

Acknowledgements

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Raison d'Etre

It is true that no new history is needed for Boston's startup ecosystems. To their rise, fall, and resurrection, many books have been written. Similarly, no need for new analysis on how startup clusters form. The recipe is clear: pillar firms, research hub, fluidity of entrepreneurial labor markets, fluidity between academia and business, strong links between research universities and businesses, a propensity for one generation of entrepreneurs to give back to the generation beneath it, and risk capital infrastructure. Before long, by George, you have a Silicon Valley! Nor, again, is there any urgency to capture knowledge about Harvard's ecosystem in writing. It persists in the oral tradition of many professors, administration officials, and alumni today. So why write any history?

Over the course of my independent project, I have spoken with dozens of students, professors, administrators, alumni, and service providers from Harvard, Stanford, MIT, and Berkeley. I listened patiently to understand what makes each ecosystem tick. The commentary I received, by and large, was not positive. From outsiders, a deep misunderstanding of Harvard's ecosystem and how to begin navigating it began to emerge. From insiders and Bostonians, I heard a deep pessimism and discouragement about the future of our ecosystems.

I heard that Harvard's ecosystem is failing. That it simply doesn't engineer student collaboration across schools, like Stanford does - it is idiotic! From others, I've heard that Harvard is overengineering its ecosystem, coddling our students. That the university is impenetrable for service providers. Just too many departments who don't talk with one another! That there is no One Harvard, and it is dooming the potential of the ecosystem. I've been told that the Boston culture is too conservative. Its puritanical values infect and destroy entrepreneurship. That Boston's entire entrepreneurial legacy is anachronistic. That Boston just cannot reinvent itself. It has great universities, but it cannot retain talent. People don't want to stay in Boston. The weather is bad. And it has no new wins nor new stories of success that would entice people to remain or to come. I wish this were a straw man. It's not.

As I spoke with stakeholders, researched, and evaluated the opportunity, it suddenly dawned on me that I am in the minority, part of what one might call the crazy crowd. I acknowledge how extraordinary ecosystems are in other universities and how special Silicon Valley is. And, in this article, I will outline why exactly they have become extraordinary. Against that knowledge there are many opportunities to improve our own. I propose one roadmap and recognize that there is a lot of work to be done. However, unlike many, I do believe that Boston is at its core an entrepreneurial city. I believe that Western Avenue *can* become the new 'Sand Hill Road' and Boston, a new Florence. It will take many actors, many community builders. What I hope this history does is permit the reader to hear that perspective and consider joining in the work behind building a better and more equitable startup ecosystem.

Birthplace of American Entrepreneurship

Over its history, this city and its surrounding region have been called many things. When eleven hundred Pilgrims landed in Massachusetts in 1630, John Winthrop presented his vision, the first vision, for Boston: it would be a model to which all of Europe would look, a "city upon a hill." Referencing Christ's Sermon on the Mount, where he first tells his listeners that they are "the light of the world," the biblical reference set the stage for Boston's sense of entrepreneurial purpose and conservative moral superiority. Later callings - mockings in other cities that avant-garde shows and literatures were "Banned in Boston" and knowing ascriptions by Oliver Wendell Holmes that Boston was the "hub of the solar system" (or so it thought) - reflected that, over time, Boston had not changed much. It would be called the Cradle of Liberty for its ignition of the American Revolution. The land of the bean and the cod for its main proliferating sources of food. The place of ice, stone, and men for its core, valuable, exportable resources. But my favorite has become "The City of Notions," which it earned at least as soon as 1823, for its being a font of innovation and ideas. The history of entrepreneurship in Boston was complicated: for as often as it rooted itself back to history and principles as often it was the first to look forward.

This complicated history surfaces when examining early missed growth opportunities. Take the early American wine trade as an example. Dominant in the trade of Madeira wine at the start of

the 18th century, Boston merchants became outpaced by those in Salem, New York, Philadelphia, and Charleston. The reasons were many. As towns, New York and Philadelphia grew faster than Boston. By focusing on creating a community of wine importers, Salem and its port developed a cost advantage over Boston, whose more general port was only 14 miles away. Wine for our general merchants was an afterthought to other goods. The wine business centered around supply shocks, and merchants in other cities participated in speculation, hoarding additional inventory for moments when supply would suddenly, unexpectedly stop. Not Boston. Its principled early banking communities would not provide the longer credit terms needed while those in other cities were more comfortable doing so. As opportunities passed by our entrepreneurs, they steadfastly remained passive.

There were reasons to be passive in Boston. Much wealth and access to early pools of financing, more so than in other emerging cities, were concentrated across families. Screw up in buying new inventory as a shopkeeper, and you may not only have harmed your entire family's reputation but also put all of their subsistence in peril. Nobody wants that. Boston's story of entrepreneurship really only begins because the city became an expert by necessity not in accepting risk, but in managing, or staging, it. A port city, Boston depended on its ships. But wars and storms made their passage dangerous and return uncertain. Unsatisfied with the high premiums and inconveniences of unorganized maritime insurance in London, specifically by way of Lloyd's Coffee House, Boston built its own insurance practices. Premiums and profits followed as wars occurred. Over time, maritime insurance practices evolved into professional associations and corporations. Then, as journeys became more lengthy and ships more valuable, insurance companies began to pool the risk of a trip with other insurers. Other insurance businesses, like fire insurance companies, spawned. Recognizing that scale would deliver greater profits, the leading maritime insurer, the Boston Marine Insurance Company, led by its President Thomas Davis, was aggressive in expanding its business, soliciting as far south as New York and Philadelphia and as far north as Portland. With insurance available, families in Boston could take bets without risking their livelihoods.

Not only did Boston spawn the American Revolution - the Great American Experiment, the ultimate upstart against behemoth, the town of David versus Grand Goliath - but it started the American Industrial Revolution as well. The first manufacturing mills were invented in England. These new technologies dramatically slashed cotton and clothing manufacturing costs. England had become king, and she knew it. Placing a ban on all textile workers from traveling internationally, her message was clear: this trade secret must remain in the country. Fortunately for Boston, it didn't. At a time when the American South was becoming a major producer of cotton, manufacturing machinery and technology made its way first to New England. But the first years were to my mind a false start. The Beverly Cotton Manufactory, funded and founded by the elite Cabot family, guarded its technology in secrecy from other interested entrepreneurs. When it shut its doors in 1798 due to high fixed costs and unmanageable variable costs, the Boston elite learned that the money of individual families would not be enough for capitalizing on the more ambitious ideas and opportunities that were materializing.

So wealthy merchants formed the Boston Associates. This loosely linked set of family financiers and visionaries would make investments in new ventures over the next century that nourished Boston's ecosystem. At their height, they controlled 40 percent of Boston's banking capital, 40 percent of all its insurance capital, and nearly as much in the state's railroads. By pooling their capital together, they were able to diversify the risk in any one large investment. It is only with this collective that Francis Cabot Lowell was able to found the Boston Manufacturing Company, the first vertically integrated factory in the United States. Lowell, himself a founding member and part of Boston's elite, had spent his early years as a merchant. When Britain and France enforced an embargo on the United States in 1807, his business suffered and he realized that only by moving its manufacturing processes into the US could the country own its own destiny. Its dependence on imports needed to reduce. He traveled to England, brought back the power loom technology, learned from the trade secrets of Beverly Cotton, and started the BMC. He developed a process, known as the Waltham-Lowell System, to standardize and improve his factory. Then, he expanded. He and the Boston Associates began to build towns along the Charles River to support the new factories. They needed labor and brought in immigrants into these communities. One business, the Merrick Manufacturing Company, was built in 1823 and endured until after World War II. Waltham, Lowell, Lawrence, Holyoke, and many other towns were founded by these visionaries, who noticed an opportunity and de-risked it for every stakeholder (worker, financier, family, municipality, customer) involved. As the Boston Associates realized returns on their investments, they re-invested their money to construct railroads, and they donated large sums to philanthropy of private enterprises.

Syndicating investments made other businesses possible. As the Industrial Revolution took off, merchants discovered fertile whaling grounds and factories began needing access to whale oil, sperm wax, and baleen. The structure and methodologies for financing these enormously expensive New England whaling ventures in the early 1800s eerily resemble the venture capital and startup ecosystem today. Investors would carefully select the captain and team. The higher the quality, the more equity they would get in the profits. Most prized were successful captains returning for another trip. Together with the captain investors would agree on the business plan and hiring. They would give advice on operations and on how the captain should treat his crew. They built synergies by giving codebooks to all the whaling ships they made investments in. When those ships passed each other in the ocean, they would trade intelligence. Whenever they would reach a port, they would write back to the investors giving them updates on their venture. Some ships spent five years out on the sea looking for whales. Others, about one third, never made it back. But for many who risked hunting whales across the world, the risks were surgically reduced and the returns were spectacular.

