INNOVATION CASINO

Grow Digital Revenue with an Ecosystem Innovation Fund

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INTRODUCTION

THE INNOVATION CASINO

THE "INNOVATION CASINO" METAPHOR

You might be wondering: What is a casino doing in a book about corporate strategy? The smell of all-you-can-eat shrimp, the clicking of a roulette wheel—these images are probably not what you had in mind when preparing your company's 80-page strategy deck. Yet, the likelihood of any strategy going to plan is set by odds, often as slim as the odds of players winning in a casino.

This book uses the metaphor "innovation casino" to describe the odds of generating financial returns from innovation so you can beat them. For decades, vertically integrated firms have made high-stakes bets on innovation. However, in the innovation casino it is the *players* who bet big. Players think they will beat the odds, but few do. Fortunately, by taking an honest look at your odds, you can retool your approach to win more frequently.

Large firms have a unique opportunity to improve their odds in the innovation casino with an emerging business model called digital ecosystems. Digital ecosystems give large firms the opportunity to make thousands of bets on innovation, which is playing like the *house*. Each chapter in this book provides a "house strategy" to fund innovation in digital ecosystems: 1) Fund start-ups instead of acquiring companies; 2)

Master the odds to invest in start-ups; 3) Recoup principal with 100X more bets than VC; and 4) Standardize to deliver gains from overall performance. Together, these house strategies form a new funding model, which I call an ecosystem innovation fund, or EIF. As we will see, an EIF is a hybrid of venture capital and the US government's Small Business Innovation Research grant program (SBIR). EIFs combine the best from both models to create a new vehicle for large companies to invest in innovation in their digital ecosystems.

Peering into the hazy future, I see a reversal of the debt and tax trends of the last decade. As you will read in the next chapter, cheap debt and low taxes helped pay for companies' bets on innovation in the 2010s. Companies chased top line growth with acquisitions, and productivity was an afterthought. When borrowing costs and taxes increase, companies will need to stop chasing growth at all costs and start chasing productivity. To become more productive, big businesses will need to resolve a paradox: the departments that hold down risk so companies can scale (HR, finance, legal, brand, compliance, etc.) also hold down innovation. Constrained by their organizations, large firms have historically been able to make just a few bets at a time on new products, services, and processes. This explains why companies have operated like players in the innovation casino. The solution to these organizational challenges lies in digital ecosystems.

BECOME THE HOUSE WITH A DIGITAL ECOSYSTEM

Like the "app store" on your phone, a digital ecosystem is a supply chain for data and digital services that are delivered over a platform. Digital ecosystems are made possible by the digital transformation that occurred over the last decade. Companies in nearly every industry have invested in digital transformation technologies like Application Programming Interfaces (APIs), Internet of Things (IoT) sensors, and software platforms. Wells Fargo built a set of APIs that *Intuit Quickbooks* uses to help you

balance your checkbook (Crosman, 2017). *Square* uses Wells Fargo APIs when you swipe your credit card at your local coffee shop ("Commercial Entity Agreement"). A top US railroad uses a camera based IoT sensor that scans trains for damage and open latches ("Integrated Camera") when the trains come into the yard. Thanks to APIs and IoT sensors, companies are sitting on mountains of data around production and consumption. This data is essential for helping customers, suppliers, and distributors boost productivity. The platforms where this data is exchanged form the foundations of digital ecosystems. This idea is also referred to as the "platform economy."

A digital ecosystem has three components: (1) a platform, (2) network effects, and (3) market expectations of continued growth (Valdez-de-Leon, 2019). Some of the most valuable companies coming out of the last decade such as Facebook, Apple, Google, Amazon, and Alibaba check all three boxes. These companies have access to data and can monetize it through their platforms. They enjoy low customer acquisition costs due to network effects. Their customers and partners expect them to be around for a long time, which makes it difficult for their competitors to take market share (Sengupta et al., 2019). Technology research firm IDC predicted that "by 2023, 60% of the Global 2000 firms will have a digital developer ecosystem with thousands of developers, and half of those enterprises will drive 20% or more of digital revenue through their digital platforms" (Gens, 2019). Why would thousands of developers build on your platform versus that of the competition? In the platform economy, success boils down to who has the strongest network effects and market expectations of continued growth—in other words, who has the strongest digital ecosystem.

The Apple App Store is an example of a digital ecosystem with strong network effects and market expectations of growth. At the end of 2019, the Apple App Store had 1.84 million apps (Clement, 2020). Apple is playing the innovation game like the house because it only makes a handful of the apps that reside on its platform. The rest of the 1.84 million apps

were built by developers, and Apple reaps the financial rewards by housing them. Apps contributed to a 13% year-over-year growth rate for Apple's services segment, the second largest revenue segment behind iPhones, at the end of the year in 2019 (Spangler, 2020). Meanwhile, at the end of 2019, BlackBerry's app store closed its doors. Called BlackBerry World, the app store launched in 2009, only nine months after Apple's. When BlackBerry World launched, Apple already had 25,000 iPhone apps with nearly 1 billion downloads ("BlackBerry World"). BlackBerry developed a rival platform, but it couldn't rival the network effects Apple was generating between users and developers. As time went on, market expectations dwindled as it became harder for developers and customers to bet that BlackBerry World would catch up.

How can you help your company's digital ecosystem resemble that of Apple and not of BlackBerry? First, ask how you can improve your core product by 10X. Google calls this "10X thinking," and writes, "True innovation happens when you try to improve something by 10 times rather than by 10 percent" ("Creating a Culture of Innovation"). You need 10X innovation to give customers reasons to pay a premium and remain loyal in a competitive market. Yet, bureaucracy is designed to prevent 10X innovation. To get departments like engineering, marketing, sales, compliance, and finance on board with a transformative idea, you need to work on something everyone can get their heads around, which is your core product. Find the core product that built your company into what it is today. Then, focus everyone's efforts, starting with the CEO, on making that product 10X better.

Apple shows us the way. The company produces a handful of core products; independent developers tackle everything else. The lesson from Apple is to improve your core product by 10X and turn it into a platform for your digital ecosystem. For example, the iPhone was a 10X-better smart phone that became the platform for the App Store. App ideas that might have been a distraction for Apple became opportunities for other

companies. Remember Zynga? The company built a video game empire on top of the iPhone. Zynga received investment from the iFund, a $200 million venture capital fund for iPhone apps (Perlroth, 2011). The iFund is an inspiration for the EIF model in this book. Venture capital firm Kleiner Perkins fundraised and managed the iFund while Apple provided market research and support ("iFund"). By opening up the iPhone to developers and assisting Kleiner Perkins, Apple played the innovation casino like the house. Your company can do similarly by deploying the strategies in each chapter of this book.

