INNOVATE @BU

Creating a Vision for Entrepreneurship and Innovation@BU

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Boston University's ambitious goal is to create a hub in the Boston entrepreneurial ecosystem that benefits students, alumni and faculty, offering students experiential learning opportunities and bringing recognition to our diverse intellectual and creative contributions.

Consistent with the "One BU" definition of entrepreneurship, we consider entrepreneurship as "a behavior of learning—a set of principles, a mindset—crossing all disciplines that can be broadly defined as a directed application of innovation, in short, the method by which ideas receive a concrete reality." Our goal is to produce students armed with an entrepreneurial mindset, encouraged to generate new ideas, validate, iterate and engage in creative problem solving to take initiative on the hard problems of the day. We agree that universities, as "engines of innovation," have a responsibility to foster innovation and help "find solutions for grand challenges" (Thorp & Goldstein, 2013).

BU ENTREPRENEURIAL LANDSCAPE

Entrepreneurship lives at BU, with over 50 courses offered across campus, primarily in the Questrom, Communication, Engineering and Law Schools. We engaged with students, alumni and faculty to understand how current entrepreneurship and innovation needs were being met. We discovered that apart from a strong collaboration between Questrom and Engineering, students struggle with cross school registration and are often unable to take classes outside their school. Student engagement is supported by the College of Engineering's world-class EPIC prototyping center, the BUzz lab hosted by the Questrom School of Business, the newly launched Entrepreneurship and IP Law Clinics, with plans for BU Spark! in the Hariri Institute, College of Arts and Sciences in the works. However, these efforts are largely fragmented, and many students are unaware of these resources and do not view these efforts as servicing the entire campus. To create a university-wide initiative linking these efforts together, faculty encouraged the task force to be inclusive of social entrepreneurship and innovation more generally.

EXTERNAL BENCHMARKING

We benchmarked BU's approach to entrepreneurship in comparison with 20 other universities, a significant undertaking. Task force members conducted 47 interviews, visited facilities at 11 universities and participated in three national conferences on entrepreneurship education over the course of three months. Our results show a dramatic rise in students' innovation spaces opened since 2009. Relative to other universities studied, BU devotes fewer resources to university-wide programs and spaces for student entrepreneurs. Smaller schools support an average of 125 student startups a year with over 200 events, while BU supports about 20 startups a year with about a dozen events. Our scale suggests we are capable of more. We also found that many benchmark universities are introducing university-wide entrepreneurship minors for undergraduate students, including recent rollouts at universities like Carnegie Mellon, Duke, Michigan, and Princeton. While several schools comparable to BU in size operate in a hub role where entrepreneurship is diffused widely across the campus and is matched by substantial investment, currently BU operates more as a coordinator with a few under-funded champions.

CREATING THE VISION

We recommend creating an overarching conceptual framework that links campus resources into a single innovation architecture that helps students and faculty map resources and points of engagement to the innovation process. We recommend the removal of barriers to cross-school registration and the creation of a new undergraduate gateway class on entrepreneurship and innovation with a minor available to all students that builds on existing general education requirements. To support student engagement, we recommend the creation of a student collaborative innovation space staffed with roles to support curriculum innovation and community engagement campus wide. To differentiate BU's approach from other local efforts, we recommend that this center provide a strong visual, geographic and programmatic link to Boston's larger entrepreneurial ecosystem which can also facilitate partner-based learning.

Stimulate. Support. Sustain.

The task force's charter was to evaluate ways to stimulate, support and sustain the entrepreneurial aspirations of Boston University students and alumni from all schools and colleges and to help them acquire the skills and mindset needed to innovate, create and lead new initiatives with economic, social and cultural impact. The task force conducted extensive benchmarking with local and peer or aspirant universities to understand how others have approached entrepreneurship campus-wide and engaged with students, alumni, faculty and city stakeholders to create a compelling vision.

This mission did not include the commercialization of innovations based on discoveries made by University faculty or academic research in areas other than entrepreneurship. Our vision identifies specific programmatic elements and strategic options that could be incorporated into an executable campus plan. We identify specific areas where Boston University can excel and identify the strategic options that can best meet the mission criteria outlined above with an aim toward identifying both short-erm and long-term initiatives.

BU Entrepreneurship Initiative

+ cultivates an entrepreneurial mindset and culture across the BU campus

+ creates a community of entrepreneurial innovators at BU uniquely connected to the greater Boston entrepreneurial ecosystem

+ supports student and alumni entrepreneurial ventures through mentoring, coaching and incubation

+ leverages existing resources by tapping alumni networks to judge venture competitions, and mentor or coach student teams

+ leverages and capitalizes on our faculty's existing intellectual strengths University-wide

+ offers a platform to engage alumni with students

+ builds on the strengths established by the BUzz Lab, Singh Imagineering Lab, EPIC, Media Ventures, Spark!, and the Entrepreneurship and IP Law Clinics

+ advances research and scholarship on entrepreneurial ecosystems and on BU's impact on innovation and the region

+ distinguishes Boston University's entrepreneurial capabilities and intellectual strengths from peer, aspirant and local schools

As "engines of innovation," universities have a responsibility to foster innovation and "find solutions for grand challenges" (THORP & GOLDSTEIN, 2013).

As articulated in the One BU report, "Entrepreneurship is not an autonomous discipline or a field unto itself. It is a behavior of learning—a set of principles, a mindset—crossing all disciplines that can be broadly defined as a directed application of innovation, in short, the method by which ideas receive a concrete reality."

As "engines of innovation," universities have a responsibility to foster innovation and "find solutions for grand challenges" (Thorp & Goldstein, 2013). Grand challenges are complex "wicked" problems (Churchman, 1967) with no easy solution, systemic problems like curing cancer, combating climate change, or reducing poverty (Ferraro, Etzion, & Gehman, 2015). The National Science Foundation (NSF) argues that progress on broad challenges depends on participants from multiple intellectual disciplines who bring different knowledge domains to the problem, but who also face "special challenges and opportunities with respect to collaboration"(NSF, 2011: 71). Universities are uniquely situated to help address these special challenges.

The quest to work on problems that matter has shifted the focus of universities that have been dedicated to entrepreneurship for decades. Tom Byers, who has led the Stanford Technology Ventures Program (STVP) since the 1990s, notes that "...there has been a shift at STVP. Teaching entrepreneurship to engineers and others on campus is now set in the context of solving the world's biggest problems." (Thorp & Goldstein, 2013: 50). Rather than equate entrepreneurship with commercialism, many universities view entrepreneurship as a platform for interdisciplinary problem solving that complements rather than substitutes for traditional liberal arts and sciences. "It is appropriate and even imperative that entrepreneurship enter the dialogue of America's great research universities." (Thorp & Goldstein, 2013: 6). Several shifts in demographics and the cultural and economic environment also motivate university interest in innovation and entrepreneurship.

TRADITIONAL JOBS ARE DISAPPEARING.

Entrepreneurial and innovation skills in the form of independent thinking and creative problem solving will be increasingly relevant to our students' ability to carve new career paths as many traditional jobs disappear. Nearly two-thirds of school age students today will work in jobs that do not yet exist (Davidson, 2011). First, churn among firms is likely to produce new kinds of jobs as the mean lifespan of the average firm is falling (Innosight, 2012). Second, globalization, automation, outsourcing and organizational efficiencies may also contribute to the disappearance of traditional jobs (Thurik et al., 2013). The Gartner Group estimates that one-third of all current jobs will be converted into software, robots, and smart machines by 2025 (Barajas, 2014). Another estimate from Oxford scholars puts the loss of US jobs to computerization at 47% (Frey and Osborne, 2013). With these shifts, entrepreneurship education that teach students core life skills like identifying opportunities, taking risks, generating and testing ideas will be critical to students' ability to define and craft the jobs of the future.

Why are Universities interested in entrepreneurship?

Entrepreneurship is not an autonomous discipline or a field unto itself. It is a behavior of learning—a set of principles, a mindset—crossing all disciplines that can be broadly defined as a directed application of innovation, in short, the method by which ideas receive a concrete reality.

It is appropriate and even imperative that entrepreneurship enter the dialogue of America's great research universities.

ENTREPRENEURIAL ENTRY IS STARTING EARLIER

A survey of MIT alumni from the 1930s to 1990s shows that "the median age of first time entrepreneurs has gradually declined from about age 40 (1950s) to about age 30 (1990s) (Hsu, Roberts, Eesley, 2007). More recently, the Global Entrepreneurship Monitor (Kelley et al., 2015) suggests that about 28% of all people aged 20-34 are entrepreneurs. GEM estimated that in 2014 there were 165 million entrepreneurs worldwide between the ages of 18 and 25. There is some evidence that entrepreneurship may be no longer be tried only after realizing a successful career but as a way in which some young people launch their careers.

MILLENNIAL MINDSET

Another argument for promoting an entrepreneurial mindset is that Millennials crave entrepreneurial skills. Linked to the increased interest in entrepreneurship is the "coming of age" of Millennials (those born between 1982 and 2004), many of whom were "born digital" with the birth of the personal computer in 1984. Millennials are theorized to be somewhat detached from traditional institutions, expect to switch jobs frequently, seek more innovative work environments, and place a high premium on workplace versatility and flexibility. In addition, many are sensitive to social and environmental goals. Millennials seem to enjoy near-ubiquitous exposure to entrepreneurship via social networks, parents, and peers, increasing their likelihood to engage in entrepreneurial behavior. One study showed that more than half of undergraduate non-business majors expressed interest in an entrepreneurship course (Shinnar, Pruett, Toney, 2009).

An alternative interpretation is that over achieving, multi-talented Millennial students have become "excellent sheep" and having been taught to jump through the hoops needed to advance to college with ease, do not yet embrace the independent mindset needed to initiate change on the important problems of the day (Deresiewicz, 2015). As one BU Entrepreneurship Advisory Council member explained: "we need to get them to think about creating opportunities rather than meeting expectations." The Association of American Colleges and Universities (2011) has reaffirmed the need to develop an "entrepreneurial mindset" (Welsh and Tuller, 2014). Individuals with an entrepreneurial mindset challenge conventional thinking, see connections where others do not understand the value of a team, focus on the larger goal, learn from setbacks, develop and appreciate a sense of self, and communicate effectively (Higdon, 2005).

PREPARING THE CLASS OF 2020

The current cohort of freshmen represent the class of 2020, a year that has been the target of many prognostications. The emergence of blended learning, MOOCs and flipped classrooms represent attempts to match novel approaches to teaching with the styles of learning favored by Millennials. Yet, there is concern as to whether and to what extent the traditional college education will remain relevant to potential employers. Many college graduates are underemployed (Vedder, Denhart, and Robe, 2013), potentially because college education is not appropriately educating students in line with market needs. Rather than try to predict the needs of the future, universities need to arm students with the power to create the future: many are betting that cultivating an entrepreneurial mindset will be the key to this determination.

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—ENTREPRENEURSHIP ADVISORY COUNCIL MEMBER

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Universities make a distinction between cultivating an innovative and entrepreneurial mindset that encourages students to identify and take on new challenges and measuring entrepreneurship outcomes in terms of firms founded. While campus initiatives can encourage a small number of student entrepreneurs and affect the number and quality of firms founded, that is not the most important goal for most universities. A 2016-2017 Pitchbook report found that student founders from the top 10 undergraduate programs (Stanford, Berkeley, MIT, Harvard, Penn, Cornell, Michigan, UTexas, Tel Aviv U, UIllinois) created over 6,000 companies that received funding in excess of $105B. However, increasing the rate of student founded firms is not the goal, nor is the goal to place more students in startups. Working in startups can have significant short term career costs in that they typically pay less, offer less favorable working conditions, are less stable and perhaps have reduced productivity. On the other hand, there are significant long term benefits to working in startups in that they may grow faster, offer greater breadth of experience and perhaps increased levels of responsibility and autonomy—thereby enriching human capital in the long term. In short, universities steer clear of "pushing" students into entrepreneurial opportunities, as the modal outcome for most startups tends to be failure.

While supporting those students who want to start ventures is important, that is not the most critical measure of success when launching a campus-wide entrepreneurial initiative. Rather, most universities focus on fostering the development of a set of independent and creative skills that cultivate students' abilities to design and launch new initiatives for social, economic or cultural impact. Rather than rely on simplistic metrics such as the number of student and alumni startups founded, Princeton's mission is to spur creativity and help "students build the character they will need for taking risks, following their passions, and persisting through the inevitable failures that are necessary parts of entrepreneurial activity" (Princeton University, 2015).

Most students who pass through campus entrepreneurship centers do not graduate and start their own firms but rather take on leading innovation roles in established firms. The Director of Northwestern's Garage, which serves 12 colleges and receives about 1,000 unique student visits a month, estimates that only 10% of their students founded firms after graduation. The vast majority are hired by established, high growth firms like Google, LinkedIn and Facebook. Similarly, Duke has run their Program 4 Entrepreneurship (P4E) where students work on their startups over a three course sequence for the past 8 years, growing from 8 students to over 100. Only 18 out of 67 class projects have survived but these students receive top job offers in finance and strategy from firms like Bank of America and Walmart. For Northwestern and Duke, placement in innovative decision making roles at firms that value entrepreneurial and innovation skills is a more important measure of success than the number of firms founded by students.