Boston had built a killer combo. Its risk capital, de-risking mentality and emerging Yankee ingenuity, access to technology, and business model innovations attracted new talent and spawned new valuable companies. Frederic Tudor - the "Ice Man" - failed five times before he created a worldwide demand for ice, which he supplied from Boston as far as to the Caribbean and to India. Alexander Graham Bell, a professor at Boston University, invented the telephone and started at least three telecom companies in Boston, the last, AT&T, becoming the most

valuable telecom company in the world. A competitor, Elisha Gray, moved to Boston to innovate and invent. In 1901, King Gillette founded the American Safety Razor Company, using freebie marketing to reach millions of customers. Many years later, his business sold to P&G for over \$50 billion, and it endures still today. Serial entrepreneurs Frederick and Francis Stanley moved to Boston to start in 1902 Stanley Motor Carriage Company, the first large steam automobile company in the United States. One had hope that Boston would dominate the uncertain, budding, new transportation industry. After all, Frank Weston and Albert Pope had popularized the bicycle decades earlier throughout the United States through aggressive marketing in Boston, importing, then vertically integrating and inventing an assembly line process mimicked years later by Henry Ford. Boston had become a city of early adopters.

Over the next half century, Boston entrepreneurship succeeded because it mixed its foundation with federal research and military funding, because research institutions tied closer relationships to industry, and because its technology clusters strengthened. Polaroid emerged out from Harvard. Described as a “juggernaut of innovation,” Polaroid invented instant photography and became one of the best known high technology businesses ever. A few years earlier, a Harvard-MIT PhD Vannevar Bush co-founded the American Manufacturing Company. What started as an innovative refrigeration technology evolved into a behemoth that caught every wave. From developing electronics and microwaves into World War II, to supplying missiles, radio, and transistors afterwards, the company - now Raytheon - morphed into the third largest defence contractor in the US it is today. Many high technology businesses set up shop around Route 128, and venture capitalists followed.

But federal defense funding was cut in the late 1960s, and our tech industry died very slowly thereafter. Raytheon had not spawned many great entrepreneurs. Unlike the companies one century before, it did not collaborate. Except for the government, it partnered little. Massachusetts raised taxes to curb a rising state deficit. Talent began to migrate away to Silicon Valley. The get-in-done Yankee culture that had been built in the 1800s had receded. Now when Boston found itself on the forefront of subsequent waves - venture capital, PC, telecom - it persistently failed to capitalize on opportunities and transition. When its entrepreneurs succeeded, they failed to imitate the Boston Associates and reinvest into the next wave of entrepreneurs.

Nevertheless, Boston has rebuilt much of its ecosystem over the past three decades. George Church, Bob Langer - The “Edison of Medicine” - and George Whitesides allied with venture capitalists to build biotech successes with market values totalling over \$50 billion. State biotech funding in research further enabled its rise. Extraordinary pillar companies like PillPack, Kayak, Toast, Desktop Metal, Gingko Bioworks are many others have been built. Platform companies like HubSpot and Wayfair have trained up their own suppliers or spawned out new entrepreneurs. Serial entrepreneurs like David Cancel (formerly HubSpot) and Paul English (formerly Kayak) have made Boston their home and are spinning out successful company after successful company. After succeeding, entrepreneurs have gone back into academia and are investing in the next round of entrepreneurs. Long-standing non-compete laws have been

largely done away with, improving the fluidity of our labor market. To be sure, we have a long way to go before we build the ecosystem that we want. But truly how far we have come in our history of entrepreneurship. How much farther this city will go.

Interlude on Silicon Valley Ecosystem

All things truly extraordinary become great only by design and by chance. Silicon Valley is no exception. A research institution was founded in the middle of nowhere, in farmland, around freedom and beauty by a successful industrialist. Necessity became the mother of invention. To succeed, the institution, Stanford University, needed to create an entire ecosystem. A town. A new life. Like Israel, therefore, to its core its origin story birthed a practical institution. It focused on engineering, and it admitted everyone, including women. Alumni who graduated stayed behind - surprisingly, most stayed behind - and built up the town. They spoke with students. They invested time and capital in them. Because typical financing structures did not exist there as they did on the East Coast, the university or alumni of the university would be the funding mechanisms for new ventures. Alumni invited their teachers to come visit the companies they had started. Professors learned about new technologies in practice and brought them to the classroom faster. Later, many alumni came back to teach. By the time they did, many of their old professors would have left to start their own companies. The intellectual market here, it had a way of being very fluid. And so the ecosystem started out as self-nourishing. Silicon Valley defined the virtuous cycle, and it persists in its blood and bones today.

Why did anyone come when an institution sprung up out of the middle of nowhere? First, San Francisco and San Jose were not far off. Having two feeder liberal towns for this talent and innovation served as a terrific platform. Second, the weather was attractive. Third and most important, at the time, Stanford began with the only electrical engineering program in the country. It started at the cutting edge of research. Great minds who felt contained in the more conservative parts of the East Coast, well, they moved out West to freedom to engage in impactful, intellectual work.

In many ways, the story of American high tech entrepreneurship in the early part of the 20th century is the story of MIT and Stanford. Both were situated in states with extraordinary public education and access to higher learning. Both were practical institutions and venture factories. Both attracted professors who could apply their research and technologies into new ventures. MIT had the telephone; Stanford had the transistor and the vacuum tube. Both attracted behemoth companies to pitch tents nearby. Think Raytheon for Boston, or HP in Silicon Valley. Both were at the forefront of high technology. In the 1950s, for example, they dominated microwaves. Both ultimately ingested huge portions of the government's military spending for the products of their technological breakthroughs. Both, frankly speaking, had ventures who grew and became reliant on government spending. But when military budgets shrunk in the 1970s, Silicon Valley thrived and Boston was left behind. Why the striking contrast in outcome?

There were notable differences between the two. Unlike in Stanford, professors in Boston did not have an open invitation to visit and hang out in company offices. Few of those who did did so. Investors in Boston had evolved from the Boston Associates, a collective of family elite who invested around trust and networks and relationships. They were just more conservative, far less courageous, or reckless, than ventures needed. Fluidity of labor was simply not as possible. California did not enforce non-competes - not even those of other states. Massachusetts, on the other hand, did. The platform companies were not self-nourishing. HP worked with startups, out from which new behemoths grew; Raytheon consumed startups and left nothing. (Many large companies in Massachusetts played large roles in creating captive labor markets.) No substantive startups spawned from their employees, unlike with Shockley, then Fairchild, then Intel, AMD, Kleiner Perkins, and countless others. Nor did behemoth entrepreneurs become investors in only their own communities, like they did in Silicon Valley. In other words, the ecosystem was not self-sustaining and so it missed out on new waves. It faded as its counterpart soared.

Silicon Valley soared at a critical juncture in entrepreneurial history. In the early 1970s, along came a real estate developer by the name of Tom Ford. Ford was a visionary. For years, he worked at Stanford and led its land development program. Later, he built Sand Hill Road. Where others saw dunes and trees he saw accessibility to Stanford, proximity to platform companies, and an even drive to San Francisco or San Jose. It worked. He secured emerging investors, like Kleiner Perkins and Sequoia, whose founders had excellent reputations as entrepreneurs but no experience as venture capitalists. After their success, he kept building and many more service providers followed. He added a restaurant called Sundeck (and restricted other eating options). VCs learned about companies from each other at Sundeck and Buck's. They spoke about term sheets for lunch. Founders connected and learned from each other. Professors learned of interesting opportunities as they caught up with professionals. Students were able to get the same access into the ecosystem. It was, after all, all there, right by their campus. A community developed. Fundraising sped up. Financing became more founder friendly - each VC knew about each deal; the most competitive one would win. No longer would founders need to spend months traveling through cities fundraising. Now, they could visit 20 VCs on the same block in two or three days. Why would they go anywhere else? Right as all of this was happening, in 1978, the Department of Labor eased the ERISA under the "prudent man" rule, thereby allowing pension funds to invest in private equity. Money began to pour into venture capital, and new funds hatched overnight. Where else could they go but Silicon Valley? They further nourished the ecosystem, which never again blinked twice. Boston was slowly left behind, a gradual collapse made sudden this millennium when Greylock, the first truly great VC firm, moved its headquarters from Cambridge to Silicon Valley. It is no coincidence that in the midst of all this, Tom Ford, made rich, gave back to his communities. The virtuous cycle of nourishing the ecosystem continued even with him.

Of course, one only need to examine cities' bids to become the automobile hub in the country - Chicago, Pittsburgh, Cleveland, Detroit, and others - to see that luck plays a big role in the outcome. And Silicon Valley had that as well. It made its own luck. Look no further than Fred

Terman, for example, who was the Dean of Engineering at Stanford after the Second World War. Terman not only encouraged his students to start companies, companies like HP, Varian Associates, and Litton Industries, which he would finance. In fact he recognized how important a few people and businesses could be to the ecosystem. He recruited them to move and to move back. He recruited hard. He brought back Dave Packard and William Hewlett. Had William Shockley not come back home to Palo Alto, would the Traitorous Eight have founded Fairchild Semiconductor in Silicon Valley? Would, in turn, Intel, and Kleiner Perkins and Sequoia have happened? Probably not.

Fair Harvard: Stand Tall

When I first joined Harvard as an undergraduate, in 2010, the zeitgeist of a few on campus was that they could be the next Mark Zuckerberg. So many bright minds came encouraged in their thinking that they could start something big and impactful. But after a few months in Cambridge, what became clear was how extraordinary it was that Zuckerberg had built anything at all. There was no infrastructure. The culture was risk averse. Students feared failure, sought prestige, and more often than not were being routed into traditional career paths.