CALCULATE YOUR ODDS AND BEAT THEM

There are two sources of inspiration for this book. The first is the metaphor for the innovation casino. The metaphor stems in part from the book *Strategy Beyond the Hockey Stick*, published by three partners at consulting firm McKinsey & Company in 2018. Their book on corporate strategy was based on a dataset of 3,925 of the largest-revenue, non-financial companies. Their data revealed that figuring out your odds of success—and improving them while there is still time—is key to generating economic profit (Bradley, Hirt, and Smit, 2018). Could a similar, odds-based approach be used when funding innovation? The above question led me to seek a data set that measured financial returns from investments in innovation. The largest such data set I found was historical US venture capital fund performance from *PitchBook*. In Chapter 2, we'll use this venture capital data set to reveal the odds that players face in the innovation casino. The house strategies in this book are designed to help you overcome players' odds.

The second inspiration for this book might come from a surprising source: a government program. After all, a government program is not the first entity most people think of when it comes to innovation. Yet, the Small Business Innovation Research program (or SBIR for short) has helped catalyze nearly 70,000 patents, 700 publicly traded companies, and $41

billion in venture capital investments since 1982. Notable SBIR alumni include 23andMe, Symantec, and Qualcomm (Rozansky, 2019). Funding for SBIR comes from eleven government agencies that set aside 3.2% of their research and development budgets for grants ("About SBIR"). The US government gets its money back when SBIR-funded businesses generate income and pay taxes. SBIR is the original house in the innovation casino. Similar to how SBIR funds innovation in the US economy, your firm can fund start-ups in your digital ecosystem.

The house strategies in this book transfer the approach of SBIR to corporate venture capital, albeit with a twist. What the SBIR model is missing are straight-forward ways to recoup principal and generate a return on capital. With these in place, you can use outside investment instead of your firm's own cash. For this piece of the puzzle, we look to venture capital. I coined a term for this hybrid funding model: an ecosystem innovation fund, or EIF. EIFs can help you incentivize start-ups to innovate on your platform. Your EIF can encourage stronger network effects and market expectations for your platform, turning it into a bonafide digital ecosystem. Your EIF should look nothing like the SoftBank Vision Fund, a player in the innovation casino that made huge investments in a handful of unicorn companies. Instead, your EIF would be most compatible with a new generation of start-ups called "zebras." Unlike the capital-intensive, unicorn start-ups that received investment from SoftBank, zebras are capital-lite and more resourceful. Zebras are likely to stick around if your ecosystem can provide them with steady top-line and bottom-line growth opportunities. With the amount of cash it would take to bet on a handful of unicorns, you can incentivize hundreds of zebras to build new products and services that extend your platform. This book gives you the funding strategies to motivate zebra start-ups to build in your digital ecosystem, so your large firm can play the innovation casino like the house.

CHAPTER ONE

FUND START-UPS INSTEAD OF ACQUIRING COMPANIES

Vertical integration has been overdone. This house strategy is about how large companies can grow organically in the new, platform economy by focusing on their core assets and funding start-ups to build non-core innovations.

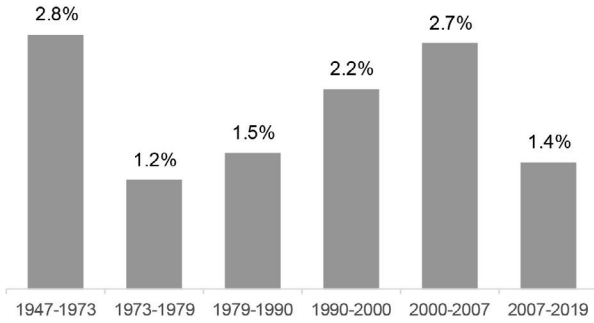
THE CURRENT PARADIGM AND THE PROBLEM OF CORPORATE DEBT

It is time for large companies to grow organically. To understand why, we look to the financial paradigm of the last decade and the problem of corporate debt. According to hedge fund magnate Ray Dalio, decades are marked by paradigms that shape market relationships. Perhaps due to human nature, people often push these paradigms to their limits. The paradigm that follows tends to move in the opposite direction from the one that came before. For example, the 1970s were marked by low productivity growth and high inflation. The behaviors of investors, governments, consumers, and businesses during the 1970s gave way to a new paradigm of higher growth and lower inflation in the 1980s (Dalio, 2019). We are now exiting the paradigm of the 2010s, which was marked by cheap debt and low productivity growth.

During the 2010s, the US Federal Reserve and central banks around the world lowered interest rates and began quantitative easing, the process by which bonds are bought to add liquidity to the financial system. Although low interest rates and quantitative easing started as a response to a liquidity crisis in 2008 and 2009, these practices continued into the next decade even after the liquidity crisis was resolved. Did the real economy ever recover? Growth of output per worker (or "productivity") slowed to 1.4% for the 2007-2019 period ("Labor Productivity"). This is the second lowest period of productivity growth since the stagflation of the 1970s, although you would not guess it if you looked at the stock market.

CHART 1: Labor productivity change for nonfarm businesses

Measures the goods and services, or output, produced per hour by all persons. This chart shows the average annual percentage change in labor productivity between 1947 and 2019.



Source: Data from "Labor Productivity and Costs: Productivity change in the nonfarm business sector, 1947-2019," US Bureau of Labor Statistics, 2020. bls.gov/lpc/prodybar.htm, (Jun. 1, 2020).

The stock market boomed during the 2010s. At the start of the 2010s, assets like stocks and real estate were discounted due to the preceding liquidity crisis. Investors who bought at the beginning of the decade began to realize gains. This gave other investors confidence to jump in. Asset

prices rose, but rising asset prices did not translate into inflation in the real economy. Wages stagnated, and interest rates were held down by the US Federal Reserve and other central banks to stimulate employment (Dalio, 2019). With interest rates low and asset prices on the rise, investments that produced income, or yield, became harder to find. Investors seeking yield often took to the corporate bond market. On the other side of many bond transactions were large companies raising money to acquire top line growth.

For big business, the strategy was often to borrow at single-digit interest rates and acquire companies with double- or triple-digit growth rates of revenue or users. Walmart provides a useful case study. In 2016, Walmart acquired Jet.com. It paid $300 million in shares and $3 billion in cash for the company that was then one year old. Four years and $2 billion in losses later, Walmart is shutting down Jet.com (Lunden, 2020). In terms of the innovation casino, placing a single bet worth $3.3 billion is the strategy of a player, not the house. But people believed big bets and fast growth was the recipe for success. Proof that the recipe produced tasty treats included Facebook, Apple, Netflix, and Google, and their rising stock prices. Then, there is the finding that when companies diversify, their cash flows appear more stable and thus more credit-worthy (Hann, Ogneya, and Ozbas, 2013). The more a company vertically integrated, the more it could borrow for the next acquisition. So, the cycle continued.

Debt-fueled corporate expansion over the last decade also fueled bureaucracy. In their *Harvard Business Review* article, "The End of Bureaucracy," Hamel and Zanini shared that more than one-third of US employees now work in firms with more than 5,000 employees. "Bureaucracy," they wrote, "is particularly virulent in large companies" (2018). The authors point to the expanding size of organizations as a reason for average US productivity growth stalling to a level just 10 basis points above the stagflation of the 1970s. Bureaucracy can obstruct even the most motivated worker. According to Michael Mankins, "The average company loses more than 20% of its productive capacity—more than a day each week—to 'organizational drag,'

the structures and processes that consume valuable time and prevent people from getting things done" (2017).