Entrepreneurial Mindset vs. Entrepreneurship

Universities must focus on fostering the development of a set of independent and creative skills that cultivate students' abilities to design and launch new initiatives for social, economic or cultural impact.

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The best way to predict the future is to create it.

An entrepreneurial mindset is increasingly valued not just by startups but also by established firms. A recent Gartner report estimates that more than 50% of established corporations will adopt lean startup methods by year 2021: combining the speed and agility of a startup with the scale and resources of a large enterprise. Lean startup principles embrace identifying new opportunities, creating a minimum viable product, combined with cycles of experimentation and iteration to test, validate and gain customer feedback at the earliest stages of a project, rather than lengthy periods of requirements definition embraced by linear stage gate methods. By emphasizing experiential learning that teaches rapid prototyping, experimentation, and deep understanding of complex challenges, universities can help their students be better prepared for future market demands. Thus, entrepreneurship is not the end goal for all students. Rather, campus entrepreneurship and innovation initiatives offer a laboratory for students to learn skills critical to success at any high growth established firm: research, creative problem solving, team building and the fine art of getting things done with limited resources.

CROSS CAMPUS ENTREPRENEURSHIP EDUCATION

Universities have evolved from offering single courses on entrepreneurship to building centers, to full curriculum redesign, campus outreach, campus-wide infusion and, ultimately to full integration (Morris et al., 2013). In the first wave of growth, business schools increased entrepreneurial education from 250 courses in U.S. colleges and universities in 1985 to more than 500 courses in 2008 (Torrance et al., 2013). By 2013, more than 9,000 faculty were educating 400,000 students in entrepreneurship (Torrance et al., 2013). Many consider us to now be in the second wave of entrepreneurial education, where entrepreneurship and innovation is not just a business-related discipline, but a campus-wide concern extending into engineering and the arts and sciences, and involving students, faculty, staff, and administration (Torrance et al., 2013). According to Tom Byers, head of Stanford Technology Ventures Program: "innovation and entrepreneurship is too important to be left solely to any one school" (2013: 49). In this wave, entrepreneurship has broadened to include social as well as economic impact. According to Thorp and Goldstein, including social impact into the definition of entrepreneurship is "key to winning the hearts and minds of the faculty in the core disciplines at research universities" (2013: 58). This belief is backed by Kauffman Foundation research, which suggests that by including social entrepreneurship in university-wide initiatives, campuses will be more likely to attract a more diverse group of students from a broader base of disciplines.

Approaches to cross-campus entrepreneurial education consider two dimensions: a university's breadth of scope (curriculum, co-curricular, research) and the strength of a university's commitment and investment in entrepreneurship (resources, infrastructure, stakeholders, and culture) (Brush, 2014). Using these two axes, universities vary in assuming the roles of Broker, Coordinator/ Facilitator, Hub, and Developer.

Universities assuming a broker role offer a high breadth of courses, co-curricular activities, and research projects, but support is bottom-up and campus wide participation is not a priority or centrally organized. The university's role is to disseminate and broker across courses and co-curricular activities. Universities that act as a Coordinator or Facilitator offer less breadth and limited faculty and staff support. For these schools, entrepreneurial activities are bootstrapped and not central to the school's strategy. There may be a "lone wolf" champion but minimal infrastructure and resources. The university's role is to coordinate small sets of entrepreneurial activities for a subset of the student population.

Innovation and entrepreneurship is too important to be left to any one school.

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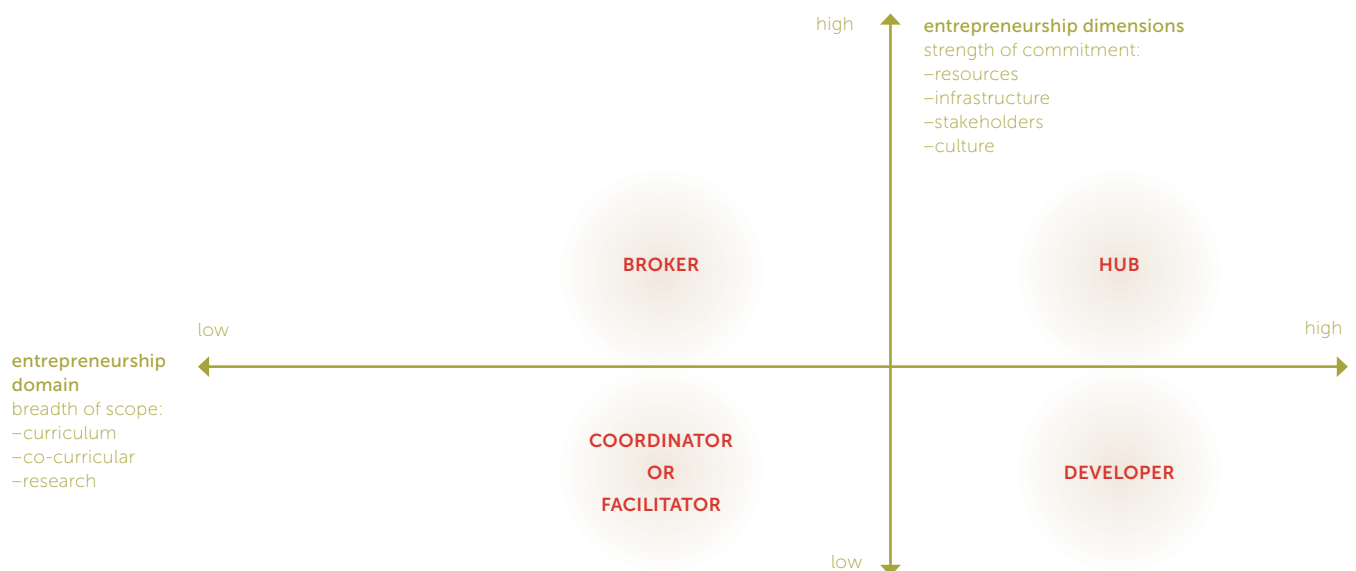
Universities in a Hub role offer a broad scope of entrepreneurial activities and education with a deep commitment to diffusing entrepreneurial education throughout the campus. Entrepreneurship may be a required course, entrepreneurial co-curricular activities are campus-wide, and the learning objectives of the school measure entrepreneurial learning in students. Significant resources are dedicated to entrepreneurship and the skill set is central to all university activities and infused across all stakeholders. Universities that act as a Developer offer significant commitment in terms of resources, infrastructure, and culture, but their focus is on a narrow set of curricular, co-curricular, or research activities. For example, they may have a dedicated accelerator or center that receives significant support, but entrepreneurial principles are not widely diffused across campus.

Based on our analysis, BU is currently in the lower left corner, occupying a coordinating or facilitating role but has the raw assets to do more. For example, in addition to an extremely large and diverse undergraduate and graduate population, BU has some assets that many campuses lack: a dense concentration of undergraduates (78% of undergraduate live on campus) across a broad array of disciplines in one of the world's top global entrepreneurial ecosystems combined with world class research faculty. BU has capabilities at scale at both undergraduate and graduate levels across the arts and sciences, engineering, arts, law, medicine and business which local competitors cannot match. These assets can be key to improving the dissemination and diffusion of an entrepreneurial mindset.

With the support of University trustees and senior leadership, BU can move from a Coordinating role into a Hub role within the next five years and provide greater breadth and dissemination of entrepreneurship education to students beyond those in Engineering and Business. This would be an important transition as expectations are likely to continue to ratchet in what the New York Times referred to as "an innovation arms race". "Ten years ago, it may have sufficed to offer a few entrepreneurship courses, workshops and clubs. But undergraduates, driven by a sullen job market and inspired by billion-dollar success narratives from Silicon Valley, now expect universities to teach them how to convert their ideas into business or nonprofit ventures" (Singer, 2015).

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Typology of School Roles in Entrepreneurship Education Ecosystem

high

entrepreneurship dimensions
strength of commitment:
−resources
−infrastructure
−stakeholders
−culture

BROKER   HUB

low   high

entrepreneurship domain
breadth of scope:
−curriculum
−co-curricular
−research

COORDINATOR OR FACILITATOR   DEVELOPER

low

The entrepreneurship landscape at BU is broad but spotty and lacks a conceptual map tying each school's disparate offerings together in a coherent framework.

As one alum asked: "Where is entrepreneurship at BU? The messaging is not clear." There is a need for a conceptual framework as there is the appearance that the University's efforts are disjointed. One patent attorney observed: "I see no overarching plan." Our research reveals that entrepreneurship lives primarily in the Questrom School of Business, the Engineering College, the Law School and the Communication College, with an emerging presence in the College of Arts and Sciences, Pardee School of Global Studies and Medical School. The Figure below provides an overview of the breadth of Entrepreneurship courses offered across BU. However, there is no cross-campus academic program to tie these courses together. In constructing this Figure, we assumed a broad definition of entrepreneurship that included leadership and social change—leading to the identification of a relevant class in the School of Theology.

BU Entrepreneurial Landscape

DISTRIBUTION OF CLASSES

(16) Questrom School of Business
(7) College of Communication
(7) College of Engineering
(4) Metropolitan College
(3) College of Fine Arts
(3) School of Public Health
(2) School of Hospitality Administration
(2) School of Medicine
(2) School of Theology
(1) College of Arts & Sciences
(1) Sargent College
(1) School of Education
(1) School of Social Work
(1) School of Global Studies
(1) School of Law
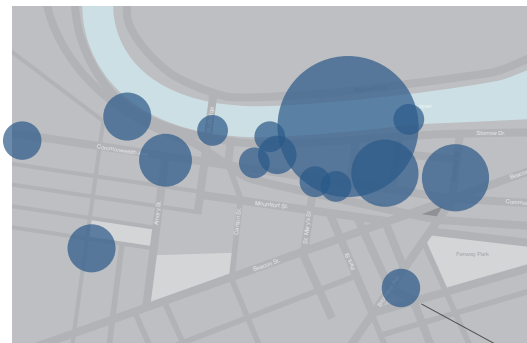
QUESTROM SCHOOL OF BUSINESS

Questrom offers more than 20 courses on entrepreneurship and innovation and has seen steady growth in interest over the last twenty years. Total enrollment in these courses, including both undergraduate and graduate students, has been steady at approximately 600-700 students per year over the last four years. Since 1995, Questrom has offered concentrations in Entrepreneurship at both the undergraduate and MBA levels; in both cases, four courses are required for the concentration (a core class and three electives custom to individual career interests). The goal of the concentration is to provide students interested in innovating in an entrepreneurial context with the skills necessary to be successful. The concentration links them to experiential opportunities like the New Venture Competition and student clubs.

Recently, Questrom launched two new experiential learning opportunities that place students directly in an entrepreneurial context. First, Questrom is offering BU graduate students the opportunity to act as investors as they evaluate and negotiate "deals" in a global Venture Capital Investment Competition. BU entered a team for the first time in 2015 and last year won its regional competition, ranking top 13 in the world—beating many prestigious schools. In 2015, Questrom started a program that allows graduate students to review deals on

The Entrepreneurial Landscape at BU

There is a gap between the studio, classroom, and the real world. Our students want to know how to translate their ideas into actionable items for real world use.

—ENTREPRENEURSHIP ADVISORY COUNCIL MEMBER

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behalf of an investment firm called G.51 and to learn the art of due diligence. We currently have 10 graduate students taking part in this program, the highest number of participants of any university in the country. Questrom also has a long standing partnership with the College of Engineering to deliver courses for the Technology Innovation Concentration which has seen steady growth from Engineering students.

COLLEGE OF ENGINEERING

The College of Engineering brings entrepreneurship and innovation to its students in a number of ways. First, it is the home of EPIC, the world class prototyping center providing 15,000 square foot of makerspace at BU which is open to all students, regardless of major, to receive training and experience on a range of relevant skills vital to product innovation. Any student, with the help of EPIC staff, can use this facility to prototype his or her new product ideas after taking a short safety course. Over 1,000 students per year visit EPIC from CAS, CFA, and Questrom. More than 50 fine arts students a year use the facility. About 15 classes per year are held in the space and student clubs hold meetings virtually every night and on weekends. EPIC contains cutting edge facilities and equipment, special curriculum, and provides students access to seasoned practitioners. Currently EPIC has six industrial partners who pay an annual fee—GE, Rolls-Royce, PTC, Procter and Gamble, Schlumberger and Saint Gobain—and has received equipment donations from another six companies.

Second, the College of Engineering offers a Technology Innovation Concentration, with the support of Questrom, which allows engineering students to take two management courses, "The Business of Technology Innovation", and "Strategy for Technology-Based Firms" (SI 480 & SI 482) coupled with two electives. Each semester, approximately 100 engineering students take these courses although not all of them complete the concentration. Questrom also provides special lectures and an idea competition as part of the year-long Senior Design Project program.

