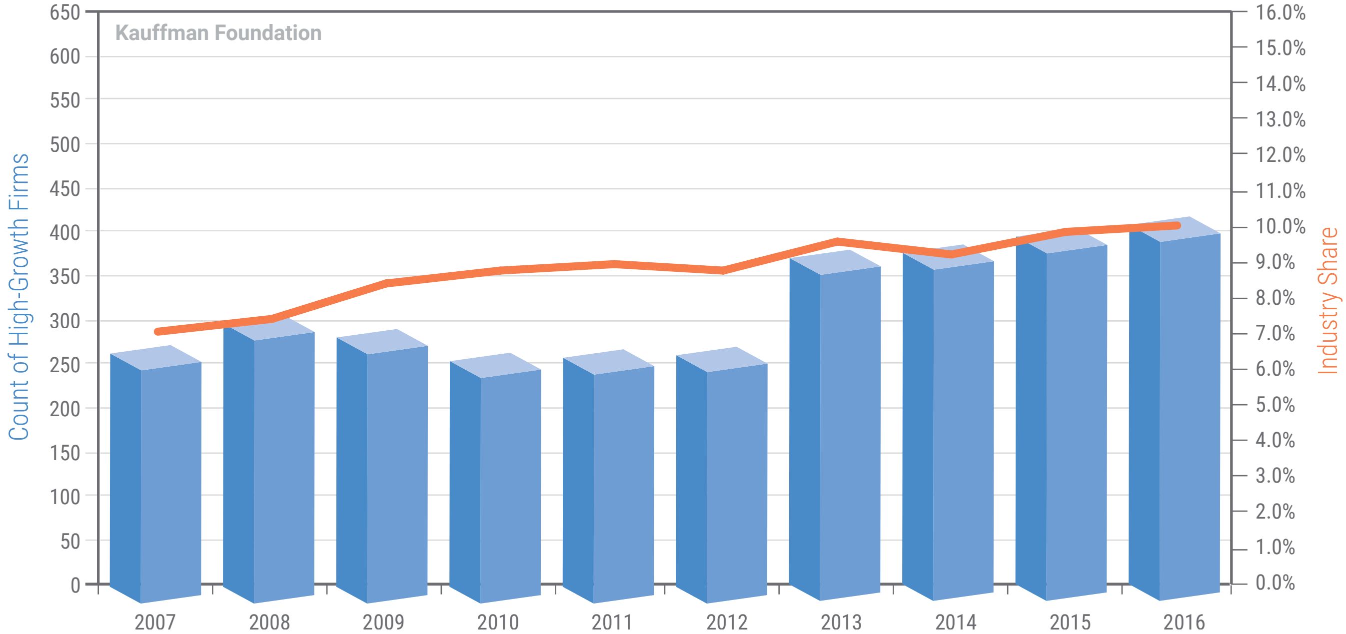
IT Services Industry Profile (2007–2016)–Ranked 1 in 2016



SOURCE: Kauffman Foundation calculations from Inc. 500|5000 data. *For an interactive version, please see: www.kauffmanindex.org.*

Figure 6

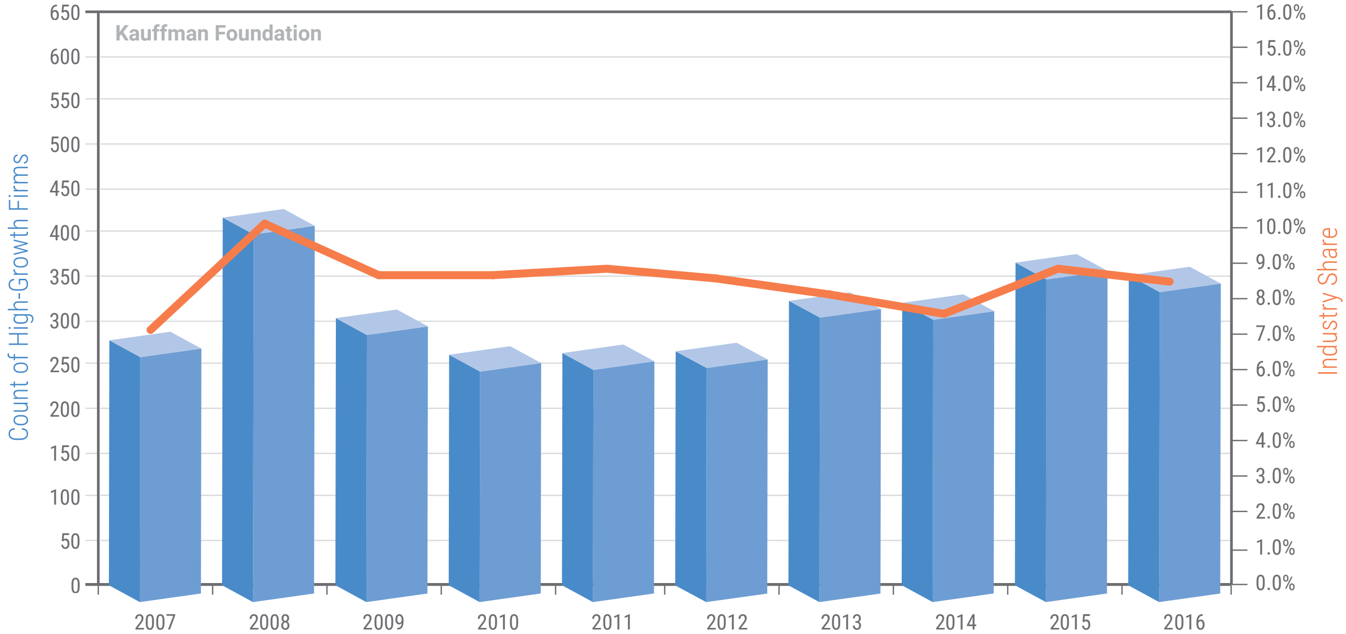
Advertising & Marketing Industry Profile (2007–2016)–Ranked 2 in 2016



SOURCE: Kauffman Foundation calculations from Inc. 500|5000 data. *For an interactive version, please see: www.kauffmanindex.org.*

Figure 7

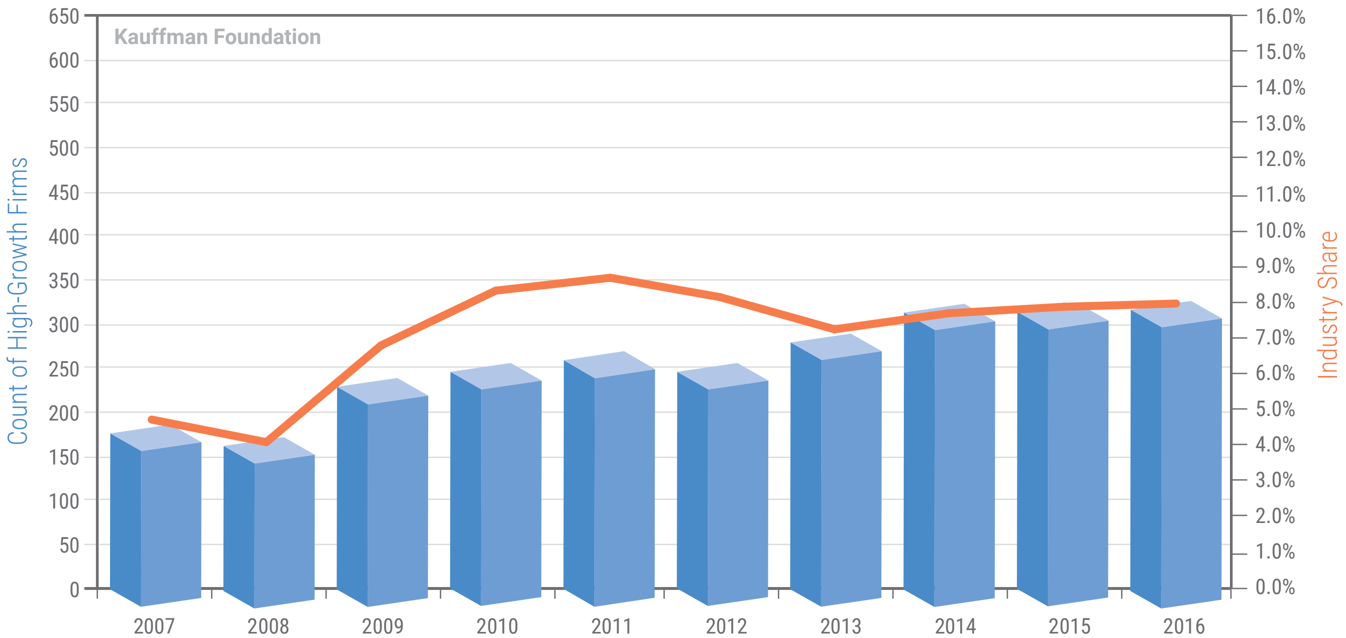
Business Products & Services Industry Profile (2007–2016)–Ranked 3 in 2016



SOURCE: Kauffman Foundation calculations from Inc. 500|5000 data. *For an interactive version, please see: www.kauffmanindex.org.*

Figure 8

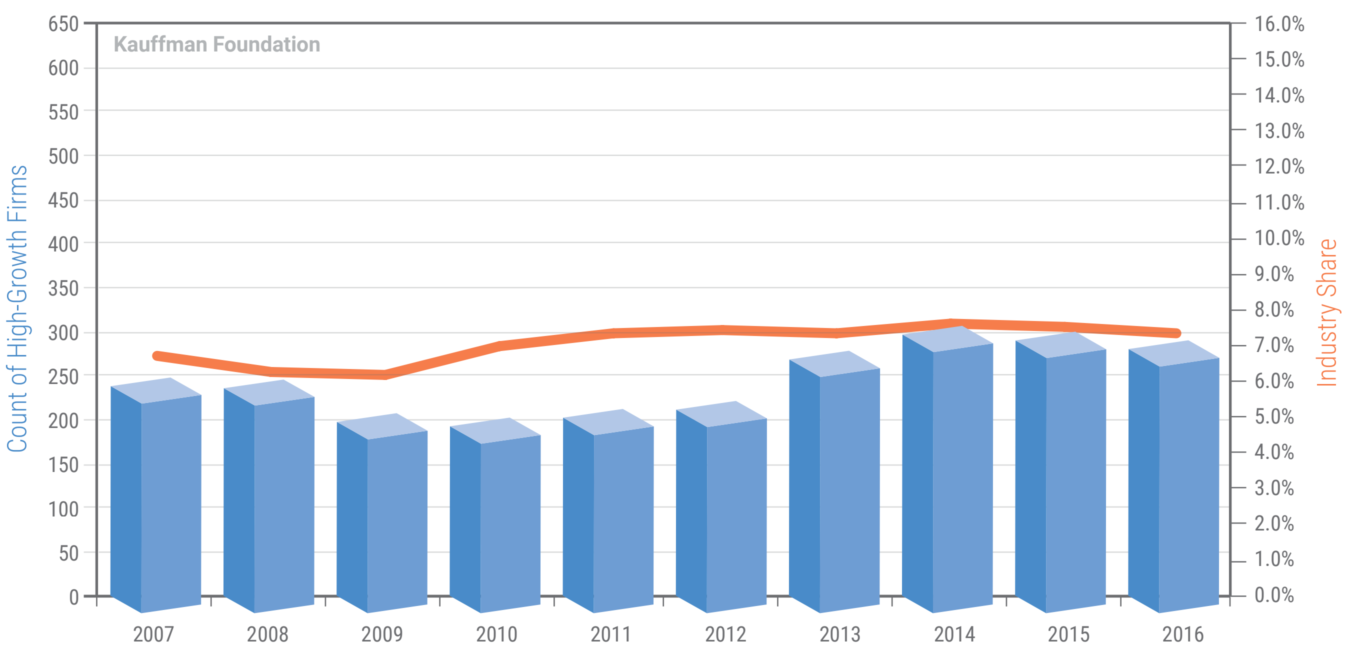
Health Industry Profile (2007–2016)–Ranked 4 in 2016