I know about bureaucracy first-hand. I started the decade working in my own business, where I answered 200 to 400 customer support emails a day and managed marketing, operations, and software development. In the second half of the decade, I joined the ranks of a Fortune 10 firm. Spurred by my later work environment, I began to research how large companies could retain their scale while helping their workforce become more productive, as I was in my previous start-up. My research eventually became this book.

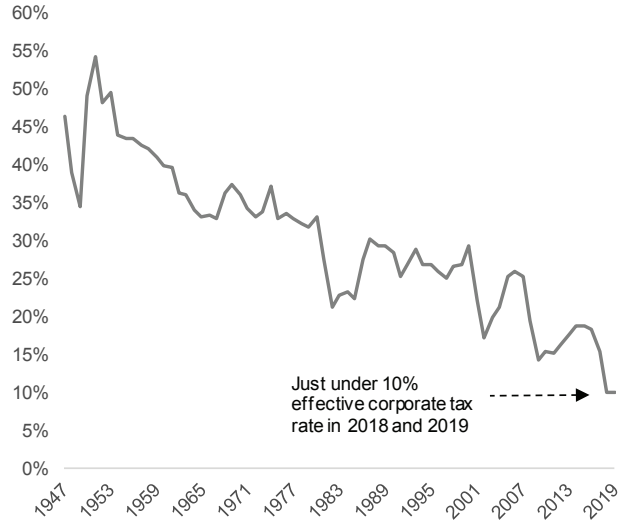
Toward the end of the decade, I wondered why the market continued to rise even though productivity growth stalled. A clue came from my certified public accountant (CPA). On my 2018 and 2019 taxes, deductions I took in previous years were no longer available. My CPA explained that the new tax cuts passed in 2017 simplified the tax code, removing deductions for me. The end result was that I paid more in taxes in the years *after* the tax cuts. Who did the 2017 tax cuts *really* benefit? "Large corporations," my CPA replied. You'll find plenty of large corporations that received tax breaks if you run your finger down the list of companies in the S&P 500, Nasdaq, and Dow Jones indices. Reducing corporate income taxes caused corporate earnings to increase, which caused the stock market to go up. With earnings and stock prices buoyed by low taxes, companies could show growth without becoming more productive. When taxes go up, the game will change, and productivity will become the primary driver of returns.

Taxes for corporations will go up. At the end of 2019, US federal debt was 106% of GDP, the second highest since 1946, when America had just finished fighting in World War II. Also at the end of 2019, the US federal budget deficit was just under $1 trillion ("Federal Deficit Trends"). Then, the COVID-19 pandemic hit. Higher spending in response to the pandemic will cause the federal budget deficit to rise by around 370% in 2020 ("CBO's Current Projections"). The pandemic exacerbated

already prevalent income inequality issues. Many "non-essential" workers were furloughed while higher income workers kept their salaries and telecommuted. Given the role taxes play in aiding social equality and funding government deficits, it is hard to imagine taxes not going up from here. When taxes do go up, corporate incomes, already bruised from the COVID-19 pandemic, are going to go down. The forces of rising taxes and falling incomes are going to heighten weakness in the debt market.

CHART 2: Falling taxes on US corporations

This chart shows the rate of federal, state, and local taxes US companies actually pay after deductions. When COVID-19 hit, taxes on US corporations were at all-time lows.

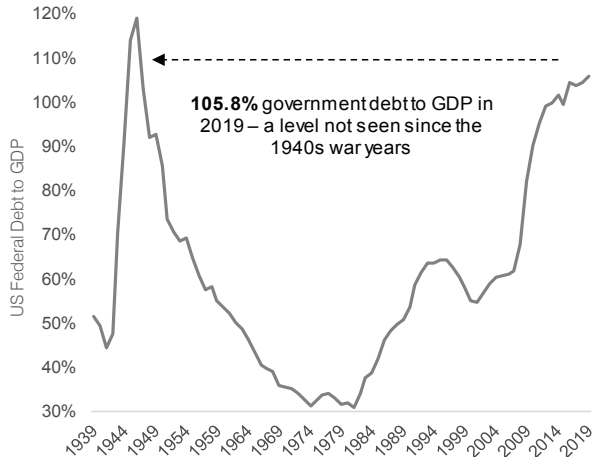


Source: Data from Vodia Capital. *ALFRED Economic Data*, Federal Reserve Bank of St. Louis: Economic Research Division, 2019. alfred.stlouisfed.org/series?seid= A551RC1A027NBEA, FCTAX, NA000323Q, (Apr. 17, 2020).

Note: Estimated using figures for federal, state, and local tax receipts from corporation and corporate earnings after tax payments.

CHART 3: Before COVID-19, US government debt was nearing all-time highs

This chart shows the total US government debt divided by total gross domestic product (GDP). It is not sustainable to have corporate taxes at all-time lows and public debt at all-time highs.



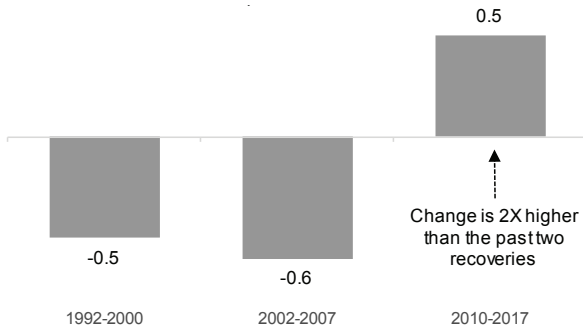
Source: Data from "Gross Federal Debt as Percent of Gross Domestic Product," *ALFRED Economic Data*, Federal Reserve Bank of St. Louis, 2020. alfred.stlouisfed.org/series?seid=GFDGDPA188S, (Apr. 10, 2020).

Of course, weakness in the corporate debt market began well before COVID-19. A 2019 analysis by Deloitte compared corporate debt in the recent US recovery of 2010-2018 with the previous two recoveries of 1992-2000 and 2002-2007. An important measurement of risk is a borrower's ability to pay back debt. One such measurement is a ratio of net debt to earnings before interest, taxes, depreciation, and amortization ("EBITDA"). Lenders want to see the ratio go down. Deloitte found that net debt to EBITDA *increased* by 2X in the recent recovery compared to the previous two. Another measurement of risk is the interest coverage ratio, which measures how many times a company can cover its current interest payments from earnings. Deloitte found that interest coverage ratios went down by 3-4X compared to the past two recoveries. While

there are a range of credit ratings companies can receive, the most important threshold is the line between investment grade and non-investment grade bonds. Deloitte found that investment-grade bonds declined by around 12% in the recent recovery compared to the previous two (Buckley, 2019).

CHART 4: Net debt to EBITDA for the top 1,000 US companies has increased

Net debt to earnings before interest, taxes, depreciation, and amortization (EBITDA) is a ratio measuring how many years it would take for a company to pay back its debt. The bars below show changes in net debt to EBITDA ratios of the top 1,000 US non-financial firms over the past three economic recoveries.