COLLEGE OF ARTS AND SCIENCES

CAS recently received a $1 Million gift that provides five years of support to incubate new ideas and collaborations through BU Spark! BU Spark!, housed in the Hariri Institute for Computing, has recruited a new Director and aims to create new initiatives such as a crowdfunding platform and an intern program in 2017. BU Spark! will be dedicated to bringing entrepreneurial principles, techniques, and experiences to computer science students and is envisioned to provide a resource center/laboratory for student innovators and entrepreneurs wishing to advance their creative ideas for products, projects, businesses and services in the technology arena.

LAW

The Law School supports student entrepreneurship by operating two Law Clinics—one that services MIT students and one that services BU students. The clinic provides timely and valuable legal advice to students on general topics related to starting a firm while providing law students with practical experience. Law students receive credit for their work in the clinic and are supervised by a faculty member. The Entrepreneurship and IP Law Clinic helps students navigate through a number of critical decision points related to such things as venture structure, contracts and agreements, investor agreements, and compliance with rules and regulations. The Questrom School shares in the cost of serving BU students while the MIT Martin Trust Innovation Center shares in the cost of serving MIT students.

EPIC is BU's 15,000 square foot of world class "maker" space.

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Over 100 Engineering students take entrepreneurship classes at Questrom every semester.

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CAS received a $1 Million gift that provides support to incubate new ideas and collaborations through the Spark! Program.

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The Law School operates two Law Clinics supporting entrepreneurship.

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College of Communications Media Ventures students develop and present venture concepts to industry leaders.

COMMUNICATION

The College of Communication instills the entrepreneurial spirit in a number of ways, offering classes such as "Creating New Ideas", but their most relevant program is the MS in Media Ventures, which unites practical experience and experiential learning with classroom instruction. Students learn from concept to execution, developing venture concepts and presenting them to industry leaders. The program is three semesters, unfolding over one year across two coasts and requires an internship at a startup or traditional media firm. The College of Communication has partnered with Questrom faculty to provide special lectures on entrepreneurship and an idea competition where students present their ideas and receive feedback from an expert panel.

FINE ARTS

The College of Fine Arts has been influential in working with other Schools at BU to bring students and the community together in creative and entrepreneurial ways. Recently, CFA, Questrom, and BU's Arts Initiative conducted a day-long symposium "Business+The Arts+Social Impact", which brought together people from the realms of arts, business, and social entrepreneurship in the pursuit of solutions to specific societal problems. The session was kicked off by the Deans from both Questrom and CFA, and was widely viewed as a great success, setting an example for similar interdisciplinary collaborations across campus.

MEDICAL

With increasing attention to the cost of health care, innovation and entrepreneurship in the medical field has never been more important. The medical campus has created a class that is cross listed with several other schools called "Bench to Bedside" that focuses on how to translate innovations from practice to market. The Medical School also has a HealthCare Entrepreneurship Program where 3rd and 4th year medical students are connected with one-month internship experiences in the business world and are supported by Questrom faculty. These students are interested in improving their understanding of the practical aspects of entrepreneurship and being immersed in real-world challenges. These connections are preliminary and not diffused broadly across the medical campus. Much more could be done to integrate entrepreneurial events on the Charles River campus with the medical campus.

GLOBAL STUDIES

Students in the Pardee School of Global Studies are required to form ideas and ventures that address grand challenges and this could be an excellent resource to spur campus-wide interest in social innovation. For example, the Pardee School has a class that encourages students' pursuit of entrepreneurial goals such as the development of mobile applications to combat grand challenges such as displaced refugees and human trafficking. Students develop concepts and business models and conduct field studies to validate their ideas. Recently, Questrom delivered a special lecture to a Global Studies class, and a Global Studies student spoke in a Questrom entrepreneurship class fostering learning and exchange.

PROVOST'S OFFICE

Most recently, through its support of the "Business+The Arts+Social Impact" symposium, the Provost's Office has supported entrepreneurial collaboration across campus. We see the Provost's Office as a strong and willing partner in the development of future cross-campus collaborative efforts. The Provost's office also provides important connections between entrepreneurial and innovation initiatives and the emerging General Education and cross campus challenge requirements.

College of Fine Art's Arts Initiative brings together people from the realms of arts, business, and social entrepreneurship.

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The Medical School offers a class helping students translate innovations from practice to market.

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BU's Pardee School of Global Studies requires students to form ideas and ventures that address grand challenges.

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The Provost's office provides important connections between entrepreneurial and innovation initiatives and the emerging General Education requirements.

ENTREPRENEURSHIP & INNOVATION PROTOTYPE: THE BUzz LAB

In 2014, Questrom founded the BUzz Lab, located on two floors of 143 Bay State Road as a temporary starter home to Entrepreneurship programs, student clubs and BU student/alumni startups. The BUzz Lab provides a wide range of services to all student entrepreneurs on campus including networking events, mentoring, entrepreneurial support services, walk-in office hours and support of student clubs. Student-run clubs such as the Graduate Entrepreneurship and Innovation Club, Boston University Venture Accelerator (BUVA), and the BU Global Ventures Consulting (BUGVC) club organize a series of annual events every year under the tutelage of Questrom faculty at the BUzz Lab.

Although the BUzz Lab is funded solely by Questrom, with modest supplements from alumni donations, it is open to all BU students and alumni. The BUzz Lab provides student entrepreneurs with a (small) collaborative incubator space called "the Hive", equipped with 15 desks, 2 rapid prototyping workstations, two team rooms, one collaborative meeting room, four faculty offices and a reception desk. This space, while far from ideal, has helped a number of BU student teams but is inadequate to service the entrepreneurial appetites of BU students campus wide. BUzz Lab engagement metrics in 2016 showed robust interest from undergraduates, alumni and graduate students, but faculty were not well represented and this requires more attention.

BUzz Lab Engagement

1625 Total Users

- Undergraduates
- Graduates
- Faculty
- Alumni
- Guests
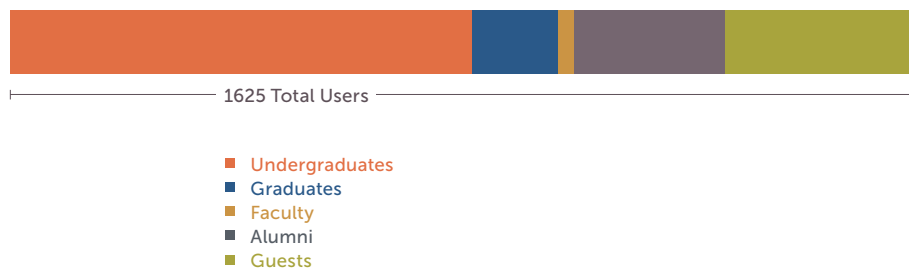
Currently the BUzz Lab has no full-time staff, but one part-time events coordinator and three part-time student interns. One faculty member devotes 1/3 of his time as Director of Entrepreneurship activities and another faculty member devotes 1/3 of his time to campus-wide partnerships. The BUzz Lab leverages existing resources by tapping teaching faculty and alumni networks to judge venture competitions and mentor or coach student teams. Although the BUzz Lab works with the Development office, with greater in-house administrative support, alumni resources could be more systematically managed and deployed to unify the student entrepreneurial experience.

While making progress in systematizing contact with entrepreneurial alumni, the BUzz Lab is overly reliant on the personal relationships of the BUzz Lab faculty and in need of relationship management support. In 2016, the BUzz Lab had over 300 registrations for the first alumni and student innovators networking event and this is expected grow. With two newsletters and The Hive, an on-line network connecting innovators and entrepreneurs with a wide range of resources, the BUzz Lab reaches a large and diverse student and alumni audience of approximately 4,000. BUzz Lab faculty maintain deep ties with diverse members of the entrepreneurial ecosystem (e.g. Golden Seeds, TiE, LearnLaunch, MassChallenge) and currently manages a partnership with the Capital Network, where BU interns collaborate to maintain a calendar of entrepreneurial events. In addition, the BUzz Lab runs two major programs: the New Venture Competition and the Summer Accelerator open to both students and alumni.

The BUzz Lab

+ starter home to Entrepreneurship programs, student clubs and BU student/ Alumni startups.

+ open to all BU students and alumni

+ "The Hive" incubator comes equipped with 15 desks, 2 rapid prototyping workstations, two team rooms, one collaborative meeting room and four faculty offices

+ leverages existing resources by tapping alumni networks to judge venture competitions, and mentor or coach student teams

+ no full time staff

+ overly reliant on the personal relationships of the BUzz Lab faculty and in need of relationship management support

+ funded solely by Questrom, with modest supplements from alumni donations

NEW VENTURE COMPETITION

For 14 years BU has run a student New Venture Competition to encourage student entrepreneurs to develop their ideas into credible ventures. The competition starts with informal "Pitch and Pizza" events in the fall and spring and culminates in a Finals Night where up to $100K in cash and in-kind prizes are awarded to students working on ventures as varied as a patient care application, an under water submersible, a new dental device, recreational utilization software, drink delivery, clothing retail and ice cream novelties.

This fall, a record number of student teams (30+) pitched their ideas, and interest has grown every year. The BUzz Lab requires investment in order to promulgate the competition across campus, process multiple rounds of applicants in parallel and develop an app to handle more student applicants. There is also a need to increase the value of the prize money to be in line with our peer and aspirant schools.

SUMMER ACCELERATOR

This 10-week summer program helps BU students or alumni advance their entrepreneurial ventures through hands on mentoring from experienced entrepreneurs from across campus and experts. Applicants come from all BU colleges including Engineering, Communication, CAS, the Medical School and Questrom. Successful applicants are provided with summer office space and expected to work full time developing their business idea with mentorship from over 20 active faculty and alumni.
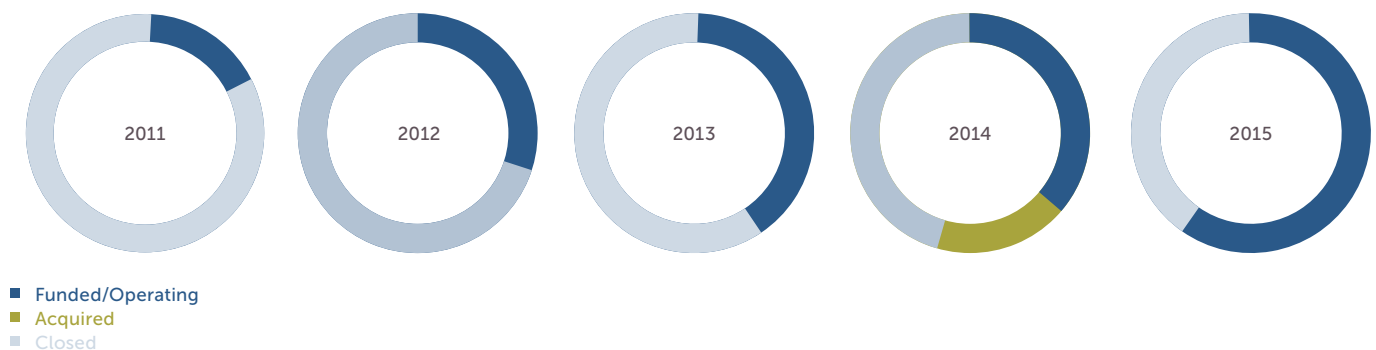
At the program's end, entrepreneurs present their ideas to a panel of Boston angel and VC investors. Selected teams may receive cash stipends up to $10,000 per team (dependent on alumni donations). As shown below, an increasing number of teams remain on-going businesses. Many teams graduate ready to apply to more competitive accelerator programs like MassChallenge—a strong sign of the validity of the mentorship offered. This year four out of 120 teams at the MassChallenge finals were mentored by the BUzz lab, one of which won the top prize of a $100,000 equity-free investment.

Living the spirit of entrepreneurship, the BUzz Lab has created incredible momentum, energy and learning among students on an very modest budget with fractured attention from extremely dedicated Questrom teaching faculty bolstered by the energy and enthusiasm of alumni and student clubs. Like many startups, the BUzz Lab currently faces the challenge of how to scale its efforts to reach a broader pool of students with potential rising interest. The BUzz Lab provides a strong platform to build upon and has been effective in amplifying and accelerating the aspirations of those students who are aware of entrepreneurship and can discover these resources, but the space and resources are not yet equipped to instill an entrepreneurial mindset campus-wide.

BU New Venture Competition

Pitch & Pizza
Pitch Coaching

Semi-Finals
Market Validation

Finals
Presentation Coaching

Winners
Mentoring

New Venture Accelerator

BU Summer Accelerator—Student + Alumni Startups

2011   2012   2013   2014   2015

■ Funded/Operating
■ Acquired
■ Closed

We set out to understand how well diverse stakeholders at BU were aware of and serviced by existing entrepreneurship and innovation offerings and to identify the unmet needs of students, alumni and faculty. To discover more, we held round tables with students, alumni, faculty and the city of Boston and received feedback from the Entrepreneurship Advisory Council throughout the fall of 2016.