SOURCE: Kauffman Foundation calculations from Inc. 500|5000 data. *For an interactive version, please see: www.kauffmanindex.org.*

Figure 9

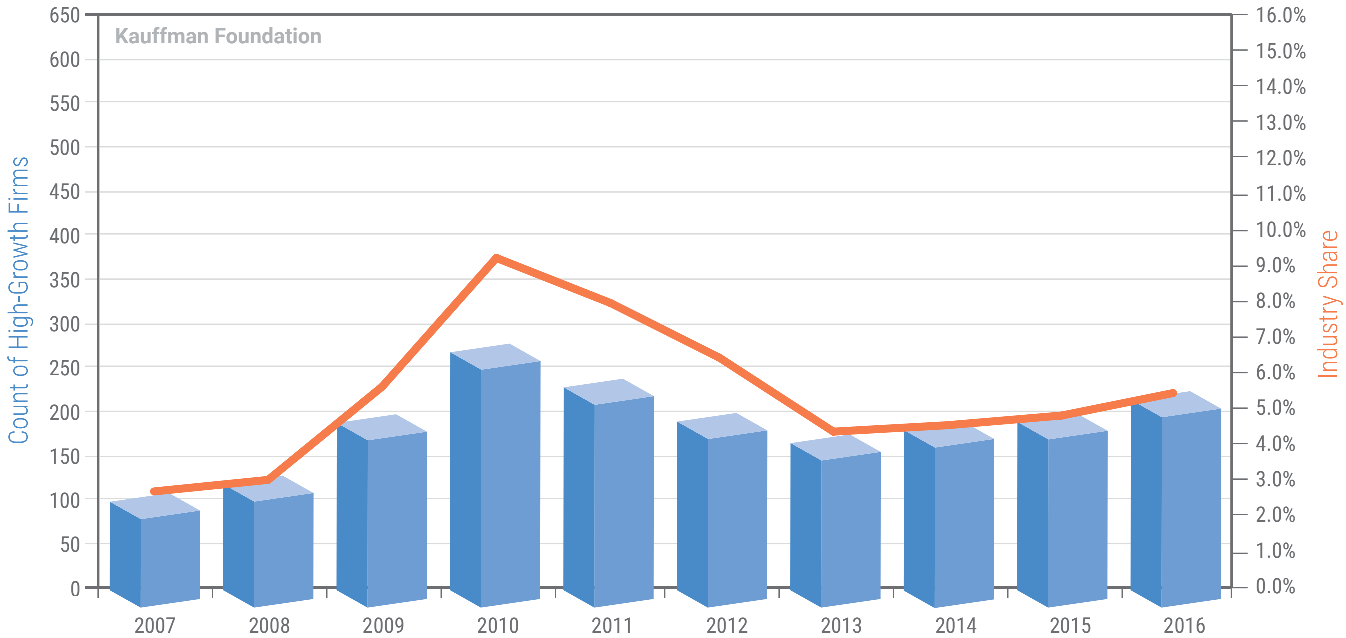
Software Industry Profile (2007–2016)–Ranked 5 in 2016



SOURCE: Kauffman Foundation calculations from Inc. 500|5000 data. *For an interactive version, please see: www.kauffmanindex.org.*

Figure 10

Government Services Industry Profile (2007–2016)–Ranked 6 in 2016



SOURCE: Kauffman Foundation calculations from Inc. 500|5000 data. *For an interactive version, please see: www.kauffmanindex.org.*

Appendix:
National Data, Select Industry Profiles, and Charts

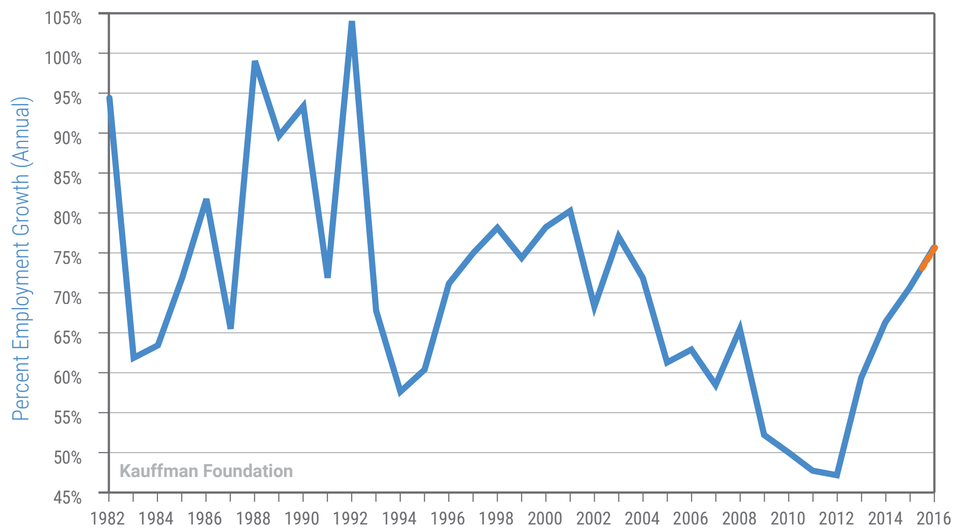
NATIONAL PROFILE

Rate of Startup Growth

2015 COMPONENT	2016 COMPONENT
70.59%	75.62%

Measures how much startups have grown as a cohort, on average, five years after founding—measured by change in employment.

Kauffman Foundation calculations from BDS. Yearly measure.

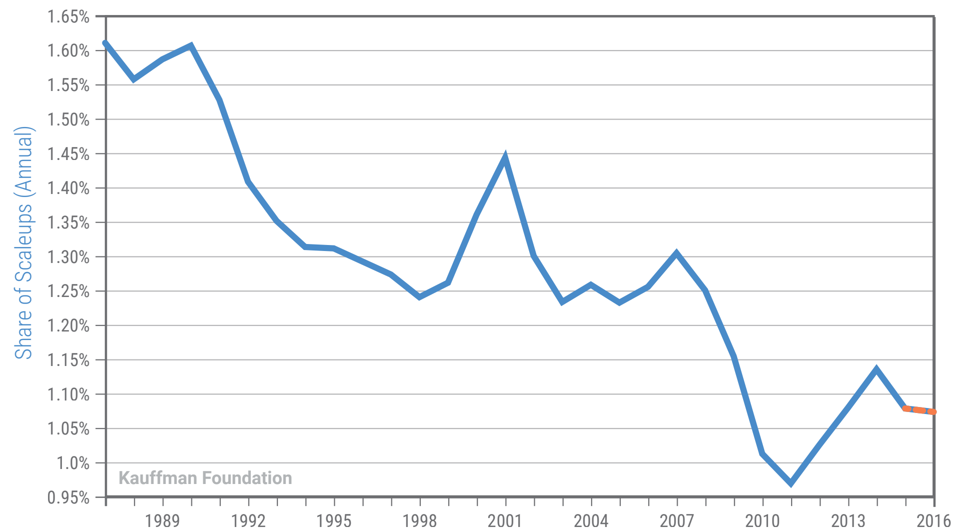


Share of Scaleups

2015 COMPONENT	2016 COMPONENT
1.08%	1.07%

Measures the number of firms that started small but grew to employ fifty people or more by their tenth year of operation as a percentage of all employer firms ten years and younger.

Kauffman Foundation calculations from BDS. Yearly measure.



High-Growth Company Density

2015 COMPONENT	2016 COMPONENT
79.3	79.1

Measures the number of private businesses with at least $2 million in annual revenue reaching three years of 20 percent annual revenue growth normalized by total business population.

Kauffman Foundation calculations from BDS and Inc. 500|5000. Yearly measure.

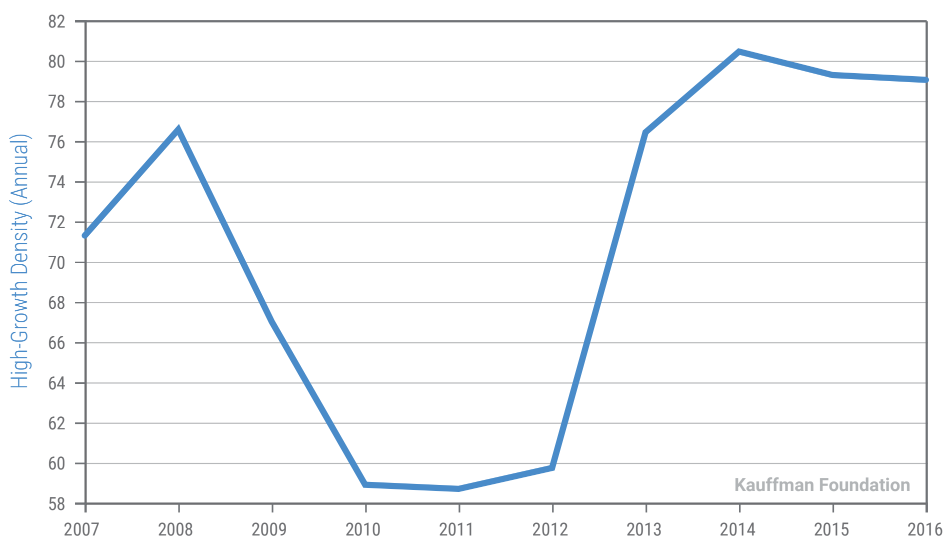
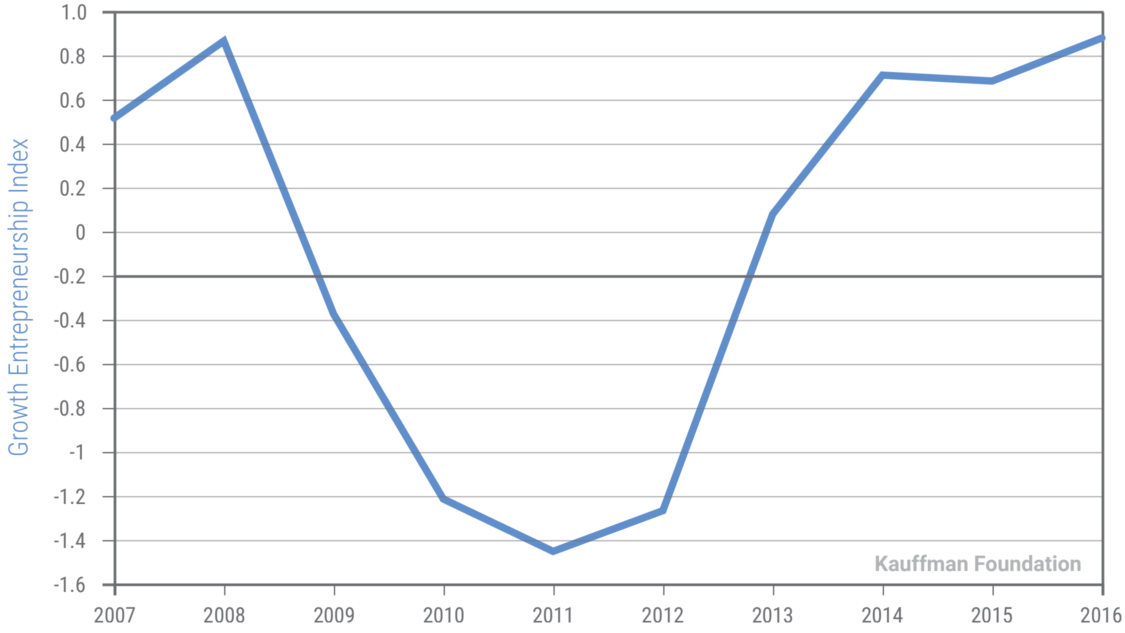


Figure 1

Kauffman Index of Growth Entrepreneurship (2007–2016)



SOURCE: Kauffman Index of Growth Entrepreneurship, calculations from BDS and Inc. 500|5000.
For an interactive version, please see: www.kauffmanindex.org.