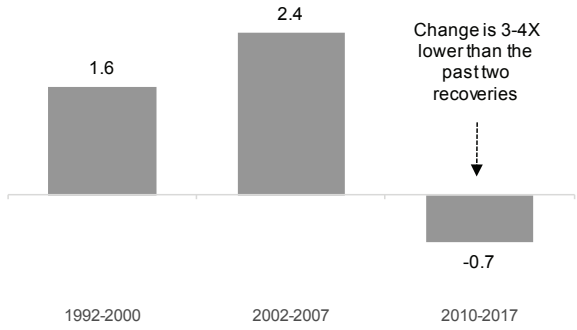


Source: Data from Deloitte Services LP economic analysis. "Rising Corporate Debt: Should We Worry?" *Deloitte Insights*, 2019. www2.deloitte.com/us/en/insights/economy/issues-by-the-numbers/rising-corporate-debt-levels.html, (Feb. 9, 2020).

With higher taxes and default risks on the horizon, the paradigm of the last decade is set to reverse. Companies seeking to deliver outsized returns will need to grow organically rather than via mergers and acquisitions. To grow organically, you must find new reasons for your customers to pay a premium, remain loyal, and refer their friends. To do so will require tapping your innovative powers and improving your core products by 10X.

CHART 5: Interest coverage ratios for the top 1,000 US companies has decreased

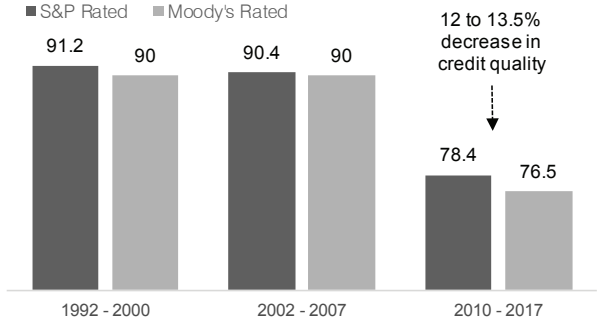
Interest coverage ratio measures the number of times a company can make interest payments on its debt with earnings before interest and taxes (EBIT). The bars below show changes in interest coverage ratios (EBIT/interest expense) of the top 1,000 US non-financial firms over the past three economic recoveries.



Source: Data from Deloitte Services LP economic analysis. "Rising Corporate Debt: Should We Worry?" *Deloitte Insights*, 2019. www2.deloitte.com/us/en/insights/economy/issues-by-the-numbers/rising-corporate-debt-levels.html, (Feb. 9, 2020).

CHART 6: Less investment-grade corporate bonds sold in the last recovery

Share of investment grade in total corporate bond sales (average for the period, %)



Source: Data from Deloitte Services LP economic analysis. "Rising Corporate Debt: Should We Worry?" *Deloitte Insights*, 2019. www2.deloitte.com/us/en/insights/economy/issues-by-the-numbers/rising-corporate-debt-levels.html, (Feb. 9, 2020).

REORGANIZE AROUND CORE AND NON-CORE INNOVATION

It takes focus to improve your products and services by 10X. Standing in the way of focus is the fact that many large companies spent the last decade acquiring non-core assets. A non-core asset is not central to the service your company provides. For example, when Microsoft bought the devices and services business of Nokia in 2013, it acquired a non-core asset. Non-core assets can be good when they drive demand for your core business. But having them under one roof can distract from innovation and create sprawling bureaucracy. In the platform economy, non-core assets can be spun off into standalone companies while remaining connected to your platform. As you move forward with less organizational sprawl, your teams can focus exclusively on your core products. When new, non-core ideas come along, instead of acquiring companies, you can encourage start-ups to build the ideas on your platform. Below are three components of organizational infrastructure that will help you reorganize around core and non-core innovation.

Idea management software: The hallmark of open innovation, software like—Salesforce *IdeaExchange*—can capture ideas from your employees, customers, and partners. Within the software, you can label ideas as core and non-core. Core ideas can be passed to your internal teams. Non-core ideas can be considered for start-up funding opportunities. The rewards of using idea management software can be substantial. A 2017 study looked at 28 companies using idea management software over two years. The company with the highest ideation rate was a large healthcare firm that implemented 500 winning ideas per 1,000 users; its net profit grew 6% over the two-year period studied. The fastest growing company was a semi-conductor

firm that executed 340 winning ideas per 1,000 users. Companies on the opposite end of the ideation spectrum, the slow innovators, generated less than 100 winning ideas per 1,000 users. About half of the slow innovators had no growth in profits at all (Minor, Brook, and Bernoff, 2017).

Two-pizza teams: The term "two-pizza teams" comes from Amazon where teams typically don't grow beyond what two pizzas can feed. Two-pizza teams are fast innovators. They should work on core ideas and receive nearly all your research and development budget. In small teams, individuals can look after products or processes from end to end. This structure empowers employees to think like owners and work productively. For example, Haier, established in Qingdao, China in 1984, is the world's largest appliance manufacturer, with around 75,000 employees globally. Haier is organized into thousands of microenterprises with an average of 10 to 15 people each. Haier's microenterprises operate like independent businesses while coordinating and transacting with each other. Thanks in part to its new team structure, Haier is launching new products up to 70% faster (Hamel and Zanini, 2018).

Ecosystem innovation fund (EIF): I coined the term "ecosystem innovation fund" (EIF) to describe a seed fund designed to spur innovation in a digital ecosystem. Your EIF helps you operate like the house in the innovation casino. This book imagines your EIF as a hybrid between the National Science Foundation (NSF) SBIR grant program and corporate venture capital. Similar to the NSF SBIR, your EIF would select investments through a small team of program directors who write funding solicitations, select winning bids, and guide start-ups through the program. Similar to venture capital, your EIF would make equity investments. The rest of this book will give you the foundation to design an EIF that uses cash from outside investors and returns principal from seed investments and gains from your parent company's stock.

CHAPTER TWO

MASTER THE ODDS TO INVEST IN START-UPS

This house strategy is about mastering your EIF's odds of producing a return from investing in start-ups that build on your platform.

WHAT VC REVEALS ABOUT INNOVATION ODDS

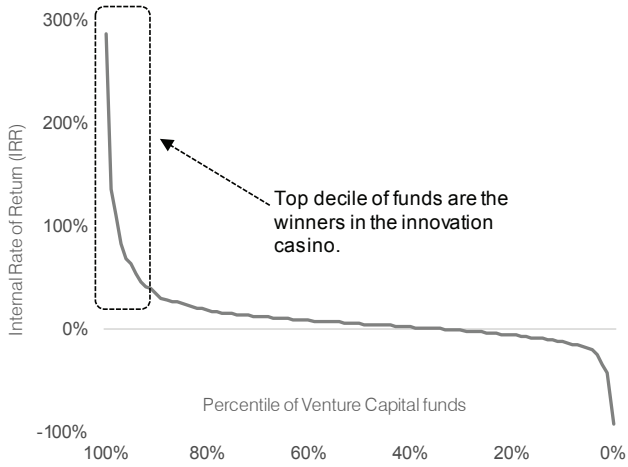
Venture capital (VC) fund returns are the closest proxy we have to calculate your odds at the innovation casino. There are three reasons why: 1) VC bets on young companies, whose fortunes correlate to innovation since they are often too young to have mature product portfolios; 2) VC funds typically bet on less than 20 companies; when one investment succeeds, the fund can post positive returns; 3) There are no other large datasets that directly measure financial returns on investments from innovation. For these three reasons, I turned to a dataset compiled by *PitchBook* of 827 VC funds established between 1976 and 2008, with performance data through January 2019.