THE STUDENT PERSPECTIVE

We invited a mix of undergraduate and graduate students from Questrom, Engineering, Communications, CAS and other schools to provide feedback and they did not hold back. First, students would like more interdisciplinary participation in existing Entrepreneurship classes held mainly in Questrom and Engineering. Since many classes are team and project-based, students felt that the projects would be more impactful and transferable to the "real-world", if class teams represented a broader set of skills. For example, one student commented that her project from a Questrom entrepreneurship class was really light on design. The team had a great idea about how to reach an untapped market with a new product, but didn't really know what the product should look like, or how to design functionality to meet the needs of their identified consumer.

While the University has made strides in creating a more interdisciplinary environment, students felt that BU needed to take deliberate, proactive steps to remove barriers to interdisciplinary classroom participation. For example, 200 undergraduate engineering students per year take at least one or two classes in Questrom. However, one of the classes (SI 480) is strictly for engineering students. While engineering students benefit from exposure to Questrom faculty, they are limited by not sharing an in-class experience with students from other disciplinary backgrounds. While the follow on class (SI 482) is designed to be interdisciplinary, it has not been marketed adequately to balance engineering and business students, and design students are underrepresented. Through effective partnerships, BU has created dyadic relationships between Engineering and Business, but this could be broadened to be more hospitable to other disciplines like design and the arts.

Students were also concerned about prerequisites, which limit both the perceived and real feasibility of taking classes in different schools. For example, students from ENG, CAS and COM interested in Questrom entrepreneurship classes felt it challenging to fit that class in with their existing mix of required classes. Depending on their program, students felt that taking a class in Questrom could be "risky", because there is limited "embedded" passed-down knowledge about faculty and expectations. The degree to which prerequisites listed were actually necessary was not clear, creating a chilling effect on enrollments. The prerequisites for classes in Questrom seemed "daunting, and basically impossible to meet if you are also required to take a set of other classes for your major". While students can ask professors for permission to take a class regardless of having completed prerequisites, students are often unaware of this, feel uncomfortable reaching out, or treat prerequisites as proxies for what they should have mastery over to be successful in the class and are wary of the potential competition from pursuing this route.

Student Perspective

+ **more interdisciplinary participation in existing Entrepreneurship classes**

+ **exposure to a broader set of skills**

+ **remove barriers to interdisciplinary classroom participation**

+ **rethink prerequisites that currently limit both the perceived and real feasibility of taking classes in different schools**

+ **gain awareness of the resources available to them or willingness to access those resources**

+ **want a centralized physical and virtual space to promote entrepreneurial learning and skill building both inside and outside the classroom**

+ **exposure to entrepreneurial concepts and principles, especially the opportunity for hands on learning**

Beyond curriculum concerns, students were either unaware of the resources available to them or reluctant to access those resources. For example, one student from engineering shared, "I didn't know about the BUzz Lab. and even if I did, there is a stigma associated with the business school honestly. We engineers are just more laid back, techie people. The entrepreneurship word might come off as off-putting to people with a tech background." While resources like the BUzz lab are available to all students, another student echoed the prior comment, "Only people who are interested in entrepreneurship and committed are interested in the BUzz lab." This same statement was made with respect to BU's prototyping center, EPIC. Students shared that, "EPIC is really for mechanical engineers, and it is hard, basically impossible to get a room there."

Some students were either unaware or reluctant to plug into entrepreneurial cross-campus clubs and events. From the student perspective, clubs are often centered around a particular school or major rather than interdisciplinary concerns. In this manner, BU's disciplinary silos are essentially replicated onto the student social structure and limit not just their learning but their interpersonal growth. In the minds of the students, this resulted in disjointed efforts—with multiple clubs focused on the same goals and outcomes. For example, one student commented, "there are over five student-run organizations on campus that promote hackathons." Students felt that resources were wasted conducting singular promotions for events with overlapping missions and participation in these events thus became diffused rather than connecting students with similar interests.

Students recommended that the University invest in a centralized physical and virtual space to promote entrepreneurial learning and skill building both inside and outside the classroom. They felt that this central space would help bring together a community, making resources known and more readily available across campus to all students regardless of their home school. They felt strongly that this "Hub" should be a place where students with "ideas" and students "looking for ideas" can convene. Many students in our round table shared that they do not view themselves as ever starting a firm of their own, but wanted exposure to entrepreneurial concepts and principles. Of primary appeal was the opportunity for hands-on learning.

Students recommended that the University invest in a centralized physical and virtual space to promote entrepreneurial learning and skill building both inside and outside the classroom.

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They felt strongly that this "Hub" should be a place where students with "ideas" and students "looking for ideas" can convene.

THE ALUMNI PERSPECTIVE

We conducted a round table with over twenty BU alumni from a range of class years to understand their perspectives on building a campus wide entrepreneurial initiative. The attendees included attorneys, entrepreneurs, angel investors and active players in the Boston entrepreneurial ecosystem. Some were leaders in organizations like Hub Angels, Golden Seeds, the LearnLaunch accelerator, MassChallenge or TiE-Boston a local chapter of TiE-Global, "the largest global not-for-profit organization fostering entrepreneurship" with over 12,000 members in 81 countries.

Alumni were receptive to the idea of enhancing students' ability to take courses outside their own school or major to create a pathway to interdisciplinary learning and encouraged the creation of a space that supported this type of cross pollination among students from different schools. One alum who had started a venture as a student and since sold his business partially attributed his success to his ability to take classes outside of his home school of Engineering. He encouraged BU to work harder to make this possible for other students as it had required effort on his part: "You need to make this easier and more integrative in the socialization process, communicate and encourage students to take classes outside of their home schools". As a student entrepreneur, this alum was appreciative of the resources, support and mentoring offered by the BUzz Lab but felt that more was needed to communicate the resources available to others campus-wide. "If you are not comfortable, you won't be open to new thoughts. [to inspire interdisciplinary education] You need a comfortable environment." (Alum, former student entrepreneur).

Alumni converged on the need to offer students greater opportunity for experiential learning or substantive work experience and several referenced Northeastern's strengths in this regard. Two alums hired Northeastern coop students every year (one hired 15 a year) to great success - favoring this model over summer internships, which, in their eyes, required excessive coordination costs relative to the benefits. A six month intern (or co-op) experience where a student was partially embedded in a firm was viewed as offering greater mutual benefit than the month of productivity offered by a fully assimilated summer intern. They recommended that the University consider ways to help students acquire more practical experience in advance of graduation to gain a competitive advantage in their career prospects.

Alumni agreed that the University's goal should be to encourage an entrepreneurial mindset rather than increase student ventures per se. "Entrepreneurial thinking needs to be baked into the undergraduate program and made available—students need to be exposed." The founder of Learn Launch argued that "entrepreneurial thinking is an investment that outstrips any particular outcome" as the careers that students will pursue likely do not exist now. "Not everyone has an idea or knows they want to be entrepreneur, the goal is to train people to become a creative problem solver". Rather than cultivate more student entrepreneurs, the university should expose all students to the entrepreneurial skills needed to navigate complex and uncertain terrain and support the few who do want to launch a venture and then sequence resources as appropriate.

Alumni observed the density of entrepreneurial activity in Boston (venture capitalists, accelerators, makerspaces, labs and co-working spaces such as Greentown Labs, TechStars, LearnLaunch, Venture Café, District Hall) and urged the University to leverage existing resources rather than recreate the wheel. Rather than recreate resources, BU can help students understand these resources by creating a conceptual map explaining when these resources are appropriate: "You don't need to provide all the resources, just point to them. That is the role

Alumni Perspective

+ believe BU should enhance a students' ability to take courses outside their own school or major to create a pathway to interdisciplinary learning

+ believe in developing opportunities for experiential learning or substantive work experience

+ feel that BU should encourage an entrepreneurial mindset rather than increase student ventures

+ don't need to provide all the resources, just point to them— that is the role of a student innovation center

+ entrepreneurial thinking needs to be baked into the undergraduate program and made available— students need to be exposed

of a student innovation center." Alumni liked the creation of the Law Clinic to support students' entrepreneurial efforts but warned against "making students shop for each function all over campus" and argued that the current resources were "not organized by location, theme, strategy or service". The University was encouraged to corral the disparate and relevant talents that student entrepreneurs need in one place to permit a "one stop shop." Said one alum, "If there was such a place at BU that people could come and meet with companies and students, just to hang if students want to talk, I would be happy to... Just knowing there is a home that I could come to, we would engage more with students."

Alumni encouraged BU to corral the disparate and relevant talents that student entrepreneurs need in one palace to permit a "one stop shop."

THE FACULTY PERSPECTIVE

Through roundtable discussions with faculty across the campus, we were able to better understand the faculty perspective. Regarding curricular offerings, the faculty expressed that in some colleges, demand for Entrepreneurship is potentially underserved. As one faculty member from CAS shared, "There are lots of very entrepreneurial faculty in the College of Arts and Sciences, but only a limited number of classes focused on entrepreneurship. Students in Computer Science and Economics for example, would likely be interested in topics focused around Entrepreneurship." From the faculty's perspective, not tapping the experiences of successful entrepreneurs embedded in the fabric of the BU community is an opportunity missed.

Faculty felt that this need could and should be fulfilled through inter-disciplinary offerings that expose students to peers interested in complementary fields of study. For example, one advisory member shared, "Engineers want and need partnership with business students." Another advisory council member asked how will this initiative "create a team between engineering and business, and other departments that facilitate collaboration and partnership?" While faculty advocated for interdisciplinary curriculum, they acknowledged that currently there are challenges that would need to be resolved to make it happen. For example, while some colleges run on 4 credit classes, others run on 3 credit classes which can inhibit cross enrollment. This could be addressed by offering a series of focused 1 credit classes on core skills like crafting effective presentations. For example, as one advisory council member shared, "BU is silo based. It is hard to get anything done across colleges. An interdisciplinary offering would need to be for some sort of academic credit." They recommended creating a structure that would align incentives, so students interested in entrepreneurship could take classes for credit, regardless of their home school.

The second theme was Entrepreneurship as a concept and identity. Consistent with our research, faculty felt strongly that any initiative should cultivate entrepreneurship as a "mindset" rather than an "outcome" and that perhaps a broader focus on innovation would be more appropriate. As one professor shared with us, "Many communications students want jobs at cutting edge, small, ventures but might not want to raise a bunch of money." Other faculty commented that many of their students who have novel, unique ideas and are "entrepreneurial" do not consider themselves entrepreneurs. The term entrepreneur, from the perspective of their students, connotes a money raiser, profit-maximizer, business person. Many students do not view themselves, nor do they wish to view themselves, in that light. A student may want to work for a start-up, small firm, creative industry, corporation, but may never want to start a firm. This does not mean that the student would not benefit from taking classes focused on an Entrepreneurial mindset. As one faculty advisory member explained: "We need to focus on the 'process' of building creative ideas. Building an idea is not just about building a 'business plan'."

The last theme discussed by the faculty was that of scholarship and research. As one faculty members shared, "This needs to engage the faculty from a research perspective". The faculty thought that to align incentives and truly build a comprehensive cross campus initiative around Entrepreneurship, this type of work cannot just be considered service or pedagogy but connected to the research agenda of the broader scholarship community.

Faculty Perspective

+ **are interested in tapping the experiences of successful entrepreneurs embedded in the fabric of the BU community**

+ **would like to create inter-disciplinary offerings that expose students to peers in complementary fields of study**

+ **would like to see greater collaboration and partnership across departments and schools**

+ **would like to encourage students to cultivate an entrepreneurial mindset**

+ **are more interested in the process of innovation: generating, building and refining ideas rather than creating 'business plans'**

+ **think broadly in terms of innovation and not just entrepreneurship**

THE CITY PERSPECTIVE

Universities play a critical role in regional ecosystems, both as generators of new knowledge and intellectual leadership as well as producers of fresh talent. "The careful shielding of a university from the activities of the world around it is the best way to chill interest and defeat progress…Celibacy does not suit a university. It must mate itself with action."—Alfred North Whitehead, The Atlantic, 1936. As one of the largest employers and real estate owners in the city, BU enjoys an unusually collaborative relationship with the City of Boston. But a robust entrepreneurial education system depends on connectivity among students, faculty, mentors, businesses, government, investors, and others both inside and outside the university.

NETWORK CONNECTIVITY

Research on inventor networks (based on patent coauthorship) has found that inventors in both Silicon Valley and Boston have become much more connected since the 1990s (Fleming & Marx, 2006). By 1999, almost 20% of inventors in Boston were connected via coauthorship on a patent, creating the approximation of a "small world" within a large regional ecosystem. In a small world structure, a dense network of relationships (or ties) can make even a very large network feel accessible by reducing the effective distance between people in the network.