Over the course of my work this semester, I learned that that zeitgeist of longing for opportunity despite no ecosystem long preceded me. While a college student, Patrick Chung, Harvard College Class of 1996, knew no one interested in technology ventures. Jamie Goldstein, Harvard Business School Class of 1994, could list the number of students in his year who founded their own companies after HBS alongside him on one hand. A Harvard Business School 1995 Prospectus led with messaging from Monitor Group and Bain. "Help clients achieve measurable results. Implement change. Strengthen client organizations," one advertisement urged. Conglomerates, investment banking firms, and consulting firms sponsored the Prospecti and trapped students. Few, by my count 1.8 percent, came to Harvard with experience founding companies or working in technology ventures. Although many more were interested in entrepreneurship, the ecosystem - the classes, the programs, the institutions, the clubs, the financing - was only just forming. To the knowledge of an alumnus from that year, two students left Harvard Business School as product managers. This year, that number will be close to 10 percent. This is the story of how our ecosystem developed, grew, and will continue to change.

Unlike Stanford's, Harvard's story for entrepreneurship is a tale of two cities. It was an institution established by Puritans who valued education and literacy. It was an institution set up only for men and, at first, to train them into moral ministers. It brought in much needed modern technologies (the first printing press in the United States). It caved in to the old ways (rote learning and memorizing the Old and New Testament to graduate). Strategically located, with Lexington and Concord to its west and Boston three miles to its east, it sat between the foment of revolution. When its own students protested and rebelled on campus (because, as it were,

the “Butter Stinketh”), it squashed its own revolutions. A Harvard President ended the Salem Witch Trials in horror at what had happened; his son, a Harvard alumnus, had started the Salem Witch Trials led by fear and a conviction for his own moral superiority. It was home to Washington’s army and America’s first literary revolution. Its home was a strict environment patrolling its students’ from straying in their ideas. Harvard was born with the Puritan legacy of conservatism, elitism, and morality, but also of agitation, education, and dissent.

There is no question that Harvard has changed the world with its research. It pioneered the practice of surgery. Its professors won Nobel Prizes. They discovered DNA and countless disease cures. But its students could not start companies while studying on campus. Its professors risked missing tenure if they toiled on business ideas. They risked losing tenure if they acted on them. The university resisted close links with business. It refused to invest in its students and related ventures, despite many famous and lucrative opportunities. For long, the controlling voice in the university was a derision toward practical study and business in favor of scholarship and liberal arts training. The resulting Harvard dropout is no myth. From Edwin Land (Polaroid) to Bill Gates (Microsoft) and Mark Zuckerberg (Facebook), entrepreneurs departed an institution with ideals and ecosystem that did not support their entrepreneurial ambition.

So it is no surprise that the first sign of change came from the outside. It started with the man who was part of the financing collective that transformed Boston’s textile industry, Abbot Lawrence. Lawrence founded the city of Lawrence, built America’s greatest mercantile house, and invested in New England infrastructure and entrepreneurs. For many years, Lawrence had funded the research of renowned Harvard professor Louis Agassiz. But, over time, he realized his own companies lacked the talent they needed to continue to innovate and outpace others. He needed more practical scientists - men of action, he called them. He donated \$50,000 to Harvard in 1847 with a roadmap for what would become the Lawrence Scientific School and what today is known as the Harvard John A. Paulson School of Engineering. The school struggled. While a crusader for educational reform and for building Harvard University’s reputation, Charles Eliot, Harvard’s President and a Boston Brahmin, did not see the school in the same status as others at Harvard. Five times Eliot tried to merge it with MIT, and each time he failed. The school lost ground until Gordon McKay came along. McKay was another Massachusetts industrialist. He had amassed a fortune from patents for shoe stitching machines. Through the years, he too began to long for broadly educated engineers and became close with Harvard faculty, who gave him sound investment advice. In 1891, he donated \$4 million to the Lawrence Scientific School - an enormous sum that ensured it would persist.

Bigger changes were to follow. In 1908, Harvard Business School, the world’s first graduate business program, was founded as an experiment. It launched a pilot at Harvard College that succeeded. So much so that a new campus in Allston, where there was only marshland and swamp, was opened in 1927. The project, like so many before it, was funded by an industrialist - this time George Baker, who had made his money in railroads and banking and was giving back. Unfortunately, even at Harvard Business School entrepreneurship was taboo. It was not a

worthwhile profession to study, a career killer, for professors. So changes were gradual, too gradual, often catalyzed by cataclysmic events.

The Second World War, for example. Before the war, General Georges Doriot had taught Manufacturing at Harvard Business School. During the war, he ran the US military planning division overseeing research and development. After in 1946, he followed the Bostonian tradition of innovating in risk capital. He founded American Research and Development Corporation (ARDC), the first great VC firm, to fund ventures of soldiers coming back from the war. He would go on to teach at HBS dozens of students who went on to become titans in venture capital, students like Arthur Rock, Bill Elfers, and Bill Draper, and he would continue to teach at business school. He merged industry with academia; magic happened. One year later, in 1947, another professor by the name of Myles Mace, a Lieutenant Colonel in the Air Force, created the first ever class on entrepreneurship - Management of New Enterprises, which would become Starting New Ventures. It was a hit. Even academics began to give the study of entrepreneurship a more serious glance for the Harvard Research Center in Entrepreneurship History was set up in this same time period by Arthur Cole. Its big idea, the creative destruction in entrepreneurs, would endure through as Clayton Christensen's *Disruptive Innovation* many years later. With the institution still skeptical about the compatibility between and divided on the roadmap for serious business study and entrepreneurship, the center itself would not.

Harvard's entrepreneurial infrastructure today can in many ways be attributed to the work of four professors. The first is Howard Stevenson. Stevenson defied Harvard's discouragement of entrepreneurship. Whenever he identified opportunities he needed to contribute to, he felt comfortable leaving. One time, he gave up his tenure. Incredibly, years later it was given back so that he would return with the blessing of Dean John McArthur. What began then was a period of extraordinary work. He launched the class Entrepreneurial Management. He defined entrepreneurship. He allied with industry and wrote case studies. Somehow he even started his own venture, The Baupost Group, a breakthrough hedge fund, at the same time. He recruited rockstar academics from other departments to come help build his department.

One such academic was Bill Sahlman. Over his career, Bill has educated more venture capitalists than anyone in the world. He started and popularized the class "Entrepreneurial Finance." Then, with Dean Kim Clark's OK, he took off. Recognizing how far behind the school had fallen relative to Silicon Valley, Sahlman helped set up the California Research Center at 3000 Sand Hill Road. He supported students in their setting up the New Venture Competition on campus. For the first time, Harvard would give students access to financing for their business plans. Arthur Rock, the great investor in Intel and Apple whose donation made possible the Professorship Stevenson held, donated more to the business school. In 1998 began the Rock Summer Fellows Program, which provided summer capital for student entrepreneurs. In 2003 opened the Arthur Rock Center for Entrepreneurship.

Next came Joe Lassiter. Lassiter, a former MIT professor turned entrepreneur, created a course for undergraduates called Innovation and Entrepreneurship. In the first year, there were 400

applications for 65 seats. Then together with Sahlman and Stevenson, he helped set up the Harvard Innovation Lab, which he co-chaired with Jodi Goldstein. Overnight, Harvard had an incubator and a physical space for all students to come work and work on their ventures.

Finally came Tom Eisenmann. He took Stevenson and Sahlman's classes on entrepreneurship and operationalized them. In the 21st century, he introduced classes like Making Markets, The Entrepreneurial Manager, Entrepreneurial Sales and Marketing, Product Management 101 & 102, Launching Tech Ventures, and Scaling Tech Ventures. He developed these courses and then brought in industry practitioners, often alumni, to come back and teach them. He brought programming to the I-Lab. He introduced Startup Bootcamp for business school students. And this year, he launched the MS/MBA program, the first real collaboration between HBS and SEAS ever, and the Roberts Fellows, a program to highlight excellence in entrepreneurship among undergraduates.

These institutions have become platforms for more ecosystem building. Lassiter's work to get undergraduates involved in the i-lab brought Peter Boyce II in. Boyce, then an undergraduate, set up Harvard Ventures, an undergraduate student club, Hack Harvard, and Rough Draft Ventures, a student-run VC fund. One year after, Dorm Room Fund followed. Now student investors populate among Contrary Capital, MBA Fund, Pear VC and others. The i-Lab expanded with the President's Challenge (2011), giving students more access to non-dilutive capital for impactful ideas, the Life Lab (2015), and the Launch Lab for alumni (2018). Under Jodi Gernon, the Rock Center introduced the Alumni Venture Competition in 2010 and its Rock 100 Summit for its alumni entrepreneurs in 2014. She built the Rock Accelerator and Venture Partner program on campus. Both allied to offer students meetings with service providers, financiers, and successful founders, many of whom were alumni. In its own way, a wilderness of marshland and swamps in Greater Boston has become a fledgling startup ecosystem.