PitchBook data show that VC returns take the shape of a power curve. In VC, the winners are the top decile of funds, which deliver returns of at least 3X to their investors (called limited partners, or LPs). VC returns are often measured using internal rate of return, or IRR. IRR is a measure

of the annual growth rate of an investment. Chart 7 shows IRR from the perspective of the VC fund itself, not its underlying investors.

CHART 7: Power curve of VC returns

Returns from US venture capital (VC) funds follow a power curve. Data are IRR figures for funds originated between 1976 and 2008 with performance measured through January 2019.



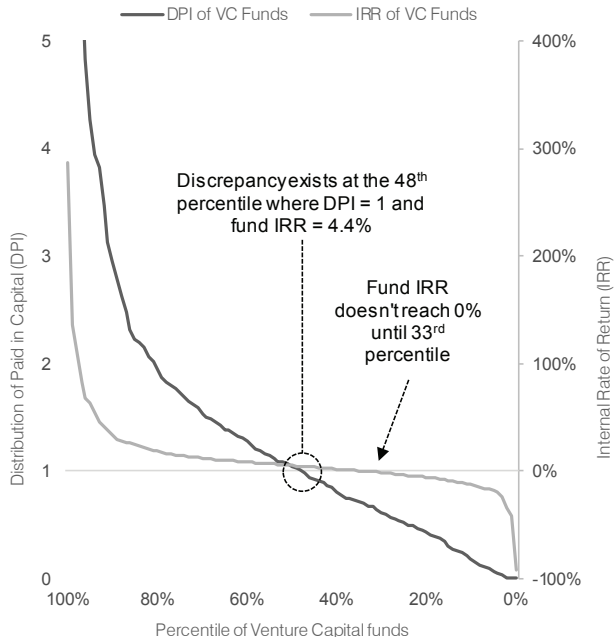
Source: Data from "Funds & IRR Search: Venture Capital, Venture Capital—Early Stage, Venture Capital—Later Stage, Fund Vintage Year 1976-2009," *PitchBook*, 2019. my.pitchbook.com/search-results/s2521878/funds, (Jan. 27, 2019). N=827

Another measure of fund performance is distribution of paid in capital (DPI). DPI measures how much the VC firm returned to its LPs as a multiple of principal. When you plot DPI on a graph, the breakeven point for LPs happens at the 48th percentile, where DPI = 1. There is a discrepancy at the 48th percentile, though, because IRR is 4.4%. IRR does not drop to breakeven, which is 0%, until the 33rd percentile. This discrepancy indicates that VC funds must achieve 4.4% IRR to return principal to LPs due to management fees and other expenses.

With IRR, it is possible to compare VC returns to other asset classes like stocks, bonds, or gold. To use IRR, we need to resolve the discrepancy above. So, we subtract 4.4% from the entire curve of VC fund returns. We call the adjusted values "Historical VC Returns." Historical VC Returns are used throughout the remainder of the book as a baseline for your odds in the innovation casino.

CHART 8: Cash returns for LPs

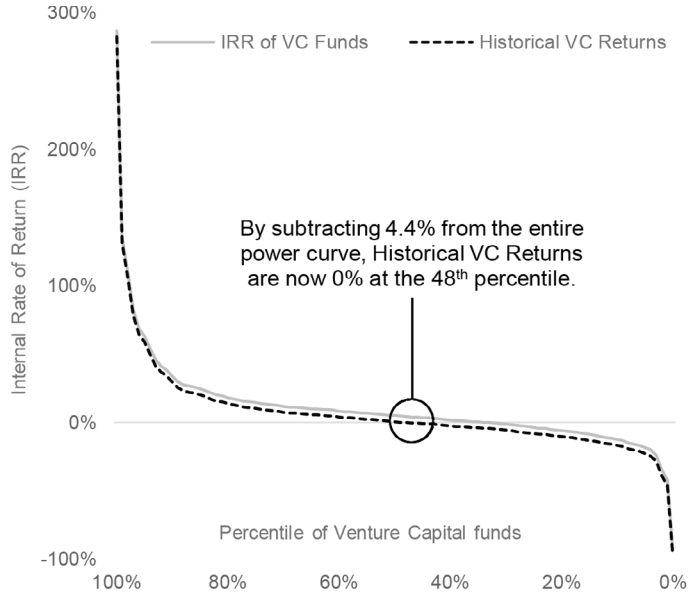
Limited Partners (LPs) who invested in US venture capital funds from 1976 to 2008 were 15% less likely to break even than the IRR figures suggest. DPI measures cash returned to LPs as a multiple of the amount invested. Data is through January 2019.



Source: Data from "Funds & IRR Search: Venture Capital, Venture Capital—Early Stage, Venture Capital—Later Stage, Fund Vintage Year 1976-2009," *PitchBook*, 2019. my.pitchbook.com/search-results/s2521878/funds, (Jan. 27, 2019). N=796

CHART 9. Calculating Historical VC Returns

In light of Chart 8, we adjust the entire power curve for IRR of VC funds down by 4.4% to find Historical VC Returns—the metric we use to compare the financial performance of VC with other asset classes, including simulated ecosystem innovation funds (EIFs).



Source: Data from "Funds & IRR Search: Venture Capital, Venture Capital—Early Stage, Venture Capital—Later Stage, Fund Vintage Year 1976-2008," *PitchBook*, 2019. my.pitchbook.com/search-results/s2521878/funds, (Jan. 27, 2019). N=827

Using Historical VC Returns as a base case, we can predict the odds for investments in innovation outperforming the following asset classes:

- **Just over 2 in 10** will beat the US Stock Market, which returned 11.15% compound annual growth from 1976 to 2018 ("Backtest Portfolio Asset Class Allocation").
- **Just under 3 in 10** will beat real estate investment trusts (REITs), which returned 8.87% compound annual growth from 1994 to 2018 ("Backtest Portfolio Asset Class Allocation").

- **Just over 3 in 10** will beat the Global, ex-US Stock Market, which returned 6.62% compound annual growth from 1986 to 2018 ("Backtest Portfolio Asset Class Allocation").
- **Just over 3 in 10** will beat the Total US Bond Market, which returned 5.78% compound annual growth from 1987 to 2018 ("Backtest Portfolio Asset Class Allocation").
- **Just under 4 in 10** will beat Gold, which returned 5.13% compound annual growth from 1976 to 2018 ("Backtest Portfolio Asset Class Allocation").
- **Just over 4 in 10** will keep pace with US inflation, which had 3.6% compound annual growth from 1976 to 2018 ("CPI Inflation Calculator").
- **1 in 10** will receive top decile VC returns of 3X principal (Chart 9).
- **Just over 1 in 2** will recoup principal (Chart 9).
- **Just under 4 in 10** will lose more than a quarter of principal (Chart 9).