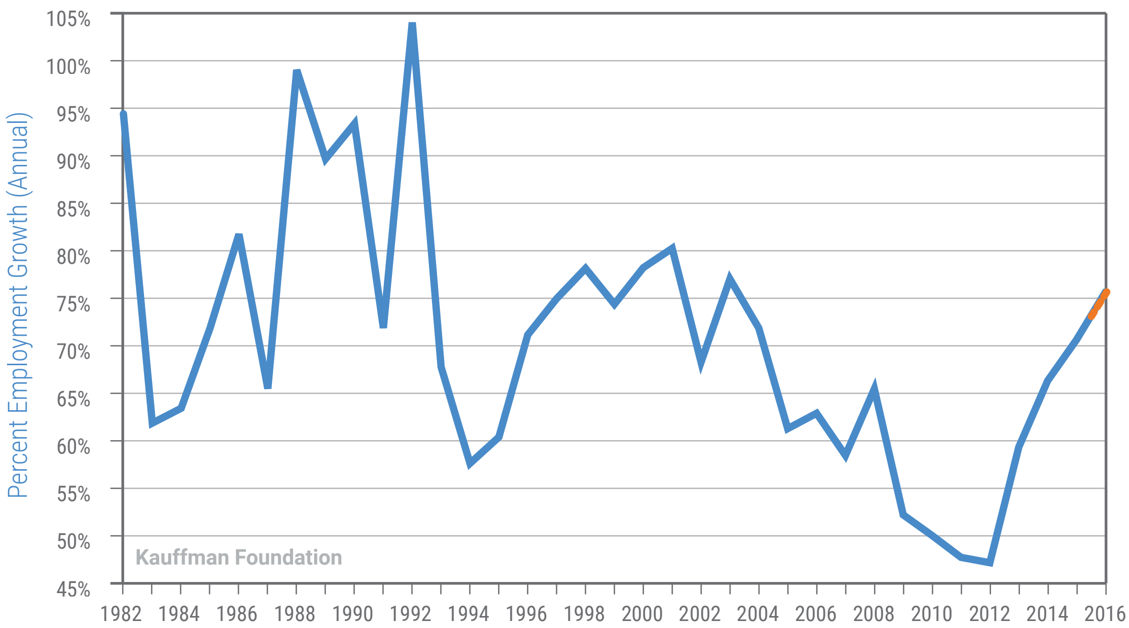
Table 1

Kauffman Index of Growth Entrepreneurship (2007–2016)

		Growth Entrepreneurship Components		
Index Year	**Index**	**Rate of Startup Growth**	**Share of Scaleups**	**High-Growth Company Density**
2007	0.51	58.42%	1.30%	71.30
2008	0.86	65.42%	1.25%	76.57
2009	-0.37	52.16%	1.15%	67.02
2010	-1.21	49.99%	1.01%	58.90
2011	-1.45	47.69%	0.97%	58.69
2012	-1.27	47.13%	1.03%	59.74
2013	0.08	59.28%	1.08%	76.43
2014	0.71	66.27%	1.14%	80.45
2015	0.68	70.59%	1.08%	79.28
2016	0.88	75.62%	1.07%	79.06

Figure 1A

Rate of Startup Growth (1982–2016)



SOURCE: Kauffman Foundation calculations from BDS. Yearly measure.
For an interactive version, please see: www.kauffmanindex.org.

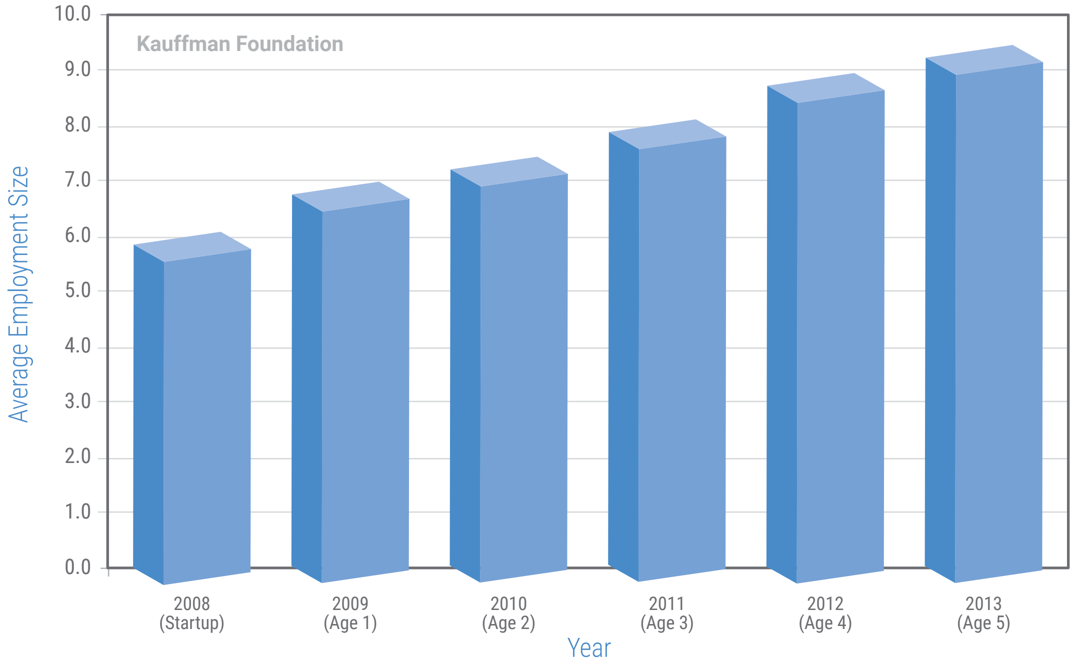
Table 1A

Rate of Startup Growth (1982–2016)

Year	Rate of Startup Growth	Year	Rate of Startup Growth
1982	94.37%	2000	78.18%
1983	61.82%	2001	80.21%
1984	63.39%	2002	68.24%
1985	71.83%	2003	76.99%
1986	81.70%	2004	71.81%
1987	65.45%	2005	61.24%
1988	98.99%	2006	62.85%
1989	89.62%	2007	58.42%
1990	93.33%	2008	65.42%
1991	71.83%	2009	52.16%
1992	103.99%	2010	49.99%
1993	67.72%	2011	47.69%
1994	57.58%	2012	47.13%
1995	60.35%	2013	59.28%
1996	71.11%	2014	66.27%
1997	74.92%	2015	70.59%
1998	78.10%	2016	75.62%
1999	74.33%		

Figure 1B

Average Size of Surviving Business by Number of Employees for Startups Founded in 2008 and Turning Five in 2013



SOURCE: Authors' calculations using the BDS.

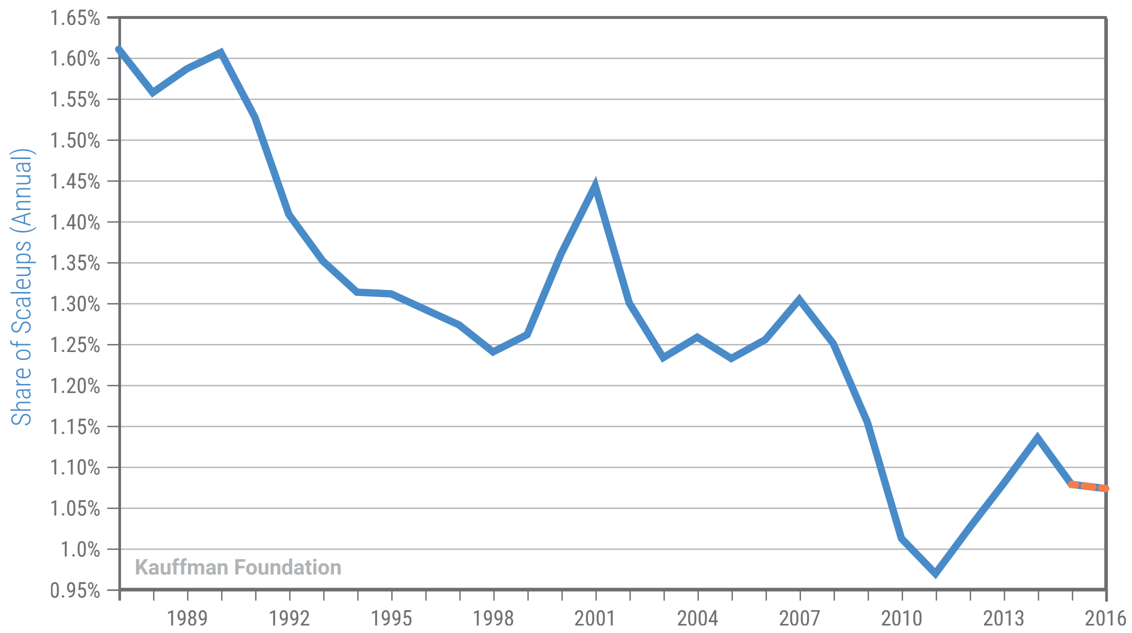
Table 1B

Average Size of Surviving Business by Number of Employees for Startups Founded in 2008 and Turning Five in 2013

Year	Average Employment Size of Surviving Business
2008 (Startup)	5.8
2009 (Age 1)	6.7
2010 (Age 2)	7.2
2011 (Age 3)	7.8
2012 (Age 4)	8.7
2013 (Age 5)	9.2

Figure 1C

Share of Scaleups (1987–2016)



SOURCE: Kauffman Foundation calculations from BDS. Yearly measure.
For an interactive version, please see: www.kauffmanindex.org.