The Case for Boston. The Case for Florence

This next section identifies what needs to happen to enable Boston to become the most robust and equitable ecosystem in the world. Over the course of the section, I will also unfurl some leading and lagging indicators that suggest there is some probability we can accomplish each action item. If my proposals and narrative here seem overly optimistic or sanguine, that's because they are. I believe in our potential as a city, our ability to build a better ecosystem together. I see only opportunity. I have great reason to be hopeful. After going through this more contemporary narrative, I hope you will join me in my optimism.

We know the recipe for extraordinary startup ecosystems: pillar firms, research hub, fluidity of entrepreneurial labor markets, strong links between research universities and businesses, a propensity for one generation of entrepreneurs to give back to the generation beneath it, and risk capital infrastructure. For Boston to become the world's next great startup ecosystem, we must do three broad things better: (1) attract better entrepreneurs, (2) keep the best talent, and

(3) empower our best talent to build platform companies together. Below I explain how we might work toward accomplishing all three.

Attract Better Talent

1. Brand Up

Ask the world's best students where they want to go to start a company. Go ahead, ask them. More likely than not, they'll say Stanford. In fact, in a survey 55 percent, when [asked](#), said it was the primary reason why they chose to attend Stanford. Ask any seasoned entrepreneur what ecosystem they'd start or join a high technology business in, and chances are that they'll say Silicon Valley. Despite our shortcomings, they should all be shouting Boston from the rooftops.

For we remain even today an extraordinary hub of innovation. Consider that MIT ranks number one in the world in licensing startups to build with its [technologies](#). Consider [this](#) Pitchbook report, which shows that MIT ranks third and Harvard College fourth worldwide in number of entrepreneurs from undergraduate programs. Consider that Harvard Business School has produced more entrepreneurs (who have raised more money) than (the entrepreneurs of) the business programs of Stanford and Berkeley, combined. Consider that female entrepreneurs who have gone to Harvard institutions have raised over \$5 billion and those to Stanford institutions have not raised even \$3 billion. Women are more likely to succeed in Boston than in Silicon Valley. Consider that Harvard has more serial entrepreneurs (281) and unicorns than anyone in the world (19, versus Stanford's 11).

Recently, we have been better at aggregating our resources and showing our strength. For example, the excellent [Boston Innovation Guide](#) leads with the very many things Boston is great at (innovation, growth and job opportunities, stem degrees per capita, and, according to 1776, startup community). It has been said that Boston has more brain than heart. Moving forward, we will need to inject more heart. We have a great story to tell, and we need to do more tooting our own horn. As a rule, we need to do more marketing that shows our successes. Harvard and MIT can both do this by infecting all via democratizing their thought leadership on entrepreneurship. And the City of Boston can signal to the successful entrepreneurs here by mentioning their successes and names on national media.

2. Strive for Radical Diversity and Inclusion

The great tech companies that succeed tomorrow will be tools of marginalized people, not instruments to marginalize folks more. The great startups of tomorrow will comprise of diverse teams. Why? Structured well, diverse teams outperform homogeneous teams. Diversity adds different viewpoints when building products and selling customers. It leads to better companies. A diverse community can solve a wider range of problems, because it understands personally a wider range of problems. The startups of tomorrow will solve not only the problems of white men in California, but the problems of Latino women in Texas, healthcare workers in Massachusetts, and farmers in the Midwest. If we want our startup ecosystem to win, we must become the most diverse and inclusive one.

Right now, we're not.

For us to become the most diverse and inclusive community, folks with different perspectives need to want to move here. Right now, many don't. Entrepreneurs from underrepresented backgrounds stay home or don't join high technology. We miss out on impact making doers. Our reputation as a racist city lingers. To stay relevant, we need to change that. The state and city should ally with and support all our successful entrepreneurs from underrepresented backgrounds, like Sheila Marcelo, David Cancel, and Reshma Shetty, to promote the city as a destination for every entrepreneur.

For us to become the most inclusive community, high technology needs to reach more than just white men. It needs to reach more than just Harvard and MIT. How can it? First, with support from Harvard and MIT. They are thought leaders and trainers in entrepreneurship. With digital learning, they can democratize access to their expertise. The broader Boston community needs technology and entrepreneurship to be demystified. They need to know only build the skill-sets but to understand the pathways to tech roles. Right now they don't. Second, with the continuing help of city and state governments to empower, skill, and enable more folks from diverse backgrounds to participate in the builder-roles of startups. Supporting and rapidly expanding programs like Hack.Diversity and Rev Boston is critical work. Third, by bringing all Limited Partners in Boston together and signing a pledge that any VC firm they invest in must have a degree of female representation. Partnerships last long, so the pledge can permit a graduated increase to 50 percent representation, but it should be an accelerated time frame. Fourth, by bringing all venture capital firms in Boston together and signing a pledge that term sheets will advise founders to build companies with diverse talent pools. Like with LPs, this pledge should be public. If coordinated together, this can send a strong message for Boston's future as an inclusive destination. Fifth, the city and state must do more to re-skill everyone. Ageism is a thing in high tech ecosystems. It shouldn't be in ours. Sixth, universities and government must ally more strongly with industry associations like MassTLC to connect diverse pools of talent at universities with startups and ingrain industry with research.

3. Harvard, MIT: Go Out and Mine

Know what *really* made Silicon Valley Silicon Valley? Fred Terman going out and getting Bill Hewitt, David Packard, William Shockley and others to move to Palo Alto. There is only one Edison, but, geez, can he create many extraordinary copycats. Each generation there are individuals who through their research can dramatically alter ecosystems and solutions we build for the world. Harvard and MIT must aggressively search for and poach those individuals from other systems. Andrew Ng and Fei-Fei Li? They should be offered a more attractive package at MIT. Patrick Hsu? He should be poached from the Salk Institute and the Bay Area and bring his CRISPR expertise back to Massachusetts. A larger effort for a larger mass of leader-thinkers like these are needed in our ecosystem. They must grow into even better Churches, Whitesides, and Langers.

These leaders crave impact and independence. They will therefore only transplant themselves for positions in places where they can attain both - places like universities, hospitals, or other research centers. Despite that it is these institutions which must find, offer, and secure the next William Shockleys and Bob Langers, I submit that an effort by a village is better than an effort by an institution to secure them to Boston. Imagine if an organized working group coalition of academics, industrialists, financiers, public officials, community leaders, and changemakers collectively reached out to plant the seed, make their case, and offer encouragement for the handful of transformational innovators offered positions in Boston to move here. Knowing a community was already formed to support their success in Boston could be the added encouragement they need.

Keep The Best Talent

When industry leaders in technology were [asked](#) what the greatest advantage of doing business in Massachusetts was, 52 percent said talented workers. When asked what the greatest challenge of doing business was, 26 percent said availability of skilled workers. It was the single highest response. This is the core story of The Hub.

Boston unquestionably produces an excellent top-of-funnel. By my count, there are 213,000 students in Boston and Cambridge combined. Nearly 125,000 of them will graduate from a Top 50 university eventually. That extraordinary pipeline of talent will feed into our technology businesses. Unfortunately, it is not enough. After we train them, some stay. But more often than not, we cannot keep them. After raising money, founders shift to the Bay Area. After graduating, high skilled students move to the Bay Area as well. This systemic, recent brain-drain leads to a high quality pipeline of talent that is not robust in volume.

Leading indicators suggest this may change. For example, startups have begun moving from San Francisco to Boston due to rising costs in SF, easier access to talent that won't be competed from them, and closer proximity to the European market. Talent has also begun retreating out from Boston with smaller frequencies. In [April 2017](#), for every 10,000 members on LinkedIn in Boston, 7.6 moved to San Francisco. In [April 2018](#), only 6.6 did. In [April of this year](#), the fewest ever, 6.5 did. Fewer folks are moving to San Francisco. Fewer, in fact, are moving to New York, Los Angeles, Washington, D.C., San Diego, and Austin as well. Why? We are becoming a better place to stay.

How can we better keep our talent? Expedite the recruiting process of Boston firms in universities. Retrain our talent. Make it cheaper for startups to operate in Boston. Expand the Series A and Series B market offering in Boston - enable them to raise money more easily. Support growth companies. Nothing better for Codecademy than when Mayor Bloomberg said learning to code from it was his New Years' Wish. In national moments, Boston community leaders must seize similar opportunities. But, frankly speaking, nothing keeps talent better than building platform companies.

Build Platform Companies Together

1. Focus on what you can win

There are many technologies that will define the next generation of companies. There are many sectors that need innovation and radical improvement which these technologies will bring. From artificial intelligence to internet-of-things, robotics, quantum, and blockchain, Boston is at the bleeding edge of many and can win in sectors that these technologies will transform - sectors like healthcare, education, transportation, energy, enterprise technology, manufacturing, security, govtech, restaurant tech, and insurance. In each, Boston has a legacy of innovation, a research expertise, a highly skilled and relevant labor force, relevant large companies, and access to seasoned risk financing that earns it a right to compete.

But resources are scarce, and opportunity must be pursued where it has been most de-risked. For Israel, that was cybersecurity. There it held a comparative advantage by way of cutting-edge research and existential daily application. By supporting the industry via government coordination, military adoption, and human capital investment, Israel has quickly come to dominate an [\\$82 billion market](#), for which its companies control a 20 percent global market share of investment. Its focus has had spillover effects into developing expertise in other areas, like computer vision, robotics, health care, and mobility.