VC RETURNS VARY WIDELY BECAUSE VC FUNDS ARE NOT DIVERSIFIED

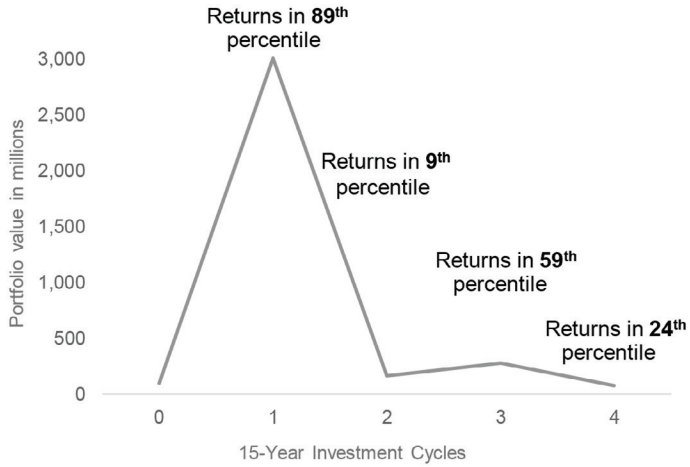
I collaborated with Anup Agarwal, one of the top financial modeling experts in the Upwork freelancer marketplace, to see what would happen over 60 years if you invested and received Historical VC Returns. The simulation tool built by Anup started with a $100 million initial investment, which is reinvested four times, each time in a different fund. Each simulated fund is dealt a *random* Historical VC Return figure from Chart 9 above which determines its returns. You can find the data table for Chart 9 in the Appendix of this book. Each simulated fund lasts 15 years for a total of 60 simulated years. In real life, VC funds

live for 8 to 12 years in which they enter into and exit all investments (Wagner, 2014). While the simulated funds last 3 to 7 years longer than real VC funds, the time difference does not have an impact on final IRR measurements because IRR is annualized. The reason for the 15-year lifespans is these simulations will be compared with 15-year EIF simulations in the next chapter.

Simulation 1: The first time I ran the simulation, it produced -0.5% IRR from start to finish. In Chart 10 below, you can see how the value of the portfolio went up and down. Fund 1 receives returns in the 89th percentile. Fund 2 receives returns in the 9th percentile. Fund 3 receives returns in the 59th percentile. Fund 4 receives returns in the 24th percentile.

CHART 10: A player with three losing hands

Simulation of a portfolio that invests $100 million in venture capital (VC) and reinvests all holdings over a total of four cycles. For each investment cycle, the model randomly chooses a Historical VC Return figure from Chart 9. Investment cycles are 15 years each.

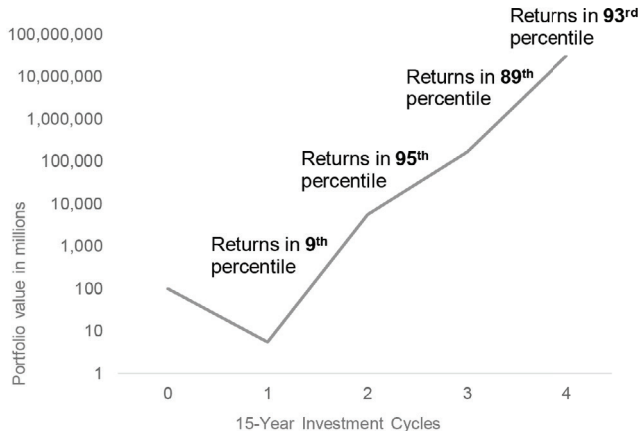


Source: Engel, Eisaiah. "EIF Model #2," *eisaiah.blog*, 2019. eisaiah.blog/eif-model-2/.

Simulation 2: The second time I ran the simulation, it produced 23.5% IRR from start to finish. In Chart 11 below, you can see how the portfolio value went down and then up. Fund 1 receives returns in the 9th percentile. Fund 2 receives returns in the 95th percentile. Fund 3 receives returns in the 89th percentile. Fund 4 receives returns in the 93rd percentile.

CHART 11: A player with three winning hands

Simulation of a portfolio that invests $100 million in venture capital (VC) and reinvests all holdings over a total of four cycles. For each investment cycle, the model randomly chooses a Historical VC Return figure from Chart 9. Investment cycles are 15 years each.

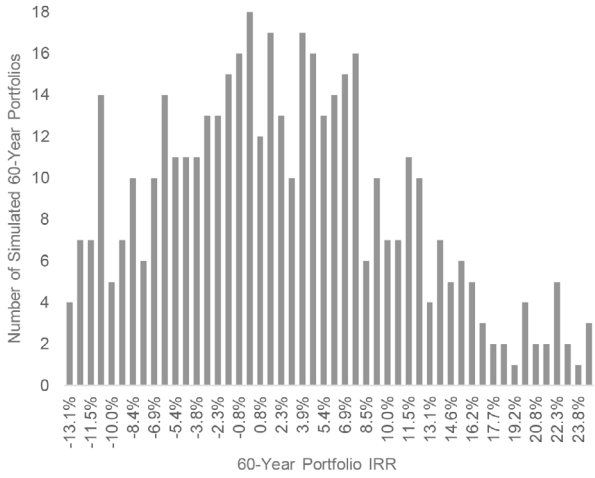


Source: Engel, Eisaiah. "EIF Model #2," *eisaiah.blog*, 2019. eisaiah.blog/eif-model-2/.

Simulation 3: I ran the simulation 500 times, and the final IRR figures varied widely. Chart 12 below shows how many portfolios achieved final IRR figures between -13.1% and 23.8%. The top and bottom 2% of funds were outliers that made the graph too wide. The outliers were excluded to better illustrate what the innovation casino looks like for most players.

CHART 12: Simulation of 500 portfolios

This chart shows the outcome of 500 portfolios like the ones in Charts 10 and 11. Each portfolio starts with a $100 million investment in a VC fund and reinvests over a total of four 15-year funds. Less than half of the portfolios (43%) break even, and this doesn't account for inflation over the portfolios' 60-year lifespans.



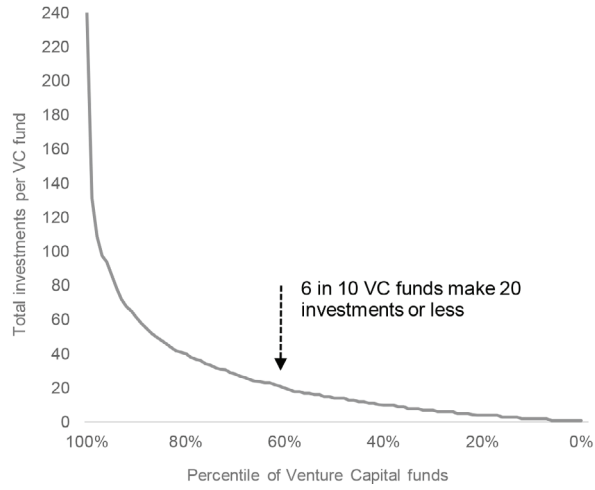
Source: Engel, Eisaiah. "EIF Model #2," *eisaiah.blog*, 2019. eisaiah.blog/eif-model-2/.