Compared to other regions, both Silicon Valley and Boston stand out in terms of regional connectivity. Boston is poised to capitalize on entrepreneurial networks given its geographic density as compared with areas such as Silicon Valley. This potential was noted in a recent "Innovation That Matters" report published by the "1776" U.S. Chamber of Commerce Foundation, which assessed the readiness of 25 cities to innovate and capitalize on the digital economy on the dimensions of talent, capital, industry specialization, density, connectivity and culture. Boston was ranked number one across all indicators of entrepreneurial potential, with the explanation that "San Francisco is the clear leader in startup activity, but its lack of a collaborative community and a declining quality of life for wide swaths of its citizens vaulted Boston to the top spot."

The report further urges civic leaders to establish mechanisms (ties) to introduce entrepreneurial firms to "anchor" institutions such as large corporations, universities, foundations and government. While network connectivity is critical to a vital entrepreneurial ecosystem, there is a need to better understand the community connections essential to innovation. As rising rents in Kendall Square drive more startups to Downtown Crossing and other locations in the City, BU has an opportunity to convene ideas and talent and create the next "innovation district" in Kenmore Square. Boston was a top 10 ranked entrepreneurial ecosystem globally, often appearing in the list of the top 5 by every report that we analyzed. However, we note that these rankings face increased competition from Tel Aviv, London and New York in particular. It is less and less the case that Silicon Valley stands out as unique; the world's entrepreneurial ecosystems are likely to become more diverse in the coming decades. By creating an additional innovation hub in Boston, BU can help secure Boston's competitive position.

City Perspective

+ BU is the largest employer and real estate owner in the city, and enjoys an unusually collaborative relationship with the City of Boston

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A dense network of relationships (or ties) can make even a very large network feel accessible by reducing the effective distance between people in the network.

—

San Francisco is the clear leader in startup activity, but its lack of a collaborative community and a declining quality of life for wide swaths of its citizens vaulted Boston to the top spot.

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Boston was ranked number one on the dimensions of talent, capital, industry specialization, density, connectivity and culture. across all indicators of entrepreneurial potential.
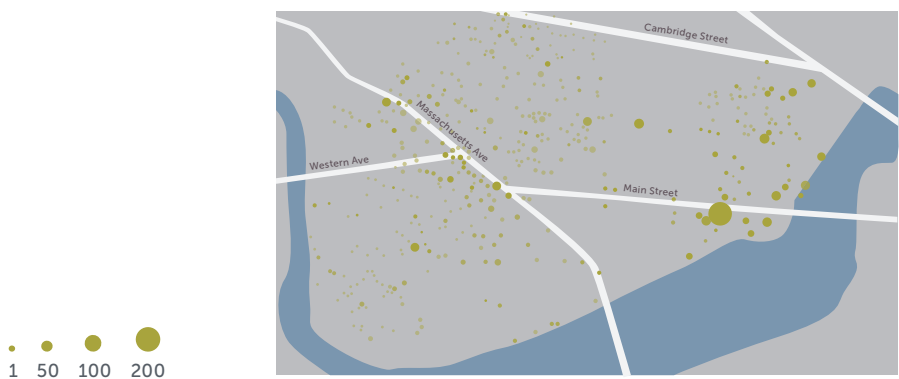
ENTREPRENEURIAL QUALITY

Entrepreneurship differs from "small business" with respect to expectations for growth. One indicator of the quality of entrepreneurial firms is their potential to grow large enough to challenge incumbent firms. Thus, the growth potential of a region's start-ups is an important measure of the quality of its entrepreneurial ecosystem. Entrepreneurial quality in the Boston area was highly concentrated around Route 128 in the 1980s and early 1990s (Saxenian, 1994; Roberts, 1991). As Guzman and Stern (2016a) show, the locus of high-potential entrepreneurship shifted after 2005. Both Cambridge and the City of Boston now outpace Route 128 in the quality of entrepreneurial startups. There is a trend of entrepreneurial activity moving from the exurbs of Boston into the city in close proximity to the BU campus.

Entrepreneurial activity in Boston—Cambridge—Rt 128
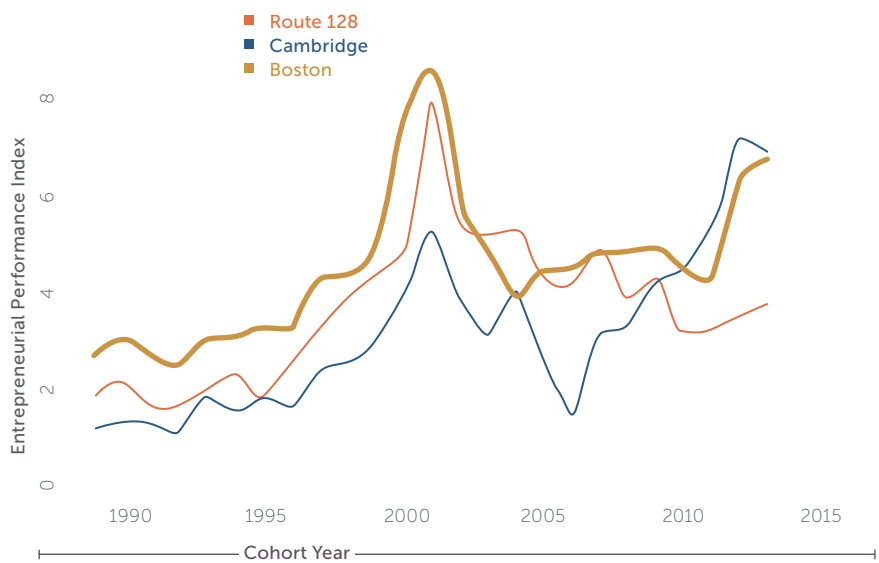
For instance, the figure below from Guzman and Stern (2016b) mapped all newly-registered business in Cambridge from 2008-2012. By creating a similar map for the City of Boston, we could provide clarity to policymakers and scholars as to where targeted interventions could be most productive within specific city neighborhoods.

Newly-registered business in Cambridge, 2008—2012

The growth potential of a region's start-ups is an important measure of the quality of its entrepreneurial ecosystem.

———

Cambridge and the City of Boston now outpace Route 128 in the quality of entrepreneurial startups.

———

There is a trend of entrepreneurial activity moving from the exurbs of Boston into the city in close proximity to the BU campus.

ECONOMIC DEVELOPMENT PERSPECTIVE

We met with Boston's Office of Economic Development to better understand opportunities for strategic partnership. This office, with a staff of 10, is charged with selling Boston internationally, boosting job growth and supporting small businesses. They have focused on recruiting key employers like General Electric to move their headquarters to Boston and are working hard to recruit other multinationals to do the same. Said John Barros, Chief of Economic Development for the City, "Talent is the draw: you are the reason they are coming here." He welcomed the chance to connect BU with these types of candidates to explain the programs we offer and the talent available in this area as part of their recruiting efforts.

Chief Barros and his staff also recognized the potential of "balloon tenants" in the ecosystem and the power of large multinationals to engage with smaller ventures and lift them up. As conveners, BU and the City could consider ways to create new types of ecosystem connections between larger tenants and nascent ventures. Such efforts could yield returns that only show up down the road in terms of early-stage capital investments as well as later-stage acquisitions.

The City recently partnered with IBM to track startups on starthub.org but has no plan to analyze the data gathered. The city welcomed our proposed participation in such an effort and discussed various types of data that could be made available for both research and coursework. Data-sharing partnerships have proven to be successful for them, as evidenced by Waze helping the city to reduce traffic congestion by 18%.

The City has invested in spurring innovation by creating the Seaport innovation District and the Roxbury Innovation Lab to ensure that the benefits of innovation disseminate throughout the city. From the city's perspective, "there is no distinction between social entrepreneurship and entrepreneurship more broadly." They want to cultivate interest in creating greater equity within the city and reaching targeted populations. For example, the city has a major initiative called WEBos (Women Entrepreneurs in Boston). While Babson was a host and contributor to this effort, BU was not involved. We agreed to explore how the BUzz lab could contribute to WEBos—not just to their annual event but throughout the year. Chief Barros also indicated interest in partnering with the BUzz Lab on educational programming for the Roxbury Innovation Center.

Finally, the city was interested in BU's role as an anchor tenant in the Fenway neighborhood and how an innovation center could generate additional entrepreneurial and innovative activity—building on the recent launch of the digital health accelerator Pulse (a spinoff from MassChallenge). While we view this real estate as the gateway to the city's campus, we also recognize that an innovation center positioned well could be a gateway to a Fenway innovation district on par with the success of the Seaport Innovation District. Prior to launching into such an investment it is important to draw upon the lessons learned from other universities.

Boston invested in innovation by creating the Seaport Innovation District and the Roxbury Innovation Lab.

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BU is an anchor tenant in the Fenway neighborhood— an innovation center could generate additional entrepreneurial and innovative activity.

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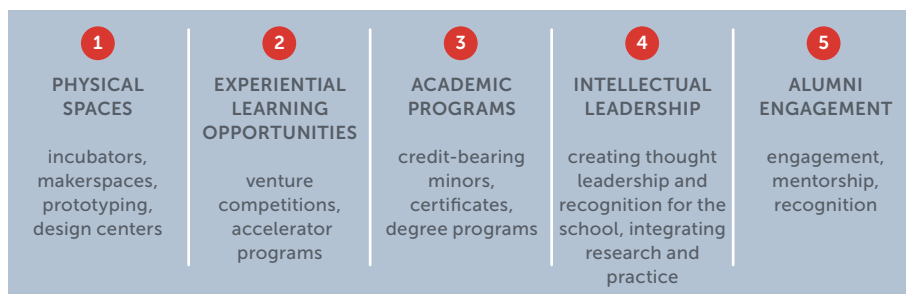**A BU Innovation Center in the Fenway neighborhood could act as a gateway to the city's campus.**

BENCH–
MARKING

BU is relatively unique in having schools of medicine, engineering, law, and business—a source of strength that can be leveraged. BU is also an order of magnitude larger than local benchmarks based on the size of its student population, with over 32,000 total student enrollments.

To learn more about entrepreneurship-related programs and resources available to students at other universities, we examined 20 universities across five domains:

①	②	③	④	⑤
PHYSICAL SPACES	**EXPERIENTIAL LEARNING OPPORTUNITIES**	**ACADEMIC PROGRAMS**	**INTELLECTUAL LEADERSHIP**	**ALUMNI ENGAGEMENT**
incubators, makerspaces, prototyping, design centers	venture competitions, accelerator programs	credit-bearing minors, certificates, degree programs	creating thought leadership and recognition for the school, integrating research and practice	engagement, mentorship, recognition

SELECTING BENCHMARK UNIVERSITIES

In consultation with President Brown, we focused on five local institutions (Babson College, Boston College, Harvard, MIT, and Northeastern) and 15 other peer and aspirant universities: Carnegie Mellon, Cornell, Duke, Georgetown, NYU, Northwestern, Princeton, Stanford, U. Maryland, U. Michigan, UNC Chapel Hill, U. Penn, U. Southern California, U. Toronto and Wash U. at St Louis. For the non-local institutions, we prioritized research universities in the U.S. with large and diverse student populations. Princeton and U. Toronto and were added because of specific initiatives of potential relevance for BU.
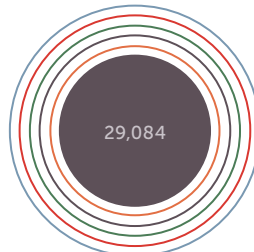
The infographic on the following page provides an overview of the 20 universities. Among the local universities, BU is relatively unique in having schools of medicine, engineering, law, and business—a source of strength that can be better leveraged. BU is also an order of magnitude larger than local benchmarks based on the size of its student population, with over 32,000 total student enrollments.

As the fifth largest in terms of enrollment, BU is most comparable to the University of Maryland and UNC Chapel Hill. The University of Maryland and UNC Chapel Hill received significant assistance and funds from the Kauffman Foundation in the mid-2000s to design and implement cross-campus entrepreneurship programs. Two other benchmark universities, Georgetown and Wash U, also received grants through the now-dormant Kauffman Campus Initiative (KCI). Wash U, for example, received $3.7M in 2003 to implement its five-year plan for university-wide entrepreneurial programs.