For Boston, that may be life sciences, advanced energies, and precision manufacturing, the areas where Deval Patrick concentrated his administration's focus. When the state and city government consider what technologies and sectors to support, rather than aspiring to valuable sectors others clusters dominate, like real estate, media, advertising, entertainment, and consumer, they should start from a position of strength in areas where we can win.

2. Unite and Compete

In their first year at Harvard Business School, every student reads a case on Colgate and P&G. After P&G creates a new sector in oral care and builds a half-billion dollar business, Colgate introduces an ineffective product, largely discounted, to capture market share. Once it sees the opportunity, it decides the best move is to compete and try to kill Crest. But in so doing, it destroys consumer trust in the category. And so the category ceases to grow as well.

That's the opportunity for Boston. We can choose to compete, collaborate, and grow the pie, or we can compete and kill the ecosystem. For many years, we have chosen the latter option. Large companies protected non-competes. Experience was overvalued and ability was undervalued. Investors grew shy, individual stakeholders could not make a substantial difference, a tragedy of the commons ensured, and the startup community could not grow the pie.

But we can, and we will. Here's how.

Cluster Up

The original cluster of high technology companies was Route 128. Since perhaps 2008, after former Governor Deval Patrick signed the \$1 billion life sciences act, Kendall Square has emerged as another cluster for technology, life sciences, and biotechnology high-growth companies. It has been called the most innovative square mile on the planet. Then, in 2010, Mayor Menino launched the first innovation district in the United States: Seaport. Folks debated whether it would hurt the ecosystem to develop several, competing clusters. Whether it was better to just focus on one (Kendall Square). Whether more would pull talent, cause confusion, and destroy our ecosystem. Whether it was right for Boston to compete with Cambridge for its innovation. While the Seaport district has had many challenges (such as escalating housing costs, lack of inclusion, and an undeveloped neighborhood), it was built, startups came, and they have flourished. It unearthed truth: more clusters and more competition leads to more innovation and more of an ecosystem.

More clusters are emerging. In 2009, the Wyss Institute was launched in Boston's Longwood Medical Area. Fitted by almost 20 research institutions (hospitals and universities), it is becoming another hub of innovation in the city of Boston. And SEAS, formerly the Lawrence Scientific School, long neglected, may at last become the engine of output matching the vision of its initial donor. For in 2015, John A. Paulson donated \$400 million to the School of Engineering and Applied Sciences. The school is moving across the river, to Allston, into a 500,000 square foot, \$1 billion campus set to open in September 2020 and set to serve over 1,000 graduate students, researchers, and professors. It will take time for the ecosystem to percolate. [West Station](#) still needs to be built to provide reliable public transportation into and out of the neighborhood, many components from Harvard University's [Master Institutional Plan](#) still need constructing, and the [Mass Turnpike](#) will move, freeing up more space. But starting in September 2020, the school will touch the Harvard Innovation Lab, the Life Lab, and Harvard Business School. As both institutions test, iterate, and slowly expand the MS/MBA program, one thing is clear: Allston will become a startup and solutions factory. Innovation in Allston is about to explode.

While such clusters are emerging, more are needed. Silicon Valley has many: South San Francisco, SOMA, Berkeley, Emeryville, Stanford, Cupertino, North San Jose Innovation District, and many more. Virtually every city along Route 101 has become a cluster. The way Boston becomes the dominant startup ecosystem in the world is by connecting to nearby clusters. The way we include those often excluded by technology is by building nearby clusters. Providence, Worcester, and towns down to New York must ultimately comprise an East Coast Corridor of technology.

Hypercluster Up

Clusters are powerful. Hyperclusters can be equally so. A hypercluster is a single complex that provides all the food, water, and shelter needed for an ecosystem. It is a co-working space of startups, venture capitalists, family offices, researchers, PR agencies, and law firms. Best example? Stanford Research Park, built by Fred Terman and Tom Ford. Covering 10 million square feet, the park houses 150 different companies and 23,000 employees. From HP to

Varian Associates, the complex has housed startups, large enterprises, and researchers all next to one another. Cohabiting the same complex facilitated finding new customers and acquirers. It de-risked businesses for future investors. Its impact cannot be understated.

One hypercluster has already been built in the Greater Boston region: the Cambridge Innovation Centre. The CIC managed a 90,000 square foot space in Kendall Square that houses startups, lab space, service providers, and venture capitalists. Between all the spaces it manages (Lab Central, Impact Hub), it claims 450,000 square feet for venture capital firms that have over \$7 billion in assets under management and for startups that have raised \$1.8 billion in venture capital. We need more.

As Allston positions itself to become a new hub for innovation, who will build its hyperclusters? Who will incent investors, law firms, startups, maturing technology businesses, students and academics, marketing agencies and development firms to come together into one shared space? Who will take on the risk to build 3000 Sand Hill Road?

Collaborate

The collaborative gene is not developed in Massachusetts. Over our history, we have bended toward disruption (American Revolution), secrecy (Beverly Cotton Manufactory), self-reliance (Emerson), or regional loyalty (cities of Cambridge, Brookline, Boston, etc., or Boston-based investors search for non-competitive, restricted access to investments). This began to change with Governor Deval Patrick, who in the winter of the Great Recession used his power as governor to convene all community stakeholders, take ideas, and act around life sciences, clean technology, and precision manufacturing. The result has been powerful. Governor Charlie Baker has made propagating diversity and inclusion in state government a critical part of his governorship. Imagine a call by Governor Baker to the technology sector of Massachusetts to convene on the topic of diversity and inclusion. As we work to build a better and more equitable ecosystem, a common leader by way of Governor Charlie Baker to streamline work toward D&I would be welcome.

More intense collaboration and competition, in general, is needed. Accomplishing any of these actions will not be the result of one woman or one man, one startup or one investment firm. Each needs a collective of actors. So start acting. Find a working group of three or four folks from various backgrounds and firms who are committed to the one action. Leverage network nodes and builders. Organize to call and recruit the very top talent to come, or move back, here. If you are a founder, look for champions who work for you. Building a transformative company is hard enough already without them. After you succeed, remember to give it back.

Don't know what to do or how to act? Contact me. If you care about our vision for building a better Boston but don't know what you can do, reach out. If you're an ambitious or underrepresented entrepreneur who needs help getting to the right customers, investors, or champions who will help you, speak up. If you know a doer who can radically transform this

ecosystem, like did Shockley for Palo Alto, but don't have the network to lobby her or him, hit me up. I am committed to building our startup ecosystem to be better and more equitable, and I will help you help our ecosystem.

Should we care about building Boston into the best startup ecosystem in the world? Are other goals not more noble? What's at stake? To my mind, too much. We risk opportunity to transform this region into an engine; we risk our future prosperity. High growth technology businesses create jobs, better, higher-paying jobs than any other model. They also generate [wealth and growth. In fact, our GDP](#) very well may be positive largely due to the impact of technology businesses alone. In 2009, technology businesses comprised less than ½ of a percent of GDP. Today, one decade later, technology businesses comprise roughly 5 percent of GDP. As the world changes rapidly, embraces technology, and accelerates its adoption of new services, there is no question that the role technology businesses will play will grow. What will happen will become a war for talent. A war over talent in a nation and a war for global talent. The city that can best attract the top talent and can best enable them to solve big problems will create the most bustling ecosystem with the most enduring engines of job creation and regional economic prosperity. Those that won't may perish. Do not forget that Cleveland and Detroit were hubs of innovation in the 1800 and 1900s. No city has a perpetual claim on innovation and talent. Every city can decline. If we leave ourselves behind in this next phase of technology development, that decline may next be ours.

Building Sand Hill Road and Florence

Improving the Harvard startup ecosystem will take time. While the core - capital, space, advisors - is there, many links still need to be built up and many problems persist. Students express (1) confusion about navigating available resources, (2) difficulty in finding the right people, and (3) an inconsistent service approach. Founders and faculty detail a culture and a reputation that fears failure and fears solving big problems. Addressing these problems can maximize the impact our student entrepreneurs make immediately after graduation. My plan below details what actions I propose we take to address core problems. This plan is the result of listening to over 50 students, faculty members, administrators, service providers, alumni, and government officials with affiliations to Harvard University. Some actions can be immediately implemented and are stage-gate solutions. Others will take considerably more time. With every action I propose, I explain what problems exactly it is addressing.

Harvard Undergraduates Only

Harvard undergraduate students comprise approximately 30 percent of the Harvard student body in any given year. Yet apart from the Harvard Innovation Lab, they have no real platform for entrepreneurship. Clubs do nothing. Run by rotating students without leadership direction and with a need to pad resumes, they do not connect students with other entrepreneurs on campus. Incentives, therefore, have struggled to align. Their student body is large, and entrepreneurship is a niche group relative to the dominant consulting and finance tracks. They

often fail to meet the right people, “their” people - undergraduate or otherwise. They struggle to receive support from the right advisors to navigate opportunities and the ecosystem. They are dissatisfied with academic programming in entrepreneurship and want more. None whom I have spoken to are satisfied with ES95: Startup RAD. All fluff, they say. Given their number, talent, relative risk appetite and unserved needs, it is my belief that addressing some of their problems will have major, high-impact ramifications for entrepreneurship at Harvard University. And given their longevity (four years), they must play a larger student leadership role in building our ecosystem.