Note: Top and bottom 2% of IRR values are outliers and have been removed from this chart for data visualization purposes.

Historical VC Returns vary widely because funds do not diversify. With 6 in 10 funds making 20 investments or less, VC funds resemble players in the innovation casino (Chart 13). Players can be dealt setbacks that they cannot recover from. Unlike players, the house can diversify. By diversifying, your EIF can invest in companies in your digital ecosystem for a long time and recoup nearly all your principal—even with the odds you have seen in this chapter.

CHART 13: VC funds are players, not the house

VCs rely on their selection skills, making concentrated bets on a few companies. This is a player's strategy in the innovation casino. Becoming the house requires making at least 2,000 investments with standardized investment criteria and processes.



Source: Data from "Funds & IRR Search: Venture Capital, Venture Capital—Early Stage, Venture Capital—Later Stage, Fund Vintage Year 1976-2008," *PitchBook*, 2019. my.pitchbook.com/search-results/s2521878/funds, (Jan. 27, 2019). N=1,316

CHAPTER THREE

RECOUP PRINCIPAL WITH 100X MORE BETS THAN VC

This house strategy is about making 2,000 bets with your ecosystem innovation fund, or EIF, so you can reliably recoup principal.

DIVERSIFY YOUR ECOSYSTEM INNOVATION FUND (EIF)

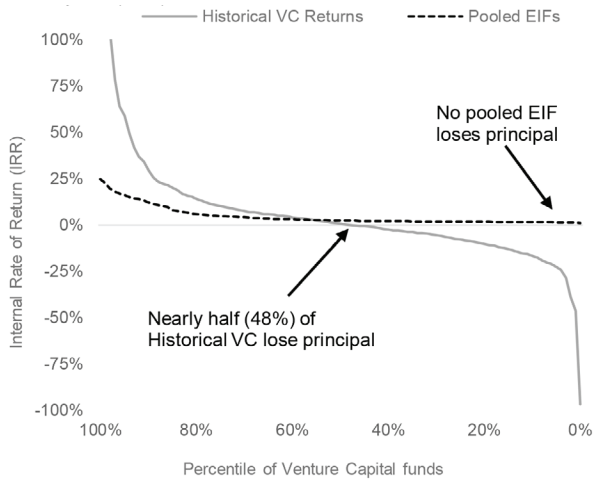
Making 100X more bets than a typical VC fund means making 2,000 seed investments (Chart 13). One way to make 2,000 seed investments is to pool with other EIFs. VC firms could pool at such scale if they had uniform standards for investment selection, valuation, and corporate governance. But they do not. To model the impact of pooling 2,000 investments in start-ups, financial modeling expert Anup Agarwal and I designed a simulation. We wanted to see what would happen if 100 EIFs each made 20 investments—the number of investments typical VC funds make—and pooled 50% of each investment to gain exposure to 2,000 start-ups. I refer to these investments as Pooled EIFs throughout this book.

Pooled EIFs do not need to be as skilled at selecting investments as VC, and indeed, they are not. When separated from the pool, EIFs are 35% more likely to lose principal than Historical VC Returns

(Chart 15). Yet, none of the same EIFs lose principal when they are pooled (Chart 14). This difference speaks to the power of diversification to preserve principal. Chart 15 reveals that the EIF simulations are directionally accurate because they form a similar power curve to Historical VC Returns.

CHART 14: Pooled EIFs do not lose principal

Simulation of 100 EIFs making 20 uniform seed investments and pooling 50% of each investment in the top 5 US metros for producing high-growth start-ups. No EIF loses principal, beating nearly half (48%) of Historical VC funds.



Sources: Data from "Funds & IRR Search: Venture Capital, Venture Capital—Early Stage, Venture Capital—Later Stage, Fund Vintage Year 1976-2008," *PitchBook*, 2019. my.pitchbook.com/search-results/s2521878/funds, (Jan. 27, 2019). N=827.

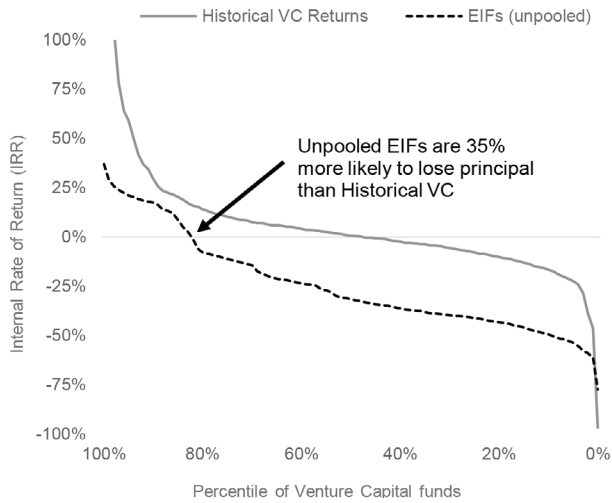
Engel, Eisaiah. "EIF Model #1," *eisaiah.blog*, 2018. eisaiah.blog/eif-model-1/.

To beat Historical VC Returns, EIFs need only to play longer. A VC or EIF that loses principal is likely to exit the game early. Diversification is how you avoid losing principal and stay in the game. Some start-up investors believe that diversification is costly. As evidence, they might point to the top

EIF in Chart 15 having its IRR of 36.8% cut down to 24.8% after sharing gains with the pool in Chart 14. Their belief does not take into account the value of time. A 2019 study by AngelList corroborates this point. AngelList is an online platform that has helped syndicate more than 3,000 investments in start-ups since 2013. AngelList found that investing in nearly every seed stage deal will yield higher rates of return than investing in more proven, later-stage start-ups (Othman, 2019). Diversification can extend the life of your EIF so that you can fund more start-ups in your ecosystem and become the house in the innovation casino.

CHART 15: Unpooled EIFs lose principal

Simulation of 100 EIFs making 20 uniform seed investments in the top 5 US metros for producing high-growth start-ups and not pooling. Even with the highest odds possible, the unpooled EIFs lose principal more frequently than Historical VC Returns.



Sources: Data from "Funds & IRR Search: Venture Capital, Venture Capital—Early Stage, Venture Capital—Later Stage, Fund Vintage Year 1976-2008," *PitchBook*, 2019. my.pitchbook.com/search-results/s2521878/funds, (Jan. 27, 2019). N=827.

Engel, Eisaiah. "EIF Model #1," *eisaiah.blog*, 2018. eisaiah.blog/eif-model-1/.