We examined 20 local and peer aspirant universities across five domains of activity
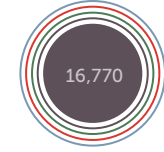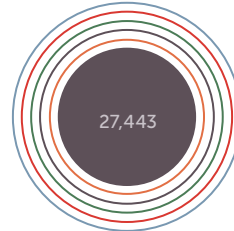
BU vs Benchmark Universities

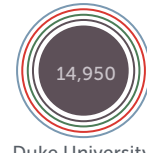University of Toronto
86,709 total students

New York University
55,000
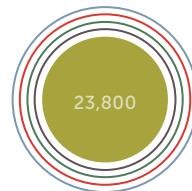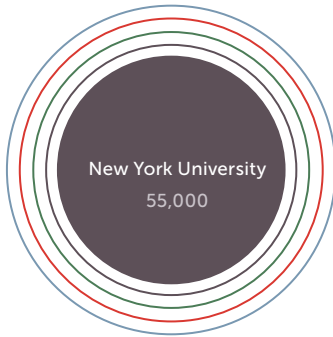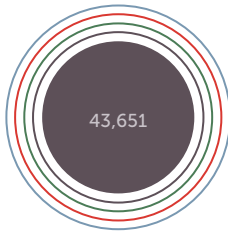
University of Michigan
43,651
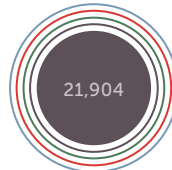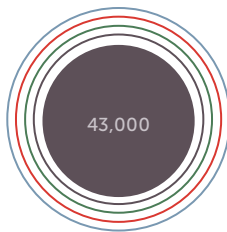
University of So. California
43,000

Boston University
32,158

UNC Chapel Hill
29,084

University of Maryland
27,443

Harvard University
23,800

Cornell University
21,904
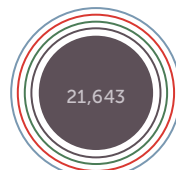
Northwestern University
21,643
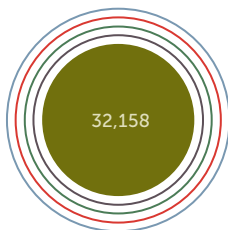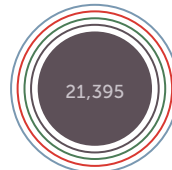
University of Pennsylvania
21,395
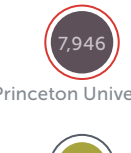
Northeastern University
19,940

Georgetown University
17,849

Stanford University
16,770

Duke University
14,950

Washington University
14,842

Boston College
14,100

Carnegie Mellon
13,285

MIT
11,000

Princeton University
7,946

Babson College
3,049

● Local

● Peer

— Has Medical School
— Has Engineering School
— Has Law School
— Has Business School
— Kauffman Campus

METHODOLOGY

To identify key entrepreneurship-related programs at these universities and gain insights about the design and operations of those programs, we used a two-staged approach and a mix of quantitative and qualitative methods.

Our team of student research assistants carried out an extensive internet-based scan to identify and compile information about the most relevant programs at each university. This task was far more challenging than we envisioned: the University of Michigan alone has 15 entrepreneurship programs and centers, and offers more than 100 entrepreneurship courses across its campus! In some instances, such as Carnegie Mellon, NYU, and Northwestern, the task was aided by visual and interactive mappings that communicate to students campus-wide resources and programs related to entrepreneurship and that explain the linkages among them. Even then, it was infeasible to compile comprehensive data on all spaces and initiatives across the campuses. We prioritized resources (e.g., physical spaces, competitions, funds) and academic programs featured on university websites or reports by entrepreneurial centers on campus.

Complementing this internet-based scan, our faculty team conducted 47 interviews, visited facilities at 11 of the universities, and participated in three national conferences on entrepreneurship education. The interviews were conducted by phone and in person, using the interview template in the Appendix as a guide. Two faculty members attended a May 2016 workshop on entrepreneurship education led by the Duke Innovation & Entrepreneurship Initiative. In addition, one faculty member attended a June 2016 "best practice" workshop for managers of student entrepreneurship spaces held at Harvard's iLab facility. This event generated useful survey evidence regarding program scale and staffing that was otherwise difficult to obtain. Finally, in September 2016, two faculty members attended the annual conference of the Global Consortium of Entrepreneurship Centers (GCEC), an organization for university-based centers, and conducted 8 interviews at that event.

47 interviews

11 campus visits

Three national conferences on entrepreneurship education

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Extensive internet-based scan to identify and compile information about the most relevant programs at each university

GENERAL FINDINGS AND OBSERVATIONS

Many benchmark universities are investing heavily in modern spaces and programs that encourage students to be more innovative and entrepreneurial. As Judith Cone, Vice Chancellor for Innovation, Entrepreneurship and Economic Development at UNC, states: "We want to infuse everyone with an entrepreneurial mindset and encourage self-efficacy and execution." Modern incubator spaces, such as the Garage at Northwestern or the Harvard iLab, are widely seen as a lynchpin in that endeavor.

Academic programs in entrepreneurship are also being widely used as a vehicle for interdisciplinary learning and problem solving. In the past few years, university-wide minors or certificates in Innovation and Entrepreneurship have been introduced at Duke, Carnegie Mellon, Maryland, Michigan, NYU, Northwestern, Princeton, UNC, USC, and Wash U. (Northeastern and Babson have longstanding offerings.) To reach more students outside business and engineering, Northeastern, NYU, Maryland and USC offer undergraduate minors in Social Entrepreneurship and more targeted areas (e.g., "Digital Entrepreneurs" at USC) likely to attract students from different colleges.

Among the universities with significant campus-wide initiatives, there are multiple governance models. In several instances, a "champion" college is used to lead the initiative and integrate with the rest of campus, typically through a campus-wide advisory council. The Dingman Center at Maryland and the Keller Center at Princeton are examples of this model, with respective stewards from business and engineering. An alternative model is more centralized. Examples include Duke's Innovation and Entrepreneurship Initiative, Innovate Blue at Michigan, and Innovate Carolina at UNC. These initiatives have broader technology transfer and research mandates, and report directly to central administration. NYU's cross-campus initiative is also relatively centralized. Initiated by the NYU President's Office to extend and integrate student entrepreneurship offerings across its campus, NYU's Entrepreneurial Institute (EI) reports directly to the Dean of Research. The Institute manages NYU's new 6,800 sq. ft. Leslie eLab, staffed by 11 people, and designed to complement strong entrepreneurship programs in the schools of business and engineering.

The governance model at Cornell is more distinctive. Launched in 2011 with a $4.5 million donation, the university-wide Entrepreneurship at Cornell program reports to a Board of Advisors comprised of Deans of its 12 Colleges. According to our interviews, five of those Deans contribute annually to the operating budget. Cornell's program receives addition funding from fees paid by different tiers of alumni supporters and, like most programs, through a variety of other donations, corporate sponsorships, and grants.

LOCAL ENVIRONMENT

Among the local benchmarks, the most significant developments are infrastructure-related. Three developments seem particularly consequential:

> **In 2014, Harvard opened the iLab, an 8,500 sq. ft. student incubator, on its Allston Campus. This state-of-the-art facility has incubated over 300 student ventures since opening, and is a showcase for entrepreneurial events on campus. Harvard's second incubator space, the 15,000 sq. ft. "Life Lab", opens soon and includes wet lab facilities.**

> **MIT recently announced that it is committing $25M to build an incubator ("the MIT Engine") to serve entrepreneurs trying to solve complex technical or scientific problems with commercial potential. Students will be eligible to compete for space in the facility and for equity-based investments administered through the program.**

Academic programs in entrepreneurship are widely used as a vehicle for interdisciplinary learning and problem solving.

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Universities are investing heavily in modern spaces and academic programs.

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In several instances, a "champion" college is used to integrate with the rest of campus.

Northeastern and Babson have noteworthy programmatic strengths. Leveraging its distinctive Co-op model, Northeastern has longstanding campus-wide degree programs related to entrepreneurship and innovation and an exemplar accelerator (IDEA) that is student-run. Last year, IDEA served 180 student ventures, provided 150 peer-to-peer coaching sessions, and allocated over $1M in grants to teams through its "Stage Gate" program. Over 2,000 students are enrolled in Northeastern's university-wide Entrepreneurship minor. Babson specializes in entrepreneurship and business education, and has top-ranked programs. Babson recently opened a satellite facility near MassChallenge in Boston and is partnering with Wellesley College and the F.W. Olin College of Engineering. Although Babson is a niche player in the local ecosystem, its reach is expanding its brand strongly associated with entrepreneurship.

To position the local benchmark universities relative to BU, we compared their breadth of offerings across campus and commitments to cross-campus integration using the Brush (2014) framework discussed earlier and shown below. MIT is famously decentralized in its approach, with a strong culture of entrepreneurship throughout its campus. The The MIT Martin Trust Center serves an important "broker" role, primarily through experiential programs. Northeastern has longstanding campus-wide offerings in entrepreneurship for students and commitments in place, as does Babson. Harvard, through its iLab and LifeLab incubators, is creating physical magnets for cross-campus engagement and courses.

We find that, relative to local benchmarks and most other universities on the list, Boston College and Boston University devote fewer resources toward university-wide programs and spaces for student entrepreneurship but have pockets of within-college expertise. We therefore placed both BC and BU in the lower left quadrant. In 2015, Boston College received an alumni gift to create a campus-wide institute for entrepreneurship. The funding amount was not disclosed, and the scale of this initiative remains unclear.

Over 2,000 students are enrolled in Northeastern's university-wide Entrepreneurship minor.

Models of Entrepreneurship Education at BU and Local Benchmark Universities
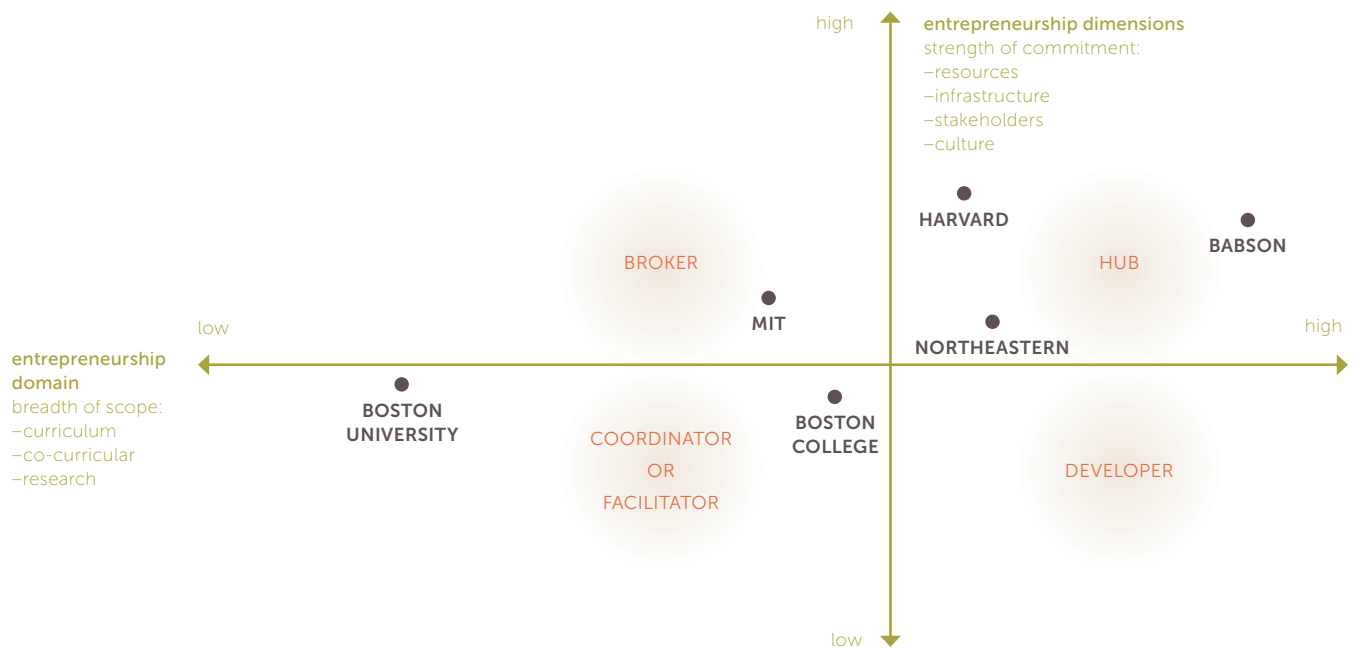
DOMAIN FINDINGS

Before turning to the domain-level findings, we should underscore several points about our analysis. Most universities have myriad programs and spaces related to entrepreneurship—often scattered throughout campus. We compiled information about the subset that seemed particularly important for campus-wide initiatives oriented toward students.

Although "technology transfer" initiatives aimed at the commercialization of university-owned IP and faculty research are beyond the scope of our report, it was often difficult to disentangle them from "student" endeavors. Some universities, for example, offer credit-bearing courses that pair students, primarily from business and law, with research faculty and post-docs to assess market opportunities for early-stage ideas. The Program for Entrepreneurs (P4P) at Duke is an example. Similarly, Penn's Y-Prize uses faculty innovations as the basis for student competitions, thus facilitating experiential learning.

The line between "student-oriented" and "technology transfer" was particularly difficult to draw when categorizing physical spaces. In 2016, for example, Penn opened a 58,000 sq. ft. venture accelerator and testing facility near campus. The new Pennovation Works will provide workshops, internships, and accelerator opportunities for students. It also has an important technology commercialization mandate and several colleges have applied testing facilities in the building. In general, we included facilities like Pennovation Works with well-articulated benefits to students and omitted spaces primarily used for sponsored research with corporations or the commercialization of university-owned inventions such as the Michigan Venture Accelerator. Specifically, we included only those spaces that were accessible to all students, and excluded facilities focused solely on a particular subset of students.