Two actions in particular may have a large impact in better mobilizing undergraduate entrepreneurship:

1. House Startup Tutors

The undergraduate experience centers around upperclassmen housing. Residential and nonresidential tutors operate out of upperclassmen houses and advise undergraduates on pre-law, pre-med, consulting, finance, and fellowships. But there are no tutors dedicated to helping students navigate startups. By leveraging a system of startup tutors throughout each house, students would have nodes whom they could turn to for help in navigating through all of Harvard’s resources. Nodes would serve as information consolidators and connectors as well, throughout the undergraduate body and into industry.

2. Academic Programming in Entrepreneurship

Undergraduates want to study entrepreneurship. They crave for more academic instruction, especially from Harvard Business School. They want instruction and organized opportunities to connect with other interested campus entrepreneurs. At the same time, they are bad students. They expect lectures, which they often skip. When they attend, they are often unprepared, late, or anxious to use technology. Their general method and culture of learning is very different from Harvard Business School’s.

So what I propose is a class with extremely well reputed alumni investors and entrepreneurs. I would publish it online, for the world to see. I would structure it like Science and Cooking - Tuesday classes lecture and science; Thursday classes discussions with renowned experts. By bringing in famous alumni investors and entrepreneurs to speak on particular modules, students would get access to a network and learn from experts. In turn, the higher profile of folks would fill up the classes to the scale of CS50, Justice, and EC10. Finally, by publishing the material from one year’s version of the class, Harvard would show itself as a leader in entrepreneurship, much like Stanford had done in 2014 with Sam Altman’s class. By democratizing access to education, the class could earn good will from the entrepreneurial community and slowly help reposition Harvard as the most desired destination for entrepreneurial undergraduate students.

Harvard Business School Only

Students at Harvard Business School have far different problems. Their ecosystem is far more mature, far more robust. They have no difficulty in meeting with investors or with raising capital.

They have accelerators, mentors, and advisors. But they struggle because Harvard Business School lacks any service orientation toward campus entrepreneurs. It has overengineered an ecosystem but often neglects the attitude needed to serve entrepreneurs appropriately. Participating in a 20 month accelerated, intense program, students often lack the courage to commit and to embrace failure. Those who do have difficulty in finding the right resources and people rapidly enough. Or lack the time to commit to every event they are invited to - many appearing trivial and trite - but don't know what to skip. By the time they learn how to navigate Harvard Business School's resources correctly, their RC year has finished. By the time they graduate their EC year, they still will not know how to navigate all of Harvard's resources for them.

Four actions in particular would orient Harvard Business School to better serve campus entrepreneurs:

1. Recruiting Days

In both the RC and EC year, Harvard Business School has a number of recruiting days, many concentrated in the first semester. The history of recruiting days goes back decades, for I see them in the 1995 HBS Prospectus. Their purpose is noble. With academics so intense, students need days partitioned out to focus on their internships and jobs. But these recruiting days are built to suit recruiting for investment banking, consulting, and finance. Startups recruit much later in the year, and entrepreneurs, well, they have no intention of recruiting. Each recruiting day, the startup community at Harvard Business School is unserved and knows how little they apply to their track. As folks bond over preparing cases for interviews, the startup community at best bails or, more often, at worst feels excluded.

If Harvard Business School is serious about training entrepreneurs, then it needs to re-orient how it serves its students. Entrepreneurs and joiners are simply on another track, and it needs to acknowledge it. (Unfortunately, a formal track is likely not the best option, since entrepreneurs go at their own, indefinable pace.) When students are recruiting for their finance or consulting roles, entrepreneurs need focused programming to work on their ventures. These should not be recruiting days; for them, they should be startup days.

Imagine one early recruiting day is a Startup Fair of all campus entrepreneurs. One day is on ideating, by Tom Eisenmann or Luis Bрева. One day is a Startup Fair of Boston companies. One day is a series of talks by professors in the EM unit, which enables students to meet potential advisors earlier. One day a facilitated mixer between founders and investors with no table-stakes. Another a low stakes get together between founders. When the rest of Harvard Business School recruits, entrepreneurs don't want to rest. A comprehensive program for Startup Days would orient and retain those bent on starting companies and signal Harvard Business School's changing commitment toward them.

2. Recruit Entrepreneurs

Students want faculty members who have gone out, dared, and built high-growth businesses to come back and teach on campus. They want advisors not only who have studied how to construct and scale an enterprise but who have lived through their traumatic psychology. Today we have several such entrepreneurs teaching: Mark Roberge, Shikhar Ghosh, Jeff Busgang, Lou Shipley, Mitch Weiss, Sam Clemens, Julia Austin. Founders want more. Why not invite alumni or local entrepreneurs like Eric Paley, Hayley Barna, David Cancel, Paul English, Dharmesh Shah, Brian Halligan, Nathan Blecharczyk, Sal Khan, Jonathan Bush, Todd Park, Andy Palmer, and Paula Long to give back and educate the community's next generation of entrepreneurs?

3. Simplify Rock Center Efforts

Founders appreciate the Rock Accelerator. They are grateful for the Rock Summer Fellowship. They are thankful for the entrepreneurs, investors, and mentors whom they can meet. Many companies form precisely because of the center's resources. Many grow and navigate the right resources through the extraordinary support of Jodi Gernon. The Rock Center has a lot working for it.

What's not working? Where are some specific places to improve? Founders hate the applications. They hate that there are two separate applications for the VIP at the Innovation Lab and the Rock Accelerator. They hate that each application consists of nearly fifty questions and is far longer than what they would find for Y Combinator. They hate how they must interview with Rock Venture Partners, who ask about how they will scale and build barriers to entry before students have even validated product-market fit. They worry that students decide how much capital is allocated to their businesses. They feel the Rock Accelerator program has been constructed only for the benefit of training venture capitalists, not for enabling entrepreneurs. They hate how long they wait to receive checks, which matters when they have negative cash flow. They hate how they don't know when they'll receive funding. They hate that if they are admitted to both the Innovation Lab and the Rock Accelerator they must meet with two separate mentors, neither of whom actually understands and adds value to their businesses. They hate the at-times bureaucratic and administrative, rather than entrepreneurial, feel. To my mind, founders are the busiest community members we have at HBS. But when I spoke with founders who touched the Rock Accelerator, many felt that was not understood in the program. One extreme case, when asked what they had learned during their time at the Rock Center, said, "I learned that I shouldn't have gotten an MBA. And so I wonder why I have." We can work to create a more systematic positive experience.

So what actions should the Rock Center take? First, shorten the Rock Accelerator application. Second, explicitly standardize the prize allocation so that cohorts feel equal and founders get their tranches transparently, with plenty of time to plan for them. Be sure to separate the decision making around money away from students. Third, simplify the program. If students are admitted VIPs, don't force two mentors. Don't center the program around advice. Build around test designs and achieving the KPI of students earning their first customer as a result of the

accelerator. In fact, build KPIs that link the Rock Center to each startup's successful hiring and selling. Fourth, consolidate events to mission-critical events.

4. Alumni Entrepreneurial Community Bridger

Ultimately, administrators cannot build an ecosystem. Students must. When new students come on campus, older students must connect them with available resources. Older entrepreneurs need to extend their networks to newer entrepreneurs. They must serve as network nodes, as sages who know what it takes to try to be an entrepreneur in the context of an HBS education. Frankly, without having gone through it, that context is nearly impossible for administrators to empathize with. So for Harvard to become the best ecosystem it can be, a virtuous cycle of giving back must develop among its students.

But the program is accelerated, designed to overwhelm, and pushes to an unrelenting drumbeat. Built to transform, it centers on self-actualization. In this context, when you feel you are just getting by, giving consistently to community, or giving to community alone, becomes especially hard. What I propose is a fellowship program for one, or several HBS alumni. Student fellows between their graduation and the start of their job, ideally after the start of HBS, would bridge the incoming class with the existing RCs and graduating ECs. By connecting students freely with resources that took time to discover and accumulate, alumni bridgers would give back to the ecosystem, set the tone on a culture of giving, build a safe space for daring to build ventures, and give students a head start.

5. Note: SEAS Integration

If we're real with each other, then we both know that the largest behavioral shifts will come from integration with SEAS. I think MS/MBA students will be strong grassroots infiltrators of doer culture for both colleges. But they must also become bridges, explaining to students from both how to best access information and opportunities at the other respective college. Apart from facilitating faculty research and coordinating calendars, successful integration between SEAS and HBS depends on the grassroots campaign of MS/MBAs and the active outreach to the other by both colleges after SEAS officially opens. One structural change to the NVC that could help facilitate cross collaboration would be to mandate that there must be team members from both institutions in teams that apply for the NVC.