Pooled EIFs are, to my knowledge, theoretical. If they are implemented, I imagine they would be formed as a type of investment partnership between your firm's EIF and those of your largest supply chain partners. Although the charts in this chapter show 100 EIFs each making 20 investments, the reality may be closer to 20 EIFs each making 100 investments. The charts were produced by a model built for this book. The model assumes each investment is exactly $50,000. Each investment is composed of six independently simulated variables that model the valuation of a start-up at the time of investment and hypothesize its odds of success. The odds of success are based, in part, on historical data compiled by the Kauffman Foundation, the Brookings Institution, and a senior lecturer at Harvard Business School. Then, the model jumps into the future, choosing one of the four scenarios at liquidity: reaching $100 million in annual sales, reaching "High-Growth Company" status with $2 million or more in annual sales and 20% annualized growth for three years, returning principal, and losing all value. These variables work together to determine the returns on each $50,000 investment. Appendix 1 of this book contains documentation and a link to download the model.

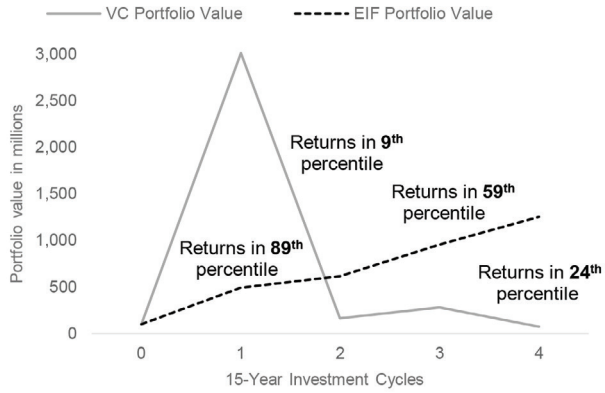
INVEST FOR A LONG TIME TO GROW YOUR DIGITAL ECOSYSTEM

In this section, you will see how Pooled EIFs compare to Historical VC Returns over 60 years. Pooled EIFs deliver predictable gains when reinvested over 60 years while VC returns are unpredictable. The charts below extend the model that Anup Agarwal and I created for Charts 10, 11, and 12 in the previous chapter. Each simulation below starts with a $100 million initial investment which is reinvested over a total of four 15-year cycles. Each investment cycle receives returns in the same percentile—albeit with the corresponding IRR values from Historical VC Returns in Chart 9 and Pooled EIFs in Chart 14.

Simulation 1: Chart 16 shows a scenario where the first investment cycle receives returns in the 89th percentile. The second investment cycle receives returns in the 9th percentile. The third investment cycle receives returns in the 59th percentile. The fourth investment cycle receives returns in the 24th percentile. At the end of 60 years, the VC Portfolio returns a compound annual growth rate of -0.5%. Meanwhile, the EIF Portfolio delivers a compound annual growth rate of 4.3%.

CHART 16: When the house beats players

Simulation of two portfolios that each invest $100 million and reinvest all holdings over four investment cycles. For each cycle, the model randomly chooses a percentile and its corresponding returns from Historical VC Returns in Chart 9 and Pooled EIFs in Chart 14.

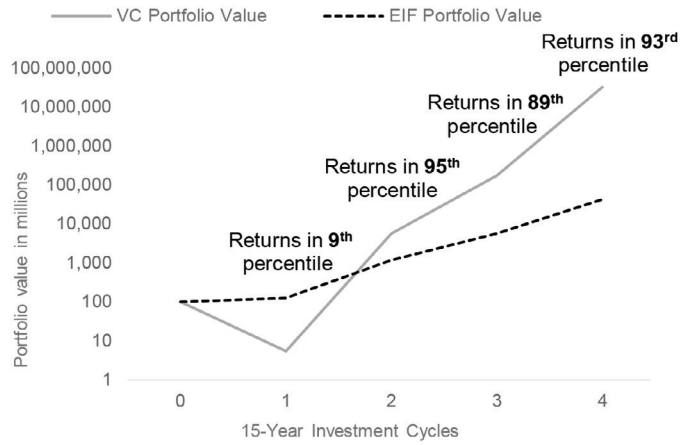


Source: Engel, Eisaiah. "EIF Model #2," *eisaiah.blog*, 2019. eisaiah.blog/eif-model-2/.

Simulation 2: Chart 17 shows another scenario where returns in the 9th, 95th, 89th, and 93rd percentiles were chosen. In this scenario, venture capital suffers a huge loss and then exponentially outperforms the EIFs. At the end of 60 years, the VC Portfolio delivers a compound annual growth rate of 23.49%. Meanwhile, the EIF Portfolio generates a compound annual growth rate of 10.6%.

CHART 17: When players beat the house

Simulation of two portfolios that each invest $100 million and reinvest all holdings over four investment cycles. For each cycle, the model randomly chooses a percentile and its corresponding returns from Historical VC Returns in Chart 9 and Pooled EIFs in Chart 14.



Source: Engel, Eisaiah. "EIF Model #2," *eisaiah.blog*, 2019. eisaiah.blog/eif-model-2/.

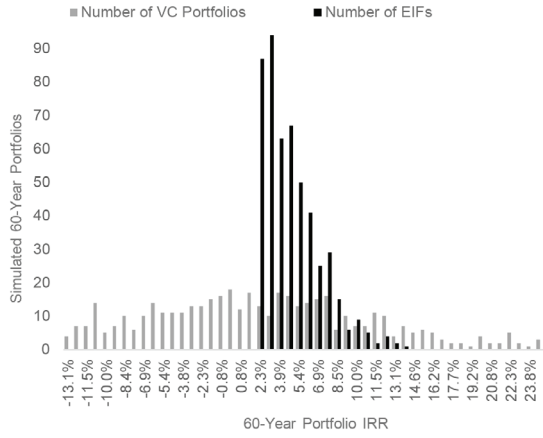
Simulation 3: I ran the simulation 500 times to produce Chart 18 on the next page, and the IRR figures for VC Portfolios fluctuated from -13.1% to 23.8%. IRR figures for EIF Portfolios came in between 2.3% and 13.8%. The returns of EIF Portfolios highlight how making 100X more bets than VC can consistently produce profitable returns when investing in startups.

The biggest obstacle to placing 100X more bets than VC is subjective judgment. This is true whether your EIF originates 2,000 investments by itself or pools with other EIFs to reach 2,000. Human judgement is part of each step in the VC deal-making process, from initial introduction to email pitch deck, to first call, to first in-person meeting, to follow-up meeting, to document negotiations, and finally, closing (Cremades, 2018). If your EIF originates 2,000 investments by itself, subjective judgment can cost extreme amounts of time. If you pool with other EIFs, subjective judgement can

produce mismatches in investment quality. So, the way to make 100X more bets than VC is to reduce reliance on human judgment by standardizing your EIF's investment processes and selection criteria.

CHART 18: Simulation of 500 portfolios

This chart shows the outcome of 500 portfolios like the ones in Charts 16 and 17. Each portfolio starts with a $100 million investment and reinvests consecutively over a total of four 15-year funds. Pooled EIFs deliver positive returns that are more consistent than simulated VC Portfolios.



Source: Engel, Eisaiah. "EIF Model #2," *eisaiah.blog*, 2019. eisaiah.blog/eif-model-2/.

Note: Top and bottom 2% of IRR values are outliers and have been removed from this chart for data visualization purposes.