Some universities offer credit-bearing courses that pair students, primarily from business and law, with research faculty and post-docs to assess market opportunities for early-stage ideas.

1 **PHYSICAL SPACES**

Universities around the country are investing in modern student centers with an entrepreneurial purpose. The universities we examined are no exception. We focused on two main types of infrastructure: student incubators and makerspaces.

The Garage at Northwestern illustrates a modern incubator space for students. Marketed as Northwestern's "hub for student entrepreneurship and innovation", the 11,000 square foot building provides flexible workspace and offers students amenities such as 3-D printers and design software. There are open areas for large events, classrooms for workshops and courses, and smaller zones where students and teams work together and meet mentors. According to recent estimates, over 1,000 students, faculty, and staff visit the Garage each month for events, office hours, and workshops, with 60 student-founded startups supported per quarter. Twice a year, the Garage administers an "accelerator" program (called Wildfire), where selected teams work in a cohort to develop and pitch ideas in a finite timeframe. "Accelerator" programs are an important form of experiential learning, as discussed in the next section.

Makerspaces are also central to university-wide entrepreneurship initiatives for students. This term is often used as a synonym for a prototyping center that, like EPIC at BU, provides industrial tools and 3-D printers. We found, however, that the term is commonly used more broadly to include "softer" tools such as design labs and data visualization software. The Garage at Northwestern, for example, provides laser-cutting tools as well as sewing machines.

Hybrid facilities also exist. As is clear, the Garage at Northwestern provides incubation and makerspace services in one building. The Foundry at Duke, which opened in 2015, is another hybrid. Managed by the Pratt School of Engineering, the 7,600 square foot space includes machine tools and equipment common in engineering prototyping centers. Much like the Garage at Northwestern or the Harvard iLab, however, Duke's Foundry also provides a flexible venture incubation workspace and programming for any Duke student.

Universities around the country are investing in modern student centers with an entrepreneurial purpose.
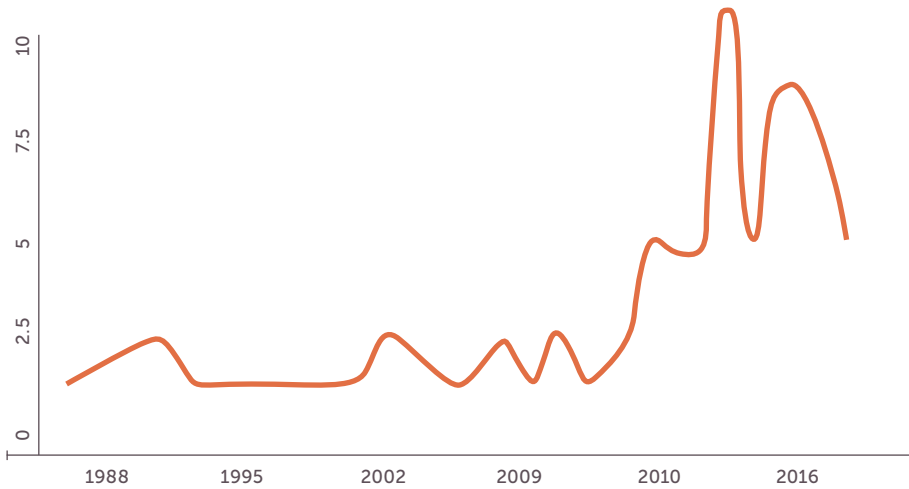
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"Accelerator" programs are an important form of experiential learning.

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Makerspaces— prototyping centers are central to university-wide entrepreneurship initiatives.

Physical Spaces—Quantitative Findings

The figure below plots the annual number of student incubators and makerspaces that we identified at BU and benchmark universities, based on the year the facility opened. We focused solely on campus-wide resources available for students interested in entrepreneurship or developing ideas for new ventures. The overall pattern is clear. In line with national trends, student incubator and makerspaces are becoming more prevalent across these campuses.

New Incubators and Makerspaces Opened by Year:
BU and 20 Benchmark Universities

To estimate the amount of incubation and makerspace available to students, we tallied the square footage of the spaces. We observed that larger, more modern spaces typically advertise their square footage—perhaps as a way to garner interest and advertise the significance of their commitments. If a facility did not report the size of its space, we assumed that it was "small" and treated it as zero. A "zero" therefore indicates that the spaces are relatively small or that a large university-wide facility for student entrepreneurship is absent, not that the university fails to provide these services to students.

Turning first to the local benchmarks, Harvard devotes the most space to campus-wide incubators and makerspaces, which is not surprising. MIT's Engine may change that when it opens. In terms of total square footage, Boston University is surprisingly on par with MIT. This parity reflects the scale of BU's EPIC facility and MIT's more distributed model. Boston College has not yet built significant cross-campus incubators for students. Northeastern's facilities needs to be verified. More troubling, BU provides less incubation space than Babson College, despite its much large population of students.
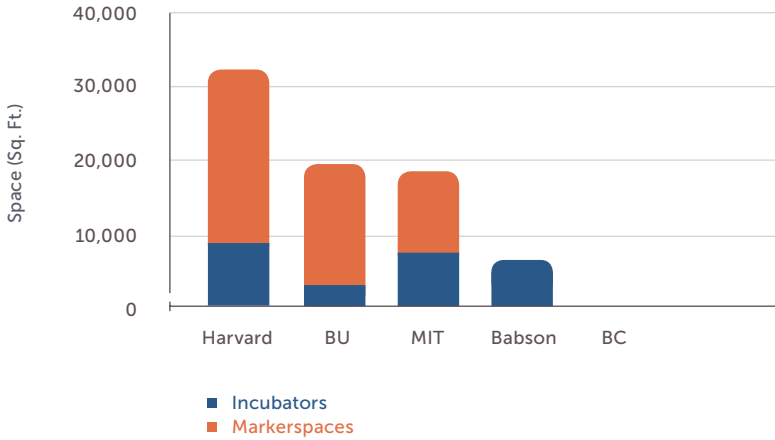
We find a dramatic rise in the launch of student innovation spaces opened since 2009.

**Incubator and Makerspaces at BU v. Local Benchmarks:
Total Sq Ft of Main Facilities on Campus**

Although BU devotes more square footage to makerspaces for students, its campus-wide incubator spaces seem under-scale relative to most of these peer and aspirant universities.

The figure below reports similar numbers for BU relative to peer and aspirant benchmarks from other regions. These estimates are based on "significant" cross-campus facilities that report square footage. The University of Pennsylvania is an outlier due to the recent opening of its 58,000 square foot Pennovention Works building. As discussed earlier, this facility is tied to student entrepreneurship programs at Penn but has a larger technology commercialization and economic development mission. Although BU devotes more square footage to makerspaces for students, its campus-wide incubator spaces seem under-scale relative to most of these peer and aspirant universities.

University-Wide Square Feet of Main Facilities
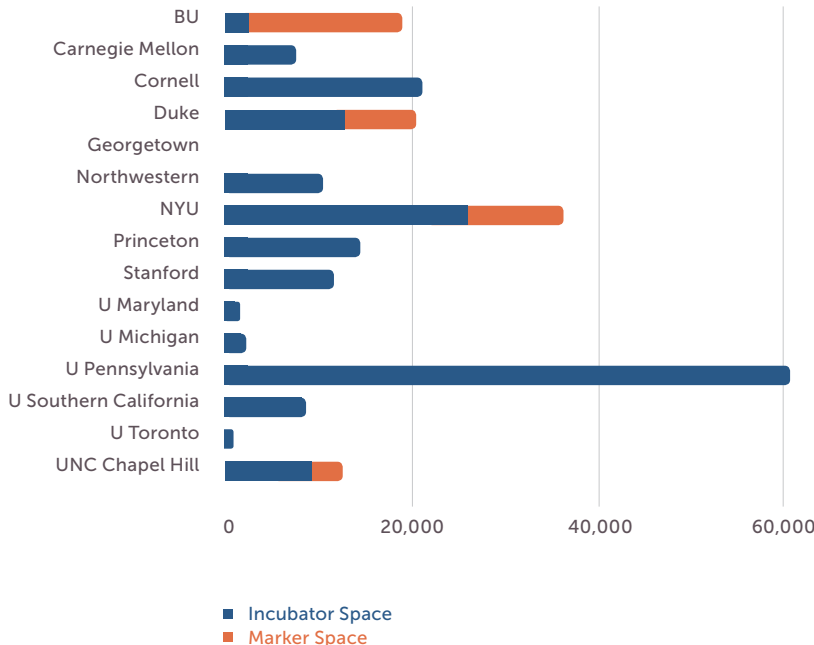
Of the incubators and makerspaces identified at benchmark universities, 41.5% have a primary affiliation with a school of business or engineering. The remaining 58.5% are either governed centrally (e.g., reporting directly to the Dean of Research or President's Office) or independently with a faculty council as illustrated by the Cornell model described earlier. Almost half (47.7%) of the incubators include "makerspaces" such as 3-D printers. Incubators with wet labs are uncommon, which is not surprising in light of their expense.

Incubators and Makerspaces

How Innovators & Makerspaces are Managed
58.5% / 41.5%
- Engineering or Business School
- Central University Administration

Incubators with Wet Lab
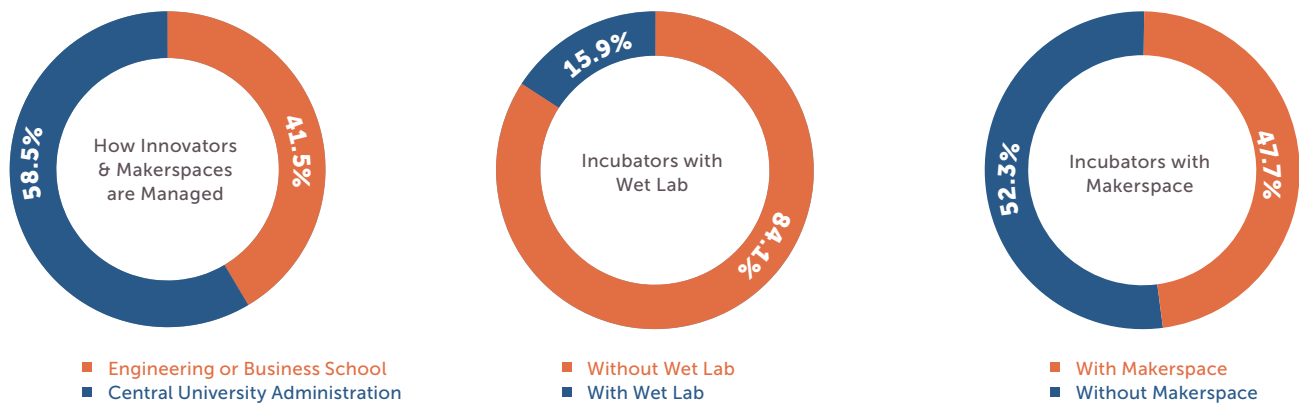15.9% / 84.1%
- Without Wet Lab
- With Wet Lab

Incubators with Makerspace
52.3% / 47.7%
- With Makerspace
- Without Makerspace

Physical Spaces—A Closer Look
When benchmarking with other universities, we sought to learn more about the operations and staffing of campus-wide entrepreneurship centers and their funding models. While center websites often provide statistics on their activities (e.g., # student visits, workshops held, students funded), such statistics are difficult to compare and wide ranging. Surprisingly, even basic information—such as the number of full time faculty and staff hired to manage the endeavor—is difficult to glean since many roles are part-time and filled by interns. We therefore rely on supplemental evidence and interview insights, complemented by survey data.

In 2016, the Harvard iLab conducted a "best practice" workshop for managing directors of campus-wide student entrepreneurship centers and surveyed those directors. Fortuitously, the director of BU's BUzz Lab (Ian Mashiter) attended, as did directors from three local (Babson, MIT, Harvard) and six non-local (Georgetown, UNC, Northwestern, Princeton, Stanford & NYU) benchmark universities.

Student incubation centers represented at the iLab workshop support 125 student ventures and run 225 major events per year on average. The BUzz Lab operates on a smaller scale, with 20 incubated ventures and 10 major events in the same time period. (Median values yield a similar pattern.) Part of this discrepancy reflects the fact that other incubators are more established, in operation an average of nine years, while the BUzz Lab recently entered its third year of operation.

On average, other incubators have six full-time staff to manage and support facilities, programming, and student engagement. The average staff size doubles to 12 if part-time staff is included. In contrast, the BUzz Lab does not have a full time director and is currently staffed with three part time positions.

Student incubation centers support 125 student ventures and run 225 major events per year on average.

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The BUzz Lab operates on a smaller scale, with 20 incubated ventures and 10 major events in the same time period.