One Harvard

All the tactical solutions suggested above will improve the entrepreneurial ecosystems at Harvard College and Harvard Business School. But they won't cut out the systemic problems of confusion about resources, inability to find people, and serviceless approach to entrepreneurs. They won't eliminate the culture of fearing failure. They'll just reduce it. Big problems such as those need big solutions. Some will take years to implement. Implementation of others, perhaps at odds with university principles, may never be possible. Each one I propose below, however, is a very necessary puzzle piece to an ecosystem that truly has a right to win. Please, dream with me and build with me.

1. FEP: First Year Entrepreneurial Program (Startup Bootcamp, August)

Startup Bootcamp by Tom Eisenmann and Julia Austin has become great. Do it in August. The January session is tough because it mixes students who are serious entrepreneurs with those playing pretend. It is a difficult combination to swallow. It doesn't help those looking to find their people find their people.

I recognize that HBS does not want programming before school starts. It creates cliques before friendships have a chance to form. But entrepreneurs are looking for their people for the entire RC year. It's hard to do because the experience is otherwise built around a section. But Startup Bootcamp in August would a call for all entrepreneurs to find each other right as they come on campus. It would build a community of right people immediately. And it would arm them with the academic programming that they so crave. By the way, in case it is not clear, this should not be an HBS-only program. HBS students want to connect with other graduate students and undergraduates. Undergraduates have outdoor and community service programs right before their first year starts to get to know those who have common interests. Those intent on making their impact by building companies that solve problems would love nothing more than a shared experience coming into Harvard with peers and graduate students and post-docs with the same goals. It's really, really hard for the niche entrepreneurs to find their people. We preach a One Harvard. This accelerates it for our network of entrepreneurs on our campuses right as they come in.

Note: it may be cost prohibitive for low-income students. Given we wish to build a better ecosystem, we must find ways to include them. While the program must be free, the other expenses that their financial aid covers (meals, housing) might not be ready by the time the program starts. It is critical to solve these logistical issues before launching the program.

Note: unlike other programs, this is an academic program and it is challenging to institutionalize academics ahead of the school year. Given that entrepreneurship is not taught at the College, the challenge in creating this programming may be more with the business school, where an education in entrepreneurship before school may create a comparative advantage.

2. AHEAD: Association of Harvard Entrepreneurs and Doers

As I study what makes Stanford so effective an ecosystem for campus entrepreneurs, I realize that Harvard actually provides more resources. Why we fail relative to them is because students and investors at Stanford know where to go to find all their people, all their information, and all their capital.

Why? Because Stanford has BASES - Stanford Business Association of Entrepreneurial Students. It is an umbrella organization for all entrepreneurial activity on campus. Run by students, BASES hosts hackathon, startup fairs, conference, treks, pitch competitions, skill workshops, and a thought leaders speaker series. If a student is curious about the startup ecosystem at all, they sync up with BASES and they catch up in an organized way to all the campus resources. Advisors consist of former students who led BASES, Stanford

entrepreneurship professors, and Stanford Directors. Its powerful alumni community proves one thing: anything that endures in a university must include students, academics, and alumni in its leadership.

We need a similar umbrella organization at Harvard. It should be called the Association of Harvard Entrepreneurs and Doers, or AHEAD, since it accelerates entrepreneurship in the community, for short. Because the Harvard Innovation Lab is the physical focal point for entrepreneurship, AHEAD must operate under the I-Lab. AHEAD should be student-run and alumni, professor, and director advised. If I am an investor, I should be able to connect through AHEAD to reach interesting student-run companies. AHEAD should organize / administer the Presidents' Challenge. (Which, again, should consider requiring the presence of team members across the University.) AHEAD should organize mixers with the entire undergraduate and graduate startup community. As often as possible, those mixers should include MIT founders as well. It should host meetings each semester with all club leadership vested in entrepreneurs - from Harvard Ventures at Harvard College to the Entrepreneurship Club at Harvard Business School. If I am student looking for a job or internship, AHEAD should be my first stop. It should even link with the alumni affinity groups for entrepreneurs (HAE and Harvard Founders' Club). If I am a founder looking for interns, employees, or co-founders, AHEAD should be my first stop to find them all. Say I am an alumna looking for talent for my venture, well, say no more: AHEAD. All non-academic programming should center through AHEAD too. Harvard has people and infrastructure to make an ecosystem tick. AHEAD enables students to sort through the confusion of resources far more simply, to contribute to the culture and hence change it into one of doers, and to meet with the community of entrepreneurs immediately and consistently - at their respective college, across the university, and with MIT as well.

While perhaps difficult to create - because, after all, Harvard is fundamentally a federation - there may be no more impactful action we can take in the short-term. If students do not organize themselves into an organization that allies with alumni, directors, and faculty, that centralized information access for newcomers and for capital providers on the outside, that serves a mission on campus which students continue to work toward after they have left, then we will not have a functional, virtuous cycle for entrepreneurship on campus. It's frankly really that simple.

3. Industry to Faculty to Student

The linkages between industry, faculty, and students are much weaker at Harvard University than they are at Stanford. A fluidity of labor between academia and industry is critical if we want our students to learn from the best and to become the best. Our intent to restrict has been noble: we are protecting our students and the integrity of our academic instructions. But we must do more here.

First, we should ask all our alumni who are working on high growth businesses to personally invite professors to visit whenever and operate out from those offices as convenient. This will not only lead to more case studies and a higher linkage to the university, but will also fluidly improve information flow and innovation on both sides. Note: When I say 'we' here, I do not

mean Harvard. I mean its students and its alumni. This is not a request that the University or its academics could make.

Second, professors should be able to start their own companies and join others without the seizure of tenure and threat of no-return. Sabbaticals to encourage entrepreneurship should instead be supported.

Third, industry should participate in our education and help skill us, for free, as part of our extracurricular time. We have some of this at Harvard Business School. We have none more broadly in the university. By improving fluidity of labor between professors and industry and by creating AHEAD, we create a synergistic platform for that industry training to take place.

4. Build Western Avenue's Sand Hill Road.

At the end of the day, our ecosystem needs platform companies. Companies like Fairchild Semiconductor and HP, which train talent, grow the ecosystem, and spawn new entrepreneurs in our community. We maximize the odds that we build platform companies by bringing in and keeping the best entrepreneurs. We maximize the speed and therefore the probability that they build platform companies by building a Sand Hill Road.

Why does Sand Hill Road work? Because as a founder, I can raise money in one day. Knowing that, why would I travel along Route 128 and through various neighborhoods in Boston and New York and waste time? Because I can exchange ideas with other founders or more mature businesses and rapidly prototype new pivots or hypotheses. Because I can find customers and acquirers more quickly. After all, they work in the same space as me and more easily trust me. Because as an investor, I have access to other investors and learn immediately of other deals. Because by being around entrepreneurs for a longer periods of time, I de-risk those ventures. I can afford to pay higher prices because I have access to information that others outside the community do not have. Because I now really have to compete and get better, which forces me to become founder-friendly. The ecosystems that don't have this luxury of speed and competition - they can never truly become as founder friendly. And - the part that no one talks about - because as a real estate developer, I have the future stream of companies assured by Stanford that will replace those who crash away and because I have a stable source of income assured by service providers and larger firms. Hyperclusters have a magical effect orders of magnitude above what clusters can achieve.

How can we most accelerate the building of platform companies? By building a modern Sand Hill Road on Western Avenue, near our Science Complex. I propose 240,000 square foot space that provides office space to law firms, PR agencies, startups, and mature, high growth companies. The older companies should be potential platform companies - potential acquirers, willing customers - for the new startups. Those more likely to endure help generate the business model economics. Like Buck's and Sundeck, two restaurants will sit inside. One will be a co-working space to chat, pitch, and learn about deals; the other to bring clients or to celebrate deals. It should include a studio for prototyping equipment to empower materials and hardware

companies to build more rapidly. It should have a gym with social sport facilities with access included in a lease package. Any registered Founder in Boston should have access to the gym facilities at no cost. It should become a place where women and men can connect and de-stress over their difficult ventures.

How do we build it? For it will be hard and expensive. Conservative construction costs alone will be \$50 million. It will take years to push through Harvard, to build, and to tie up the key stakeholders, like Tom Ford had done with Kleiner Perkins and Sequoia.

It has been suggested to me that a story needs to be sold to the service providers we would want in the building. To speak with the major, most impactful players and tell them of what's being built, to convince them not to take extended, long leases in their existing places. Speak with VCs, with family offices, with legal firms and say: wait for us, in four years, you can join a hypercluster. Someone involved with the project needs to actively, tactfully, and tactically do this during the construction. You need the right anchor tenants. I've been told is that if someone builds it, it should be Harvard Business School. It has a track record for building on time and on budget. Elsewhere I have been advised that the most expeditious method for building it would be to have alumni construct it and grant the building to Harvard as a donation. Given this would circumvent union labor and given the project itself might interfere with the Master Institutional Plan (2013-2023), I imagine there will be nothing more difficult to realize than this. But also nothing more enduring to Harvard's legacy of building Boston, serving progress, and empowering leaders who make a difference in the world.

Note: I have wondered a lot whether such a project should have an association with the University. Should I just build it on my own? I think it needs to. For the same reason that District Hall will never become the coworking space for founders and investors and for the same reason that Sand Hill Road, built by Tom Ford of Stanford did, so too must this project. Extraordinary businesses come from the free flow of labor between academia and industry. With no academia, the project becomes too risky for any builder to attract the required startups and service providers sustainably.