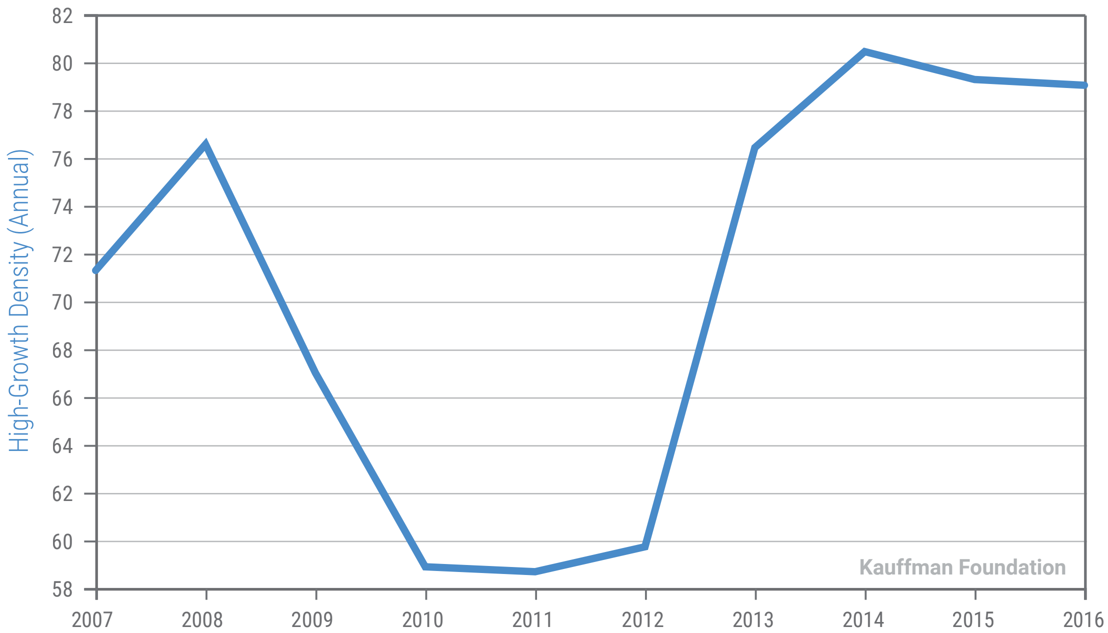
Table 1C

Share of Scaleups (1987–2016)

Year	Share of Scaleups	Year	Share of Scaleups
1987	1.61%	2002	1.30%
1988	1.56%	2003	1.23%
1989	1.59%	2004	1.25%
1990	1.60%	2005	1.23%
1991	1.53%	2006	1.25%
1992	1.40%	2007	1.30%
1993	1.35%	2008	1.25%
1994	1.31%	2009	1.15%
1995	1.31%	2010	1.01%
1996	1.29%	2011	0.97%
1997	1.27%	2012	1.03%
1998	1.24%	2013	1.08%
1999	1.26%	2014	1.13%
2000	1.35%	2015	1.08%
2001	1.44%	2016	1.07%

Figure 1D

High-Growth Company Density (2007–2016)



SOURCE: Kauffman Foundation calculations from BDS and Inc. 500|5000. Yearly measure.
For an interactive version, please see: www.kauffmanindex.org.

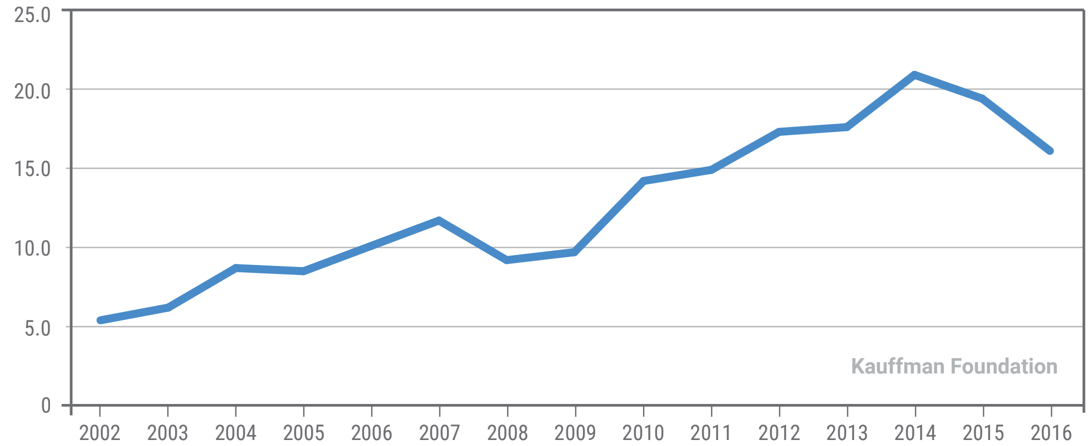
Table 1D

High-Growth Company Density (2007–2016)

Year	High-Growth Company Density
2007	71.30
2008	76.57
2009	67.02
2010	58.90
2011	58.69
2012	59.74
2013	76.43
2014	80.45
2015	79.28
2016	79.06

Figure 2

Venture Exits Density per 100,000 Employer Businesses (2002–2016)



SOURCE: Authors' calculations using National Venture Capital Association and Pitchbook data and the BDS.

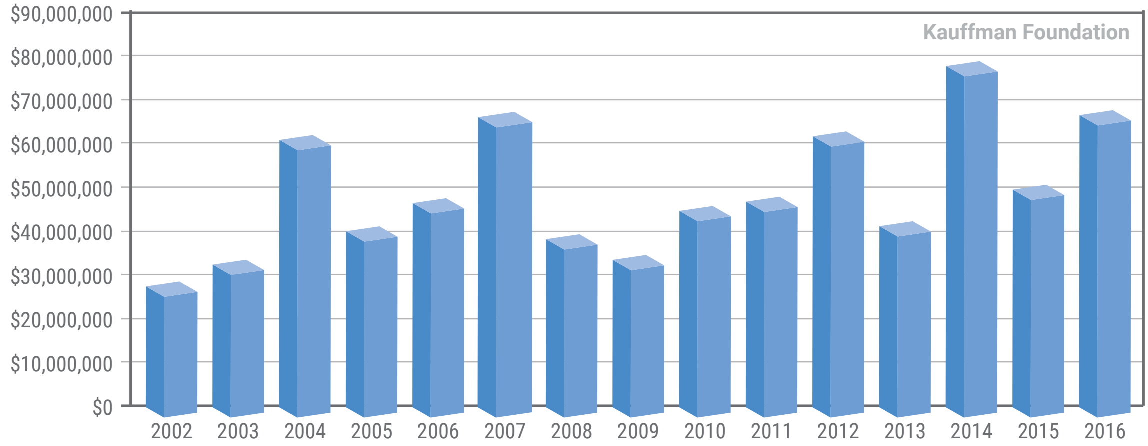
Table 2

Venture Exits Density per 100,000 Businesses (2002–2016)

Year	Exits Density Per 100,000 Businesses
2002	5.4
2003	6.1
2004	8.6
2005	8.5
2006	10.1
2007	11.7
2008	9.2
2009	9.7
2010	14.2
2011	14.9
2012	17.3
2013	17.6
2014	20.8
2015	19.4
2016	16.1

Figure 3

Average Size, Venture Exits (2002–2016)



SOURCE: Authors' calculations using National Venture Capital Association and Pitchbook data and the BDS.

Table 3

Average Size, Venture Exits (2002–2016)

Year	Average Size, Venture Exits
2002	$27,307,810
2003	$32,490,177
2004	$60,815,418
2005	$39,790,436
2006	$46,347,512
2007	$66,154,407
2008	$38,219,040
2009	$33,473,164
2010	$44,774,383
2011	$46,832,769
2012	$61,571,854
2013	$40,979,592
2014	$77,867,799
2015	$49,440,626
2016	$66,495,276

Table B | Top Five Industries with Highest Share of High-Growth Companies (2016)

Rank	Industry	High-Growth Companies	Share (%)
1	IT Services	524	13.1%
2	Advertising & Marketing	404	10.1%
3	Business Products & Services	350	8.8%
4	Health	320	8.0%
5	Software	280	7.0%

SOURCE: Authors' calculations from Inc. 500|5000 data.

HIGH-GROWTH COMPANY DENSITY

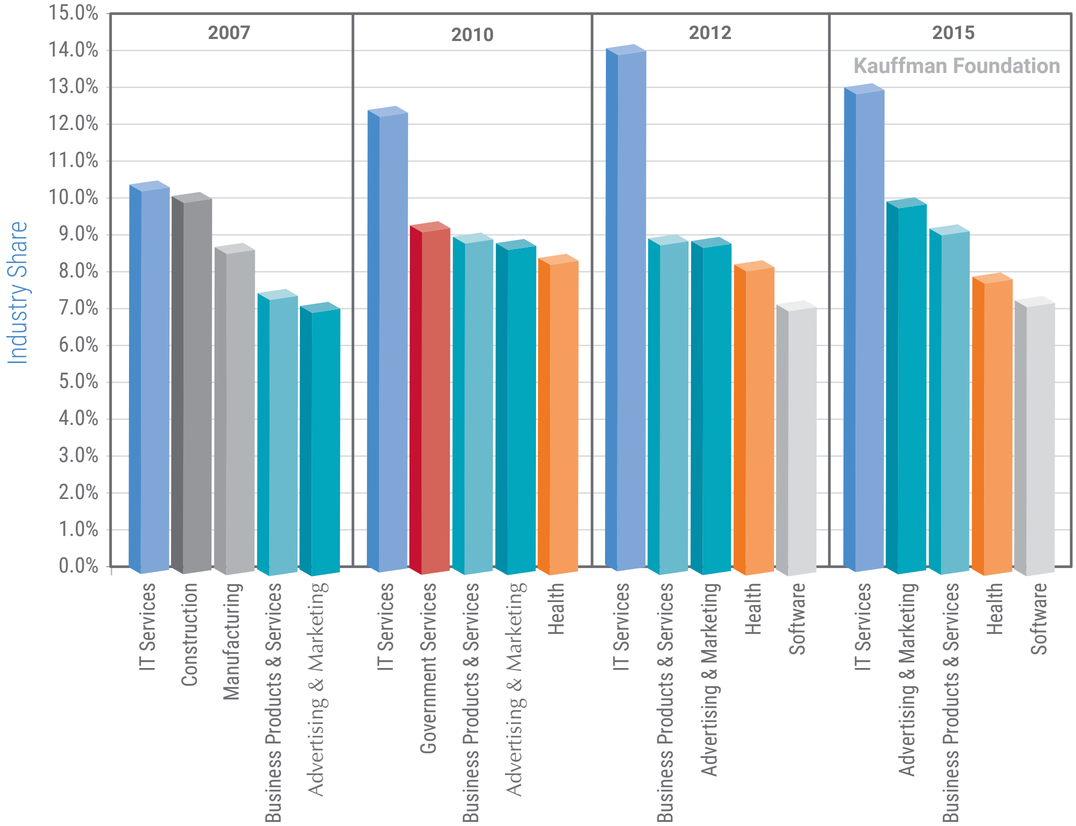
Table C | Industries by Share of High-Growth Companies (2016)

Rank	Industry	High-Growth Companies	Share (%)
1	IT Services	524	13.1%
2	Advertising & Marketing	404	10.1%
3	Business Products & Services	350	8.8%
4	Health	320	8.0%
5	Software	280	7.0%
6	Construction	221	5.5%
7	Government Services	218	5.5%
8	Financial Services	198	5.0%
9	Consumer Products & Services	190	4.8%
10	Real Estate	164	4.1%
11	Human Resources	141	3.5%
12	Retail	135	3.4%
13	Food & Beverage	120	3.0%
14	Logistics & Transportation	105	2.6%
15	Manufacturing	104	2.6%
16	Energy	80	2.0%
17	Telecommunications	71	1.8%
18	Security	62	1.6%
19	Education	60	1.5%
20	Insurance	58	1.5%
21	Media	50	1.3%
22	Engineering	48	1.2%
23	Travel & Hospitality	41	1.0%
24	Environmental Services	29	0.7%
25	Computer Hardware	25	0.6%

SOURCE: Authors' calculations from Inc. 500|5000 data.

Figure 4

Top Five Industries with Highest Share of High-Growth Companies (2007, 2010, 2012, 2015)



SOURCE: Authors' calculations from Inc. 500|5000 data. For an interactive version, please see: www.kauffmanindex.org.

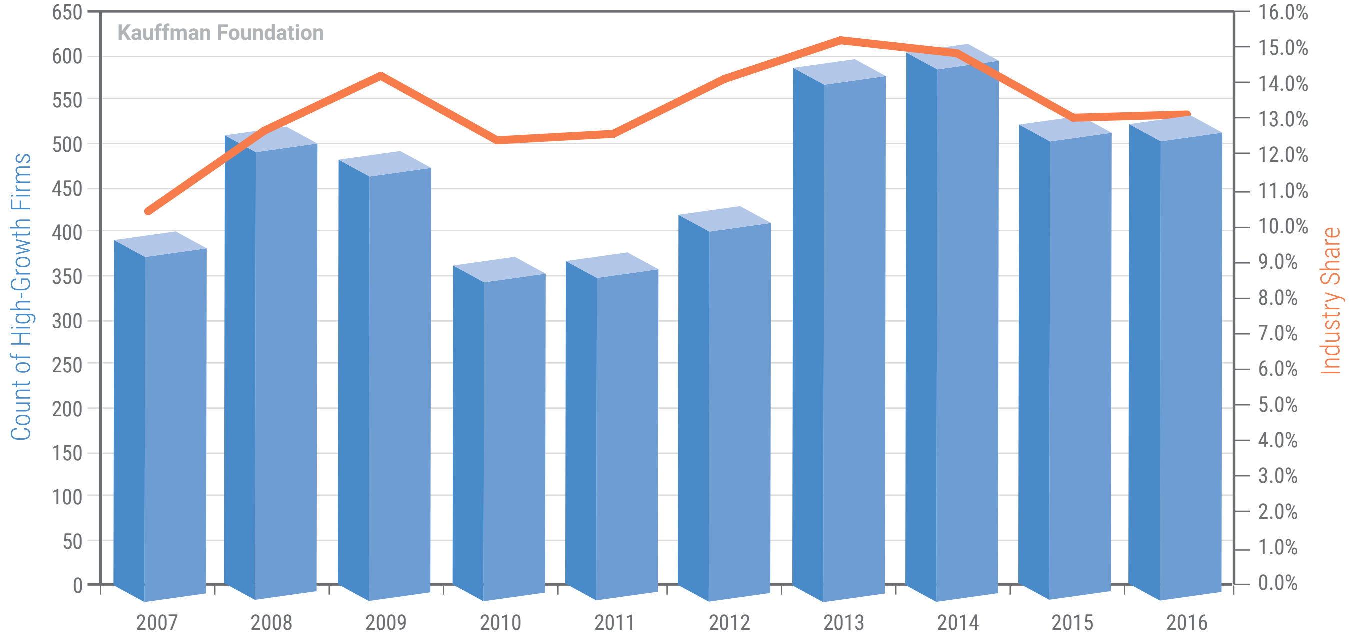
Table 4

Top Five Industries with Highest Share of High-Growth Companies (2007, 2010, 2012, 2015)

2007		2010		2012		2015	
Industry	Industry Share	Industry	Industry Share	Industry	Industry Share	Industry	Industry Share
IT Services	10.4%	IT Services	12.4%	IT Services	14.1%	IT Services	13.0%
Construction	10.1%	Government Services	9.2%	Business Products & Services	8.9%	Advertising & Marketing	9.9%
Manufacturing	8.7%	Business Products & Services	8.9%	Advertising & Marketing	8.8%	Business Products & Services	9.2%
Business Products & Services	7.4%	Advertising & Marketing	8.8%	Health	8.2%	Health	7.9%
Advertising & Marketing	7.1%	Health	8.4%	Software	7.1%	Software	7.2%

Figure 5

IT Services Industry Profile (2007–2016)–Ranked 1 in 2016

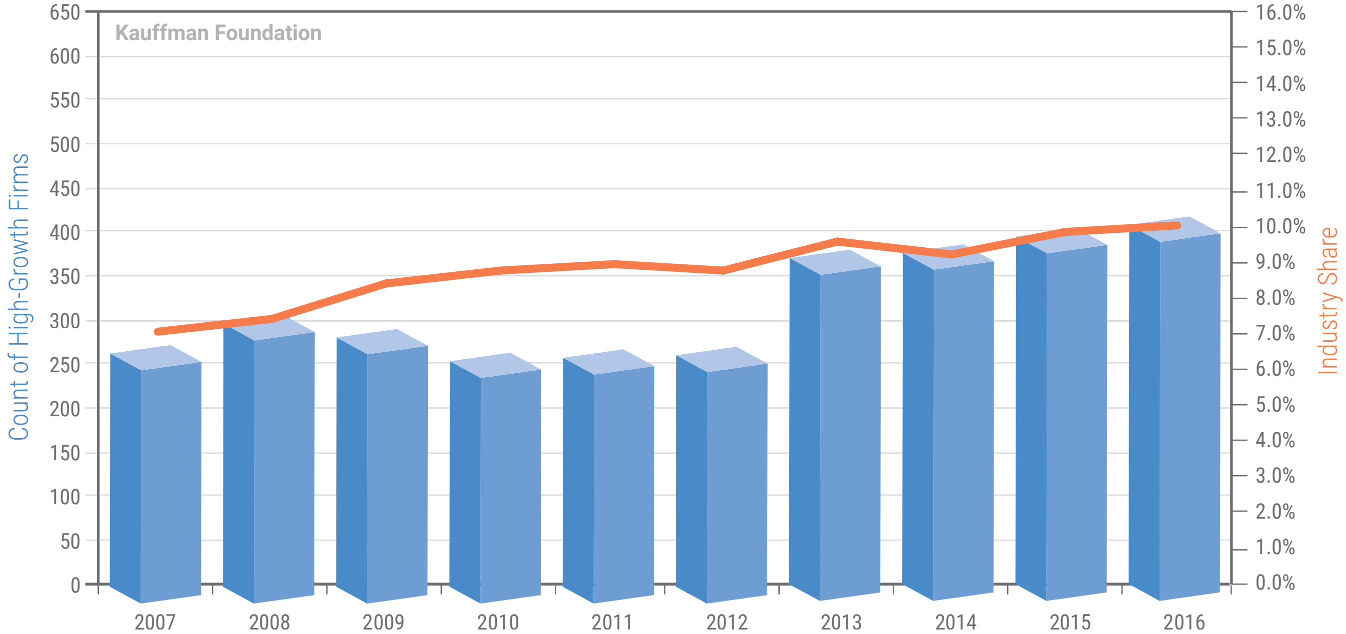


SOURCE: Kauffman Foundation calculations from Inc. 500|5000 data. *For an interactive version, please see: www.kauffmanindex.org.*

Table 5		
IT Services Industry Profile (2007–2016)		
Year	**High-Growth Companies**	**Industry Share**
2007	391	10.4%
2008	509	12.7%
2009	483	14.2%
2010	364	12.4%
2011	366	12.6%
2012	422	14.1%
2013	587	15.2%
2014	604	14.9%
2015	521	13.0%
2016	524	13.1%

Figure 6

Advertising & Marketing Industry Profile (2007–2016)–Ranked 2 in 2016



SOURCE: Kauffman Foundation calculations from Inc. 500|5000 data. *For an interactive version, please see: www.kauffmanindex.org.*

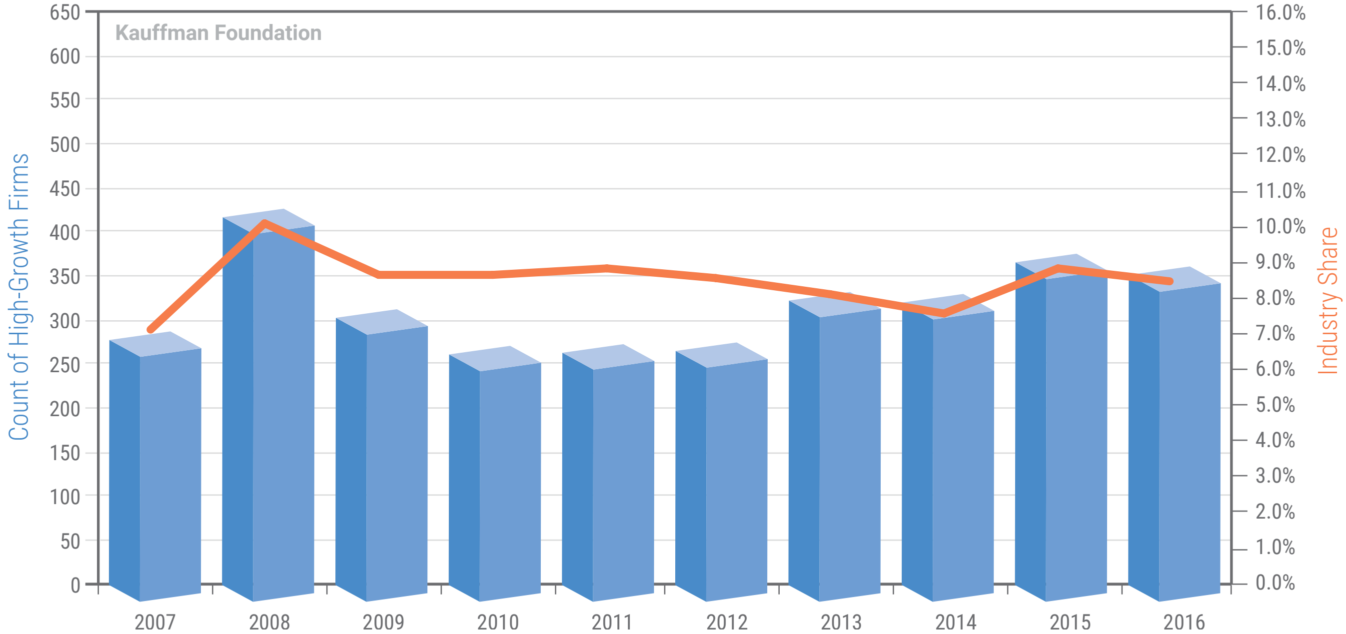
Table 6

Advertising & Marketing Industry Profile (2007–2016)

Year	High-Growth Companies	Industry Share
2007	267	7.1%
2008	299	7.5%
2009	286	8.4%
2010	258	8.8%
2011	262	9.0%
2012	265	8.8%
2013	372	9.6%
2014	376	9.2%
2015	397	9.9%
2016	404	10.1%