5. Collaborate with MIT

When I speak with senior faculty at Harvard and investors in Palo Alto, one thing is clear. Nothing worries Stanford about its future status - nothing - except for deeper collaboration between Harvard and MIT. I mention this only to say that more collaboration driven by students and by faculty between both institutions is a requirement if we are to lead in solving the largest, most pertinent problems in the world.

How to do this with faculty, I do not know. I leave it to Larry Bacow and offer my unending support to champion and push for this collaboration. What I do know is that if faculty teach classes both at MIT and at Harvard, they would be able to bridge students in both. If academic calendars are aligned better, more students can cross register. If AHEAD is built, it can include

MIT students and clubs at events it hosts. One can expect the same from MIT. If the Muddy Charles Pub at MIT were to be open to Harvard founders, they could better revel in the MIT community and more opportunities to collaborate would occur. Consider requiring some pitch competitions to include cross school co-founders. Accelerate the fluidity of labor between both institutions and you will have magic.

6. Train the rest of Boston

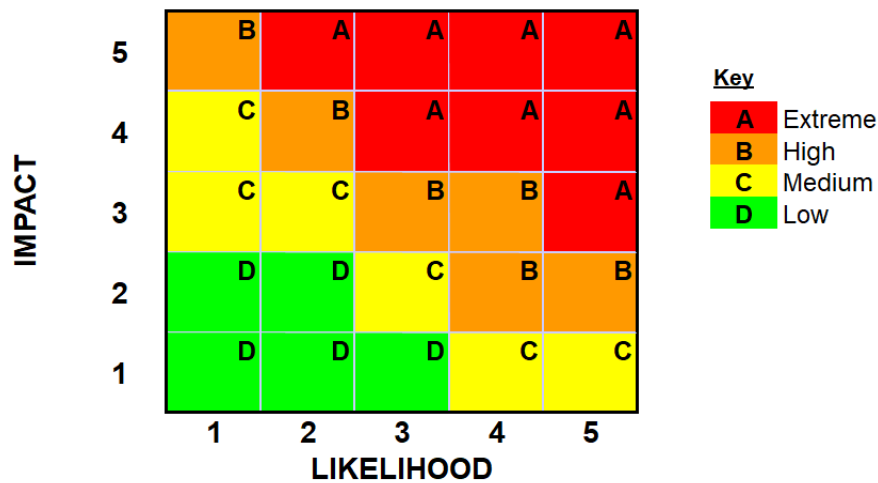
We have a lot to say about entrepreneurship, but we don't. When asked which school is best for entrepreneurship, students say Stanford or MIT. If set on becoming founders, students opt for those two institutions over Harvard.

We need to attract the best entrepreneurs. We can do this only by showing that we are the best for entrepreneurship. Yes, we can market more. But we can market better if we act. If we democratize our access to studying entrepreneurship, we will communicate to the world just how strong we are. And if we train the Boston community with a Crossfit model of physical, community education, we can include and empower our surrounding community to share in a startup ecosystem we are building. The pace of change will only increase over time, and the need for continuing education to stay relevant in startups will increase just as quickly. The goodwill we build from educating community entrepreneurs cannot be discounted.

Opportunity and Action Analysis

No company can mitigate every risk. Resources are not infinite, and individuals are not omnipresent. A Risk Matrix is a framework that aids evaluating risks on a scale of 1 to 5 for impact and likelihood. I have found the matrix to be a useful guide for showing which risks should be prioritized and which might be accepted or ignored. What it often shows is that some risks with high likelihoods deserve no attention; others with a low likelihood have an impact so great they need mitigation strategies for they are existential. Risk is one side of strategy, and opportunity is the other. So I use this same framework to evaluate the opportunity of every focus industry and action item I proposed above. We have limited resources, and we must focus them.

Opportunity Quandrants



Impact: What is the business impact here? Assuming the action *is* completed, what effect would it have on our community? How big is the TAM? How many more platform companies would form? How many more entrepreneurs would start companies? How many folks would we retain in Boston? How many more doers would we attract? How much faster would entrepreneurs move? Perhaps the exact quantity is not possible for many of these questions, but a directional point will be.

Likelihood: How many years will the action take to materialize? How combinatorial is it - in other words, how many 'ANDs' must all successively take place to achieve the action? How many interest groups and institutions must collaborate? Who can derail the work, and how can their interests be satisfied? Should everything go perfectly, what is the probability that these opportunities and actions can even materialize? Again, exact percentages are unlikely to be possible, but bucketing into ranges is doable.

Let's use AI as an example. What is its impact? Well, it will reach into healthcare, education, security, transportation, manufacturing, research, financial services, IT, retail, agriculture, professional services, and defense. It is described as the Fourth Industrial Revolution. Its impact will surface everywhere. Assuming Boston can win here, it must be a '5.' What is the likelihood that we can win in AI? Well, MIT has been on its cutting edge since the 1960s. We have an extremely robust network of experts and machine learning engineers. We have 13 labs working on artificial intelligence. What's more, MIT is launching a billion dollar AI college set to open in September 2019. If anyone is positioned to win, it perhaps is Boston. But perhaps not. AI will depend on deep pockets of data, and Silicon Valley (marketplaces and networks collecting data of billions) and Beijing (a market of one billion coerced to give data) both have comparative advantages there. Their clusters are forming already. Even were everything to go perfect, our

likelihood of winning in artificial intelligence is extremely high, but we may still not be clear front runners. Given we have rated the Impact '5' and the Likelihood '4,' our opportunity type is 'EXTREME.' We must pursue it with our resources.

Note: these ratings are my considered assessments. Ratings, like many other things in life, tend to get closer to the truth with additional input. If you disagree with any, mention your reasoning as a comment. We'll build a better priority list together.

Harvard Ecosystem Actions & Opportunities

Action	Impact	Likelihood	Type
Build Sand Hill Road	5	1	HIGH
AHEAD	4	2	HIGH
FEP	3	4	HIGH
Startup Tutors	1	4	MEDIUM
Undergrad Course	2	3	MEDIUM
Harvard Entrepreneurship Online	3	4	HIGH
Harvard + MIT Collab	5	2	EXTREME
Improve Academia - Industry Fluidity	4	1	MEDIUM
Integrate SEAS	4	3	EXTREME
Recruit entrepreneurs and doers	5	3	EXTREME
Simplify HBS ecosystem	2	5	HIGH
Community Bridger	1	5	MEDIUM
Recruiting Days @ HBS	2	5	HIGH

Boston Technologies & Sector Opportunities

	Impact	Likelihood	Type
AI	5	4	EXTREME
IoT	5	3	EXTREME
Blockchain	4	2	HIGH
Robotics	4	4	EXTREME
Quantum	3	1	MEDIUM
Security	3	3	MEDIUM
Education	4	4	EXTREME
Healthcare & Biotech	5	5	EXTREME
Manufacturing	5	1	HIGH
Restaurant Tech	3	2	MEDIUM
Insurance	3	2	MEDIUM
Energy	4	2	HIGH
Transportation	4	2	HIGH
GovTech	1	4	MEDIUM
Enterprise Tech	2	4	HIGH

Boston Actions and Opportunities

Action	Impact	Likelihood	Type
Brand Up	2	3	MEDIUM
D & I	4	2	HIGH
Build platform companies	5	1	HIGH
Expansion Risk Capital	2	3	MEDIUM
Assemble new clusters	3	2	HIGH
Hypercluster Up	4	2	EXTREME

When folks ask, “Where should I start?” or “What should I do?” I suggest they first examine the tables above. Do you agree that the opportunities rated ‘5’ on impact will have the largest impact on our ecosystem? Are you or your working group uniquely positioned to improve its likelihood of occurring? If yes, start there. If you are an undergraduate collective at Harvard College, this might mean pushing through an undergraduate course in entrepreneurship. If you are a connected entrepreneur or academic, it might mean recruiting new George Churches, George Whitesides, Bob Langers, and William Shockleys to our town.

We need successes. Kernels of success in areas you are uniquely positioned to attack will be motivating and will sustain you. We also need to swing for some home runs. And those home runs are ‘Extreme’ types in the analysis above. If you are not uniquely qualified to improve the likelihood of the actions above, consider offering help to those working on ‘Extreme’ opportunities. Your impact will be largest there.

Are you working on any of this stuff and need help or manpower? Or have a comparative advantage but no clue how to leverage it? Let me know. I’m here for you and your success in transforming this ecosystem. Remember that this is a journey that may take a decade and very likely will end in failure. It may be discouraging. It may feel as though we’re just cogs instead of main actors. It may become easier to believe that it’s better to disengage, easier to forget the opportunity cost in not building a better ecosystem. So let’s not do it alone. Let’s compete and collaborate. Let’s have fun. Let’s build the world’s most robust and equitable ecosystem in the world. How proud we will be after we have.

Sources

As I noted in my acknowledgements, this project would not have been possible without dozens and dozens of interviews I conducted with Boston and Silicon Valley community stakeholders. With each, however, my conversation was off-the-record. While I can’t include their transcripts, I *can* share my other sources and hope they will be as useful for you as they were for me.

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