Figure 7

Business Products & Services Industry Profile (2007–2016)–Ranked 3 in 2016

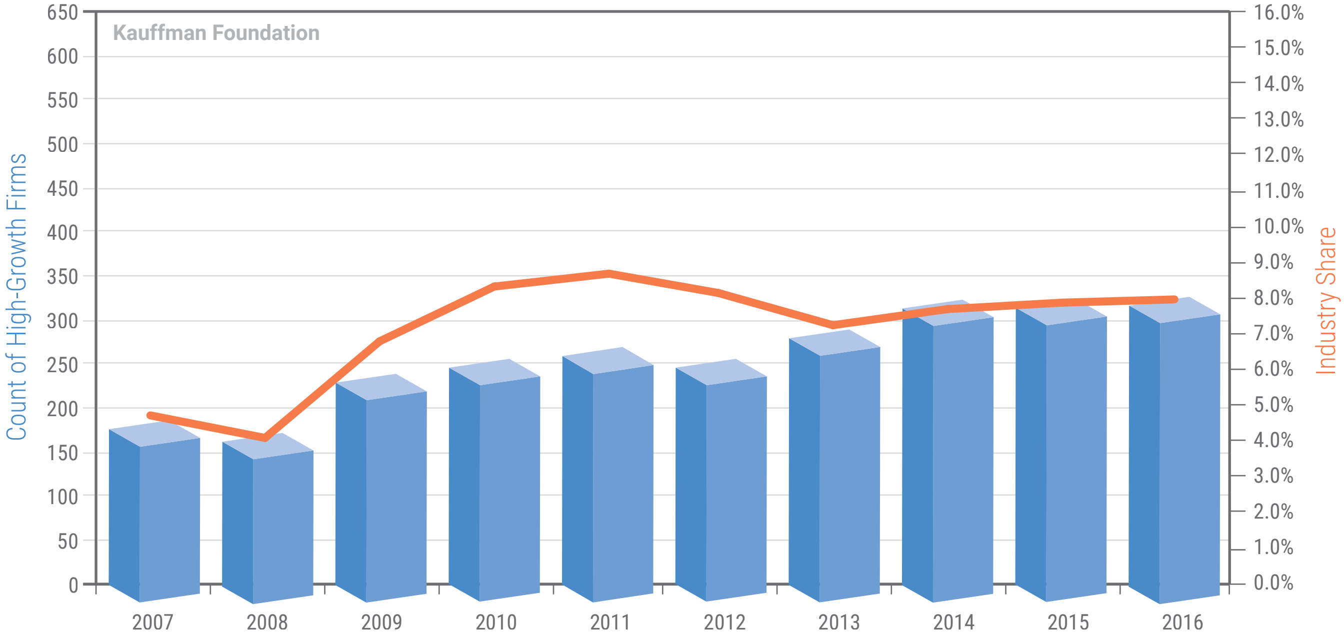


SOURCE: Kauffman Foundation calculations from Inc. 500|5000 data. *For an interactive version, please see: www.kauffmanindex.org.*

Table 7		
Business Products & Services Industry Profile (2007–2016)		
Year	**High-Growth Companies**	**Industry Share**
2007	280	7.4%
2008	418	10.4%
2009	304	9.0%
2010	263	8.9%
2011	265	9.1%
2012	267	8.9%
2013	326	8.4%
2014	320	7.9%
2015	367	9.2%
2016	350	8.8%

Figure 8

Health Industry Profile (2007–2016)–Ranked 4 in 2016



SOURCE: Kauffman Foundation calculations from Inc. 500|5000 data. *For an interactive version, please see: www.kauffmanindex.org.*

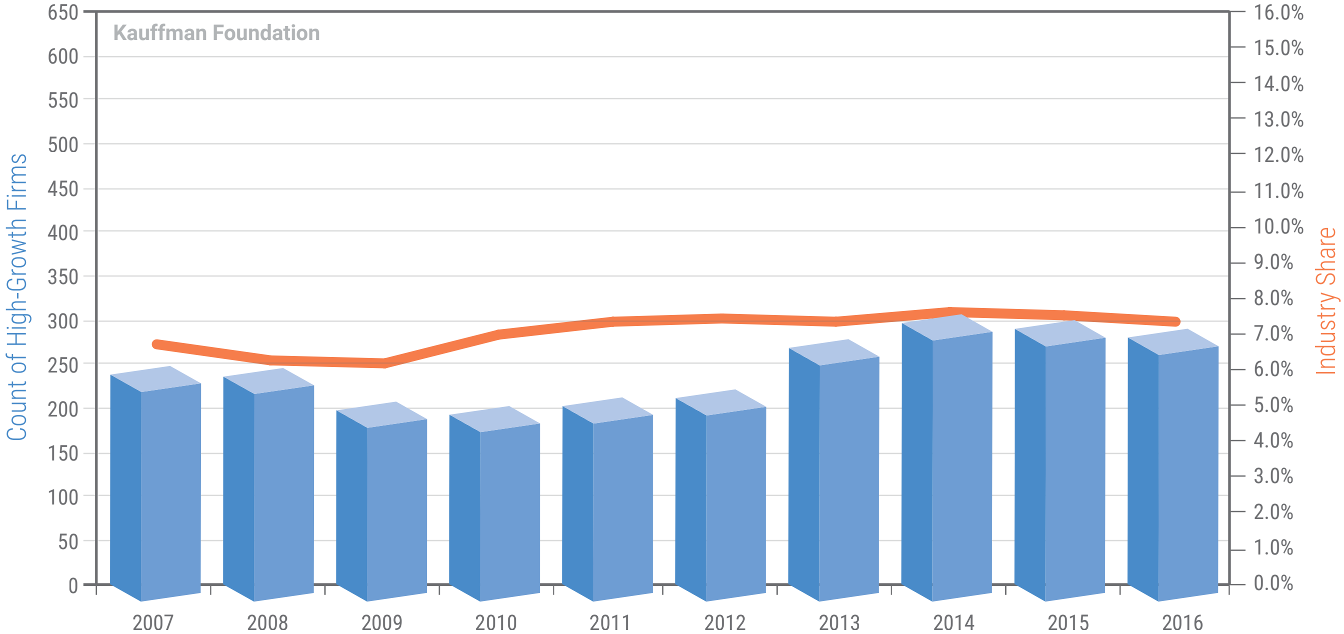
Table 8

Health Industry Profile (2007–2016)

Year	High-Growth Companies	Industry Share
2007	177	4.7%
2008	165	4.1%
2009	230	6.8%
2010	246	8.4%
2011	253	8.7%
2012	246	8.2%
2013	281	7.3%
2014	315	7.7%
2015	315	7.9%
2016	320	8.0%

Figure 9

Software Industry Profile (2007–2016)–Ranked 5 in 2016

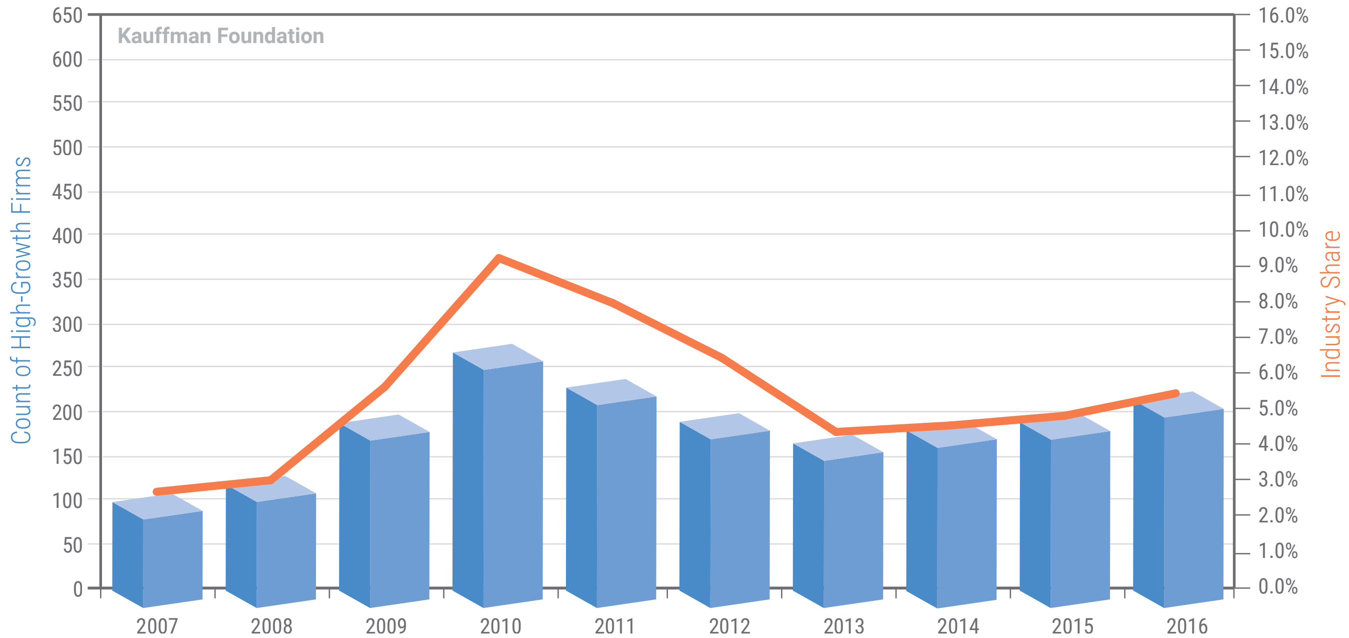


SOURCE: Kauffman Foundation calculations from Inc. 500|5000 data. *For an interactive version, please see: www.kauffmanindex.org.*

Table 9		
Software Industry Profile (2007–2016)		
Year	**High-Growth Companies**	**Industry Share**
2007	240	6.4%
2008	239	6.0%
2009	198	5.8%
2010	194	6.6%
2011	203	7.0%
2012	213	7.1%
2013	269	7.0%
2014	297	7.3%
2015	289	7.2%
2016	280	7.0%

Figure 10

Government Services Industry Profile (2007–2016)–Ranked 6 in 2016

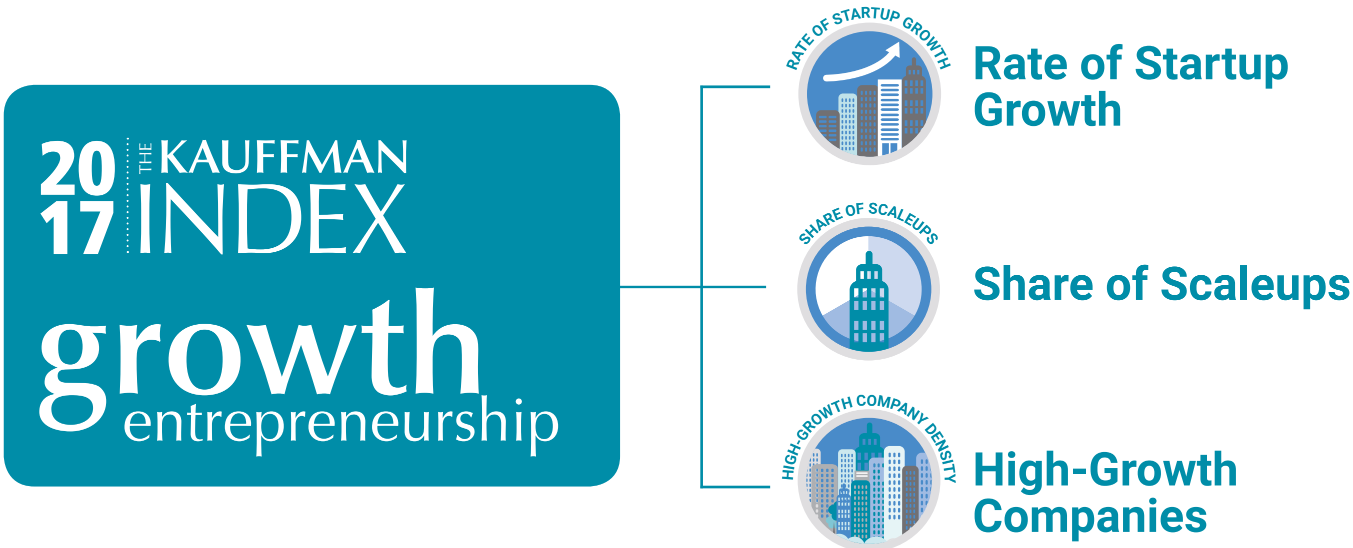


SOURCE: Kauffman Foundation calculations from Inc. 500|5000 data. *For an interactive version, please see: www.kauffmanindex.org.*

Table 10

Government Services Industry Profile (2007–2016)

Year	High-Growth Companies	Industry Share
2007	102	2.7%
2008	122	3.0%
2009	192	5.7%
2010	272	9.2%
2011	232	8.0%
2012	193	6.4%
2013	169	4.4%
2014	184	4.5%
2015	193	4.8%
2016	218	5.5%



Methodology and Framework

The Growth Entrepreneurship Index focuses exclusively on outputs associated with growth entrepreneurship—such as jobs and revenue—because the data currently available to measure inputs—such as venture capital and angel investment—remain somewhat fragmented and are not readily available across all geographies included in the Kauffman Index. Moreover, measurement of inputs may not capture the entire universe of high-growth firms because there are high-growth companies that do not have access to the inputs commonly associated with high-growth entrepreneurship or that are in non-tech industries (Motoyama et al. 2013; Ritter 2016; Motoyama and Danley 2012; Moreira 2015).

Many promising research efforts on entrepreneurial inputs are underway, including the Seed Accelerator Ranking Project, the Halo Report, Pitchbook, CB Insights, Crunchbase, Startup Genome, and the MIT Entrepreneurial Quality project. It is possible that future Kauffman Index reports may incorporate measures of entrepreneurship inputs.

Growth Entrepreneurship Index Components: Definitions and Data Sources

The Growth Entrepreneurship Index includes three components: Rate of Startup Growth, Share of Scaleups, and High-Growth Company Density. We provide detailed definitions, as well as discussions of the data sources and calculations for each of these components below.

1. Rate of Startup Growth

Definition. The Rate of Startup Growth component of the Growth Entrepreneurship Index is a yearly estimate that measures the average change in employment for a cohort of startups between the year of founding and the fifth year of operation. Startups are defined as all U.S. employer firms that are younger than one year old in a given year, regardless of industry.

Data sources. This measure uses U.S. Census Bureau data from the Business Dynamics Statistics (BDS). The BDS is a firm-level dataset constructed using administrative payroll tax records from the Internal Revenue Service (IRS). It covers all employer businesses in the United States (approximately 5 million businesses). The BDS data include numbers of firms tabulated by employment size, by firm age, and by geography (national, state, and metropolitan area). The BDS metro data geographic coverage is based on the Office of Management and Budget (OMB) definitions for metropolitan areas from December 2009.

Calculation. We calculate the Rate of Startup Growth by determining the percentage change between the average employment of all employer firms that were less than one year old in a given year and the average employment of the surviving firms in that cohort five years later.

Figure 1B below illustrates this calculation by cohort. The average U.S. startup that was founded in 2008 (and was, therefore, five years old in 2013) had 5.8 employees at founding, and the average U.S. startup that was founded in 2008 and survived until 2013 had 9.2 employees after five years of operation. The Rate of Startup Growth for 2013, then, was 58.5 percent—the percent change between 5.8 and 9.2.

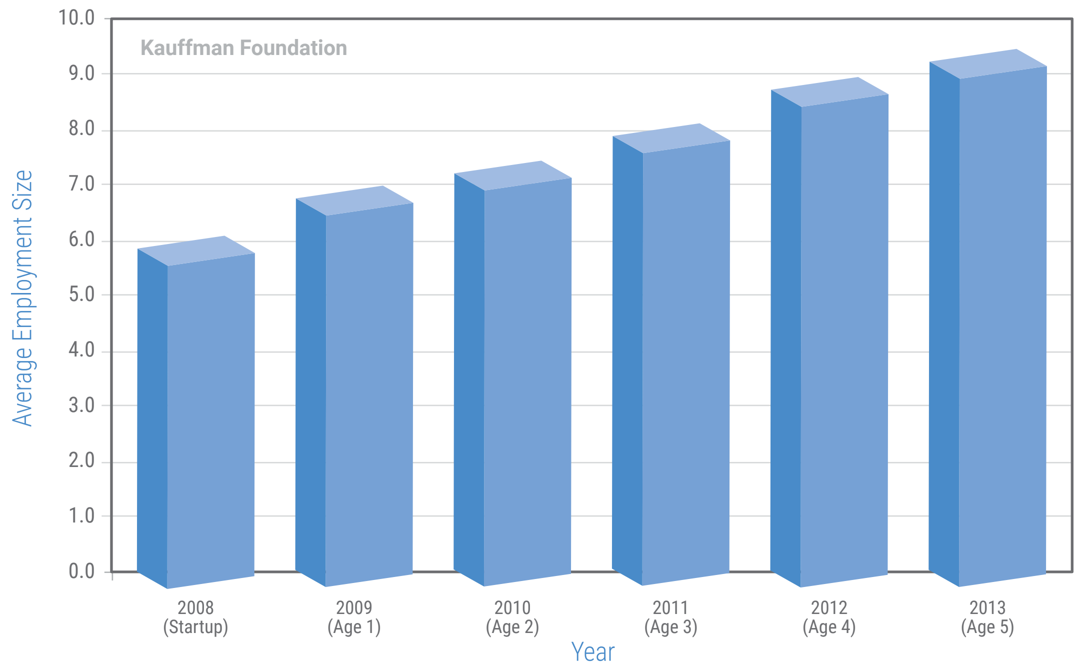
Nowcast estimates. Although the legacy version of the BDS data is comprehensive, including extensive firm data at the state and metropolitan-area levels and detailed firm size by firm age files, these data are only available from 1977–2014. There is, however, a second version of the BDS that is less comprehensive, but more recently released. These data, released September 20, 2017, are for 2015 and do not include any metropolitan-level data or firm size by firm age files. We use both the new and the legacy versions of the BDS to calculate the Rate of Startup Growth at the national level from 1982 (when the firms that started in 1977 turned five) to 2015. For 2016, we estimate the Rate of Startup Growth by taking a two-year moving average of the mean firm size by age five for 2014 and 2015, and we use that number to calculate the estimated Rate of Startup Growth for 2016. Please note that these nowcast estimates were only created at the national level; the Rate of Startup Growth figures for states and metros can only be calculated using the legacy version of the BDS and, therefore, only go up to the year 2014.

Limitations and bias. Although it would be ideal to examine average growth in employment within each firm, data limitations only make it possible to look across the entire cohort. As a result, the Rate of Startup Growth includes all new firms in the calculation of average size during their year of founding, but it only includes those firms that survive to five years in the calculation of average size during the fifth year of operation. Thus, this indicator only represents the change in employment across the whole cohort of new firms, which results in survivor bias. Employment and growth, presented here as an average, are typically more highly skewed among individual firms.

Because the BDS is based on administrative data covering the universe of employer businesses, sampling concerns like standard errors and confidence intervals are not applicable. Nonetheless, non-sampling errors still could occur. These could be caused, for example, by data entry issues with the IRS payroll tax records or by businesses submitting incorrect employment data to the IRS. These errors, however, are likely to be randomly distributed and are unlikely to cause significant biases in the data. Please see Jarmin and Miranda (2002) for a complete

Figure 1B

Average Size of Surviving Business by Number of Employees for Startups Founded in 2008 and Turning Five in 2013



SOURCE: Authors' calculations using the BDS.

discussion of potential complications in the dataset caused by changes in the administrative data on which the BDS is based.

Relationship to other research. The Rate of Startup Growth metric is based on previous work by the Kauffman Foundation that examined average company size by cohort over time in order to gauge U.S. job creation and the growth trajectories of new firms (Reedy and Litan 2011). Examining cohorts of new businesses is a common practice among researchers studying business demography. Just as cohorts of people born around the same time exhibit similar traits (think baby boomers or millennials), businesses are imprinted by the economic environment into which they enter (Moreira 2015). And just as we track the weight and height of children as they grow, it is helpful to take standard measures for a cohort of businesses as it ages in order to track the broad health of startups.

The downward trend in the Rate of Startup Growth (see Figure 1A) is consistent with other research based on Census Bureau data that has found falling levels of economic dynamism in the United States (Decker et al. 2015).

2. Share of Scaleups

Definition. The Share of Scaleups, the second component of the Growth Entrepreneurship Index, is a yearly proxy measure that calculates the percentage of all firms ten years old and younger that are scaleups—employer businesses over a year old and less than ten years old that started with fewer than fifty employees and grew to employ fifty or more people in their first ten years of operation.

Data sources. The Share of Scaleups is, like the Rate of Startup Growth, based on the BDS data described in the section above.

Calculation. We calculate this proxy number of scaleups by looking at all firms at least one year old and younger than ten years old with fifty employees or more and then subtracting all new firms founded in the past ten years that started out with fifty or more employees. We then calculate the Share of Scaleups as this number of scaleups divided by the total number of firms ten years old and younger, including those that are younger than one year old. The requirement that all scaleups are at least one year old ensures that we are focused on scaleups rather than startups. Our size cutoffs for medium and large firms come from the European Commission's definition (European Union 2003).

Nowcast estimates. The nowcasts created for the Share of Scaleups in the years 2015 and 2016 use the legacy version of the BDS data described above in the discussion of the nowcasts for Rate of Startup Growth, as well as establishment data from the Business Employment Dynamics (BED) data. We create a ratio of BDS firm data to BED establishment data to estimate the firms younger than one year old. We then calculate the percentage of firms that survive into the next year by age group. We also calculate the percentage of firms with fifty or more employees in each age group. For example, in 2015, we first use the ratio of BDS firms to BED establishments in 2014 to estimate age zero firms in 2015. We then use the percentage of firms that survived, by age group, from 2013 to 2014 to calculate the number of firms, by age group, that would survive from 2014 into 2015. Then, using the percentage of firms that have fifty or more employees in 2014, we can calculate the percentage of firms with fifty or more employees in 2015. A similar method, using 2014 ratios and 2015 data, is used to calculate 2016 nowcast data. The nowcast data then is used to estimate the Share of Scaleups for the United States in 2015 and 2016; no nowcasts were created for states or metros.

Limitations and bias. Potential errors and bias in the BDS dataset are described above.

3. High-Growth Company Density

Definition. High-Growth Company Density, the third and final component of the Growth Entrepreneurship Index, considers private firms more broadly—not just those companies that are young or small. It represents the number of private businesses that have at least $2 million in annual revenue and three years of 20 percent annualized revenue growth, normalized by the total population of employer firms.

Data sources. This component is based on two datasets; we use the BDS data described above for the total population of employer firms in the United States, and we use the Inc. 500|5000 annual list of high-growth companies to track high-growth firms (as measured by revenue).

Inc. magazine has compiled the Inc. 500 list every year since 1982, and *Inc.* added the Inc. 5000 list in 2007. To ensure wide geographic coverage of companies from year to year, we limit our analysis to the years after the implementation of the Inc. 5000 list in 2007. These firms are of all sizes and ages, and they come from a wide range of industries, from retailers to high tech. At the higher end of the distribution, some of these Inc. high-growth companies have multibillion-dollar revenues and explosive growth rates. In addition, some firms included on these lists have become Fortune 500 companies and experienced initial public offerings and/or acquisitions. Examples of companies on the Inc. 500|5000 list have included stereotypical high-growth tech firms, such as Facebook, Microsoft, Oracle, GoPro, and Zappos, as well as firms in industries that are less top-of-mind, such as Domino's Pizza, Planet Fitness, and Jamba Juice (Motoyama and Danley 2012). The data come from *Inc*. magazine and are presented here in aggregate format as a derivative report and product.

Calculation. To calculate the High-Growth Company Density, we start with the 5000-company list of high-growing private companies curated by *Inc.* magazine based on the applications it received through its selection process. We cut all firms that did not have at least $2 million in annual revenue and at least

20 percent annualized growth over a three-year period—which compounds to 72.8 percent after the three years. Applying this consistent growth threshold to the list allows us to track trends in the population of Inc. 500|5000 companies over time. This growth cutoff is based on the recommended levels put forward by the Organisation for Economic Co-operation and Development (OECD) Entrepreneurship Indicators project, and it typically excludes between 20 percent and 40 percent of the 5,000 firms on the Inc. list in a given year. After imposing this growth threshold, we look at fluctuations in the number of U.S. high-growth firms over time and by geography. We then normalize the number of companies by the population of total employer firms in a given geographic area, using BDS data. While the Inc. list goes up to 2016, the latest complete BDS data available are for 2014. As such, we normalize Inc. numbers from 2015 and 2016 against the total firm population in the BDS for 2014.

The High-Growth Company Density has no upper-bound restriction on firm age, but it requires firms to be at least three years old. As a result, the high-growth firms included in the data cover a wide range of ages, although the firms skew young. About 30 percent of high-growth companies are between five and seven years old, and approximately 60 percent are ten years old or younger.

Limitations and bias. There is some bias in the Inc. 500|5000 data, as businesses must seek out this designation. In addition, there may be other biases introduced in the data if there were undocumented changes in the selection criteria *Inc.* used over time. While Inc. firms arguably are not fully representative of all U.S. high-growth companies, the dataset is one of the few that allows us to track trends in revenue-focused high-growth companies over time and across the country at the national, state, and metro levels.

Relationship to other research. Despite their limitations, the Inc. 500|5000 lists have been utilized in entrepreneurship research for decades because of their strengths relative to alternative data sources (Bhide 2000). The High-Growth Company Density measure is based on previous Kauffman Foundation research that examines the geography of Inc. 500 companies over time (Motoyama and Danley 2012). It also is based on the entrepreneurship fluidity measure suggested by our colleagues Stangler and Bell-Masterson (2015).

Matching metro data. Matching BDS national and state numbers to Inc. data is straightforward because they define these geographic areas identically. Metropolitan areas, however, pose a challenge because definitions of metropolitan area may vary across datasets. To standardize these data, we used the OMB definitions for metropolitan areas from December 2009—the same definition used for the BDS dataset—in our calculations of High-Growth Company Density. Most of the Inc. 500|5000 data had state, zip, and street-level address information for the companies, and we used that data to match high-growth companies to metros in a multi-step process described below.

To calculate the number of high-growth companies using the Inc. 500|5000 data, we aggregated population data from the zip and street level up to the metropolitan level.

First, we created a crosswalk file connecting zip codes to counties, which makes it possible to then match zip codes to metros according to the OMB 2009 definitions. To create the zip-to-county crosswalk, we started with the Department of Housing (HUD) zip-to-county file. When a zip code crossed county boundaries, we matched it to the county with the highest ratio of addresses for that zip code. When there was a tie, we used the ratio of business addresses, residential addresses, and other addresses, in that order, to break the tie. When there was still a tie (only five zip codes in the country), we picked one county for a match. As the HUD crosswalk is extensive but not comprehensive, we complemented it by merging it with the University of Missouri zip-to-county data geocoder for zips not included in the HUD file. Similarly, when a zip code crossed county boundaries, we matched it to the county with the highest population for that zip code in 2010.

Second, we matched Inc. 500|5000 entries that contained zip code locations to the zip-to-county combined crosswalk file we created. Most of the companies in the data (approximately 94.4 percent of the 45,000 companies in the dataset included zip codes for companies) had zip location information that matched to a county.

Third, for the approximately 2,500 unmatched companies, we did two rounds of geocoding using the HERE API to identify zip codes for these firms. The first round used the structured street-level address and state for matching. Almost all 2,500 businesses were matched in that way, with only forty-nine businesses remaining unmatched. The second round of geocoding with the HERE API did a free text search on the location data available for these companies, and identified the locations of thirty-two of the forty-nine. Fourth, for the remaining seventeen companies, we manually searched for their zip codes on their websites and through internet searches.

For the Inc. 500|5000 companies that did not have zip code information, we used the metropolitan-area data provided by *Inc.* magazine to match companies to metropolitan and micropolitan areas. When that kind of location data was missing, we manually searched for the companies' locations on the internet.

Calculating the Growth Entrepreneurship Index

The Growth Entrepreneurship Index is an equally weighted index of the three normalized measures of business growth in the United States discussed above: Rate of Startup Growth, Share of Scaleups, and High-Growth Company Density. While two of these components use BDS data, which arguably are the most comprehensive time series on firms available for the U.S. economy, the third component offers a more balanced perspective on growth entrepreneurship by using a secondary source of data—Inc. 500|5000 lists.

The components we use for the Growth Entrepreneurship Index are all annual numbers across national, state, and metro-level indicators (e.g., there were no moving averages calculations). To create a comparable scale for the three measures in the Growth Entrepreneurship Index, each of these measures is normalized by subtracting the mean and dividing by the standard deviation for that measure (i.e., creating a z-score for each variable). We use national annual numbers from 2007 to 2016 to calculate the mean and standard deviation for Rate of Startup Growth, Share of Scaleups, and High-Growth Company Density. The same normalization method is used for all three geographic levels—national, state, and metropolitan area—to ensure comparability and consistency over time.

The methodology for calculating the Growth Entrepreneurship Index was updated this year due to the new nowcast estimates we created for the Rate of Startup Growth and Share of Scaleups for 2015 and 2016 in this year's study. In the 2016 Growth Entrepreneurship Index report, the Rate of Startup Growth and Share of Scaleups were based on data that only went to 2013, while the High-Growth Company Density component was based on data that went up to 2015. As we were working with data from varied time periods for that study, it made the most sense to create an aggregate measure and assign the most recent data point to 2016, the year of its publication. Since we were able to create nowcasts at the national level for Rate of Startup Growth and Share of Scaleups this year, we have 2016 data for each component (with the slight exception of the denominator for the High-Growth Company Density)—and, thus, it is most logical to make the aggregate figure that is based on 2016 data the 2016 data point.

The graphs of the Rate of Startup Growth and Share of Scaleups over time, then, are identical in this report to those in the previous report, except that they include three additional years of data (Census has released 2014 data, and we have estimates for 2015 and 2016).

The graph for the overall Growth Entrepreneurship Index figure, however, changes slightly because the composite measure combines data for all components based on underlying data for the same year (whereas these components were based on data for different years in last year's report). Last year, for example, the composite measure for 2016 included Rate of Startup Growth and Share of Scaleups components that were based on 2013 BDS data and a High-Growth Company Density component that was based on 2015 Inc. data. In this report, the composite measure for 2016 is based on 2016 data for each component, using nowcasts for two components. The trends in the Growth Entrepreneurship Index over time overall, however, are largely similar in this year's report to those in last year's report.

We recognize that growth entrepreneurship can be defined and measured in multiple ways. See, for example, Siegel et al. (1993); Birch and Medoff (1994); Kirchhoff (1994); Stangler (2010); Kedrosky (2013); and Guzman and Stern (2016). We also understand there are other approaches to the concept, and we welcome conversations on the topic as we continue to explore indicators of growth entrepreneurship.

Advantages Over Other Possible Measures of Entrepreneurship

The Growth Entrepreneurship Index has several advantages over other possible measures of growth entrepreneurship activity based on household or business-level data. We chose to use two distinct primary datasets: one based on all employer businesses (BDS) and the other based on the fastest-growing private companies in the United States (Inc. 500|5000 lists). These datasets allow us to study private growth companies in their earliest years, when only the government is likely to be aware of them, as well as at later stages of their development. These data are also optimal for our focus on outputs of growth entrepreneurship instead of inputs—thus capturing realized growth. These datasets have complementary strengths that make this Index a robust measure of growth entrepreneurship.

There are other strong, available measures of growth and growth potential for startups that were not referenced here because of certain tradeoffs—such as lack of yearly data or lack of availability for all fifty states or for metropolitan areas. Guzman and Stern (2016), for instance, while very helpful, has indicators that are not yet available for the geographic coverage we sought (i.e., all states and the country's forty largest metros).

Rate of Startup Growth and Share of Scaleups

The first two components of the Growth Index—Rate of Startup Growth and Share of Scaleups—both use BDS data, which present several benchmarking advantages. First, the BDS is based on administrative data covering the overall employer business population. As such, it has no potential sampling issues. Second, it has detailed coverage across all levels of geography, including metropolitan areas. Third, it provides firm-level data, rather than just establishment-level data. And fourth, it provides detailed employment level and age breakdown of firms, allowing us to clearly identify firms by age and size.

The BED dataset from the Bureau of Labor Statistics is similar to the BDS data. We chose not to use it for this report because of two distinct advantages we see in the BDS over the BED. First, the BDS tracks firm-level data, as opposed to the establishment-level data tracked by the BED. Second, the BED does not have metropolitan-level data available, while BDS data are available at our three geographic levels. Because the BED tracks establishments rather than firms, the BDS numbers are different than the BED numbers. Nonetheless, the trends in the two datasets move largely in tandem and usually point in the same direction.

High-Growth Company Density

The High-Growth Company Density measure is based off one of the oldest, continuous rankings of growth companies in the United States: the Inc. 500|5000 lists.

While the U.S. government has produced a time series documenting growth companies at the national level through the Organisation for Economic Co-operation and Development's Entrepreneurship Indicator Project, this time series is relatively short, covering only a few years, and is not currently available at the subnational level. In our search for an alternative data source, we also considered the National Establishment Time-Series dataset or other Dun & Bradstreet-based alternatives. These datasets, however, are not as timely as the Inc. lists and are not publicly available.

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Notes

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