Like most incubators represented, the BUzz Lab space is located on campus and does not take equity positions in student ventures. This no-equity "honest broker" approach is quite common for university-managed centers. Most incubators (78%) report that they provide funding, typically through grants and stipends, for incubating ventures. The BUzz Lab currently does not provide incubation grants to student teams, except for participants in the Summer Accelerator program.

WHAT MAKES FOR A SUCCESSFUL INNOVATION SPACE?

First, "location matters" to the success of cross-campus engagement, an obvious but important point. A director from the University of Michigan's Zell Lurie Institute (ZLI) for Entrepreneurial Studies stated: "Proximity to campus is key. We won't consider a site that's more than a 10 minute walk from central campus." "If student can't walk there, they're less likely to engage." Duke's "BullPen, a 13,000 sq. ft. incubator that opened in 2015 is in downtown Durham, a bus-ride from main campus, experiences only light student traffic outside of "big events." The managing director of Princeton's Keller Center heralded their "design thinking space", an event area that accommodates 75 people and is usually full in evenings but lamented that the facility is "more in town than on campus," which reduces daytime use and increases the importance of effective programming.[1] Some facilities, including the Garage at Northwestern and Harvard's iLab, use classroom and workspace for credit-bearing courses (e.g., on design thinking) during the day to smooth out the rhythm between day and night use.

A few schools deliberately considered engagement between their center and the regional ecosystem. The COO of the Pennovation Works project feels that this facility provides "an energy that will put Penn and Philadelphia on the radar nationally and internationally" and "reframes the perception of what's going on in Philly." She noted that, "spaces like this are the glue and landing pad for collaboration." The director of NYU's new Leslie eLab incubator explained how their new space had changed their capabilities: "we could only do so much from the sixth floor of an unmarked building." The Leslie eLab now provides larger and more modern ground floor space on Washington Square, with expanded events and services for student ventures that link into NYU's entrepreneurial ecosystem.

Second, cultivating diverse student communities is key to a thriving innovation center. To do so, several directors broadened the mission of entrepreneurship to include innovation, coupling the word "innovation" with "entrepreneurship" rather that use of the "entrepreneurship" label alone to symbolically welcome a wider swath of students. The director of Princeton's new incubator viewed the term entrepreneurship as too narrow and relied on broader terms (like "innovation", "making an impact", "creativity," and "solving problems that matter") to resonate with a wider range of students. UNC's President intentionally selected a prominent social entrepreneur to signal the inclusion of social impact when launching the undergraduate minor and university-wide Innovate Carolina initiative.

Third is the importance of strong programming adaptable to student needs; engaging with student clubs and supporting their efforts to create events of interest to them. An NYU study of 47 innovative spaces in public and private higher educational institutions (80% of them opened in the last 10 years), emphasized making innovation spaces welcoming, accessible and adaptable to student needs "for students, by students". Some went so far as to engage students involved in space's governance to ensure that programming met student needs. In addition to location, innovation spaces that took pains to cultivate diverse communities and develop strong programming were able to foster behaviors such as collaboration, risk taking, testing and being playful - all elements of the entrepreneurial mindset.

"Proximity to campus is key. We won't consider a site that's more than a 10 minute walk from central campus."

—UNIVERSITY OF MICHIGAN INNOVATION CENTER DIRECTOR

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Some facilities use classroom and workspace for credit-bearing courses (e.g. on design thinking) during the day to smooth out the rhythm between day and night use.

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"Spaces like this are the glue and landing pad for collaboration."

—UNIVERSITY OF PENNSYLVANIA INNOVATION CENTER DIRECTOR

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Cultivating diverse student communities is key to a thriving innovation center.

2 **EXPERIENTIAL LEARNING**   ● ● ● ● ●

Experiential learning is a vital part of entrepreneurship education. Most universities provide myriad opportunities for students to actively engage in innovative and entrepreneurial activities, including clubs, treks, internships, competitions, and workshops that complement classroom instruction. Many of these opportunities are extra-curricular only, but some are integrated with credit-bearing courses or degree programs. We examined three primary vehicles for enhancing student experiential learning:

   Venture Competitions, where students pitch ideas for new ventures before a panel of judges, with winners receiving cash prizes and in-kind service;

   Accelerator Programs, where teams of students advance ideas in a structured cohort-based program of finite length;

   Venture funds, where students actively participate in decisions to finance early-stage ideas, often in teams from multiple colleges across campus (e.g., business, law, STEM areas).

VENTURE COMPETITIONS
Student venture competitions are a highly visible stimulant for student entrepreneurship on campus. The structure that student venture competitions follow is quite consistent: students prepare an in-depth pitch of their business idea in front of a panel of judges after passing through pre-judging milestones. Competitions vary in the number of rounds offered before final judging. Judge panels are generally drawn from the university's entrepreneurial community, alumni or investors. Awards include cash money and in-kind services such as marketing and accounting services, legal advice, mentoring and coaching, or office space donated by competition sponsors.

We compared BU to local schools like MIT, Harvard, BC and Babson and noted that in terms of cash prizes, BU stands at the lower end. Enabled by strong alumni networks and large sponsorships, universities like MIT and Harvard dominate the scene, providing over $200,000 in cash prizes to their ventures. Outside the Boston region, BU still offers less prize money than peer and aspirant benchmarks such as USC and UNC which both offer over $200,000, similar to Harvard and MIT. Nine universities provide more than $100,000 in cash prizes to students.

To engage students with different interests, many universities run multiple tracks of a competition. NYU awards three separate $100,000 prizes (cash plus services) in the categories of: New Ventures, Social Ventures, and Technology Ventures. This competition, run within the Stern School of Business, starts with an on-line application process much like professional accelerators. Each proposal is read by three judges and scored. Teams with scores above a certain threshold are invited to present a live pitch at the quarter and semi-final events.

Most universities offer multiple competitions to students. Wharton's Y-prize is of particular interest as it turns the popular MIT X prize concept on its head: rather than ask students to devise a technical solution to a problem, this contest tasks students to discover the hidden potential in university technologies. This joint initiative between Wharton and Penn Engineering identifies an exciting but underused technology (selected by a cross-campus panel of experts), then asks students to find a problem this technology can help solve. Students work in interdisciplinary teams to find applications rather than solutions. The winner receives a $10,000 cash prize and the rights to commercialize their application. In its fifth year of operation, the Y-Prize has challenged students to explore ways to commercialize inventions from the fields of robotics and nanomaterials to fermentation technologies.

The structure that student venture competitions follow is quite consistent: students prepare an in-depth pitch of their business idea in front of a panel of judges after passing through pre-judging milestones.
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Wharton's Y prize is of particular interest as it turns the popular MIT X prize concept on its head: rather than ask students to devise a technical solution to a problem, this contest tasks students to discover the hidden potential in university technologies.

BU runs two main venture competitions, one through the BUzz Lab (New Venture Competition) and another through the Imagining Lab in engineering (Imagineering Competition). Cornell, Michigan, and USC run more than five annual competitions. BU is at par or slightly below the benchmark average in this regard. However, BU does not offer a social entrepreneurship competition, which seems to be present at most schools.

Nine universities provide more than $100,000 in cash prizes to student entrepreneurs.

Cash Prizes at Venture Competitions:

BU V LOCAL + NON-LOCAL BENCHMARKS

School	Amount
BU	$32,500
Boston College	$32,500
Babson	$67,500
MIT	$135,500
Harvard	$235,500

BU V NON-LOCAL BENCHMARKS

School	Amount
BU	$32,500
Princeton	$34,500
U Toronto	$42,500
U Maryland	$50,000
Duke	$53,500
Carnegie Mellon	$61,000
Stanford	$100,000
Cornell	$116,500
NYU	$120,000
Georgetown	$120,390
U Pennsylvania	$128,000
U Michigan	$130,000
Northwestern	$131,300
Washington U at St. Louis	$135,000
U North Carolina	$200,000
U Southern California	$217,000

ACCELERATOR PROGRAMS

The student start-up experience is greatly affected by the availability of student venture accelerators on campus. The accelerator model, designed initially by Y Combinator in Silicon Valley, is an immersive program of fixed length (often 10 weeks) where start-ups are provided with coaching and mentorship to accelerate their progress. We focused on accelerator programs organized within the entrepreneurship centers and incubator spaces of the universities studied and omitted accelerators whose main focus was commercializing faculty innovations and university-owned IP.

Accelerators equip student startups with resources such as mentorship, workshops on legal, accounting and research issues, coaching, office hours, alumni and investor networks etc. Some but not all provide space for student startups. The message across these programs is very similar: "take on student ideas and turn them into actual startups". All benchmarked universities offer 1-2 accelerator programs during the academic year or summer (the mean is 1.4 accelerator programs per year). Boston University runs two, the BUzz Lab Summer Accelerator and the student-run BU Venture Accelerator (BUVA) during the academic year and is at par with universities benchmarked in terms of the number of programs offered. With improved physical space, BU could support a higher volume of students in these programs.

For most universities, student acceptance into an accelerator program is a competitive process. Students apply and some programs require prerequisite work or certain milestones. Similar to BU's BUzz Lab accelerator, many benchmark universities provide stipends or grants to student startups admitted. Northeastern has a fund that makes awards only to their most advanced startups. Other universities, like Duke and Toronto, award prizes through their Demo Day pitching events. Funding amounts vary widely in part due to differences in the duration of the programs.

At most benchmark universities (92%), students do not receive course credit for developing ventures through accelerators, although Cornell and Duke are exceptions. In Duke's P4E program, interdisciplinary student teams work on a venture idea over the course of 1-2 academic years. Students take classes organized as workshops where they advance their venture ideas, consult with professors and mentors on their progress and face weekly checkpoints. In their final semester, students present their ideas to a panel. At Cornell's eLab, students with startup ideas receive 5.5 credits over the school year, working to advance their startups, while relating this experience to broader principles and frameworks. At Toronto's Creative Destruction Lab, MBA students receive credit for helping advise STEM-related startups while taking courses related to innovation and entrepreneurship.

At Cornell's eLab, students with startup ideas receive 5.5 credits over the school year, working to advance their startups while relating this experience to broader principles and frameworks.

VENTURE FUNDS

The term "venture funds" is sometimes used to refer to non-equity grants and stipends to students. Grants tend to be competitively awarded and cover specific costs (e.g., for prototyping). The term "venture fund" is also used to describe equity-based funds that invest in early-stage student startups, typically through convertible notes. Equity-based venture funds tend to use an "evergreen" or "self-sustaining" model, where proceeds are returned to the fund rather than to the original capital providers. Several benchmark universities (e.g., Michigan and Northwestern) use equity-based funds to provide capital to startups formed to commercialize university-owned inventions. BU does not currently offer either a student startup grant fund or venture fund.

At some schools, grant- and equity-based funds are structured to engage students in the decision-making process, serving a pedagogical role to teach students about valuation and entrepreneurial finance. The IDEA Gap Fund at Northeastern illustrates a student-run grant fund. Managed by the student-run IDEA Accelerator, student investment committees review applications from student teams who pitch their ideas to IDEA's Advisory Board. The Advisory Board decides which projects to fund. Winning students receive a non-equity grant, and up to 25 grants of $10,000 are awarded each year. The IDEA Accelerator also provides smaller grants of up to $1,000 to students for prototyping. Similarly, the Project Olympus incubator at Carnegie Mellon provides "Spark Grants" to student teams seeking to build or test their ideas, in amounts ranging from $500 to $3,000 per student venture.

Equity-based venture funds are more rare at benchmark universities, likely reflecting the larger fund size required to pool risk when investing in early-stage companies, and the increased complexity of managing these types of programs. Only five benchmark universities manage equity-based venture funds: Carnegie Mellon, Cornell, Duke, NYU, Northwestern and the University of Michigan. MIT has announced its first venture investment fund as part of the MIT Engine initiative. Similar in spirit, the $10 million N.XT Fund at Northwestern aims to support innovations that are "too advanced for federal funding but too early for private investment."

The University of Michigan is an outlier based on the number of equity-based student venture funds it manages and their longevity. In 1997, the Zell Lurie Institute (ZLI) for Entrepreneurial Studies at Michigan introduced the first venture fund in the country that allowed students to serve in roles equivalent to associates at venture capital firms. With an initial fund size of $2.5 million, the Wolverine Venture Fund typically invests in early-stage companies seeking seed or series A investments and syndicates with more experienced VC or angel investors. Over 200 students from business, law, and STEM areas have served as associates in this credit-bearing program. Assets under management have grown to $7 million. The ZLI now operates four other venture funds, including one for social ventures (Social Venture Fund), one that expands opportunities for Ross undergraduates (the Zell Early-Stage Fund), and another (Zell Founders Fund) that provides seed funding to students seeking to develop their startups after graduation. These initiatives are primarily supported through alumni gifts using an evergreen model.

Some venture funds are structured to engage students in the decision-making process, serving a pedagogical role to teach students about valuation and entrepreneurial finance.

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Project Olympus incubator at Carnegie Mellon provides "Spark Grants" to student teams seeking to build or test their ideas, in amounts ranging from $500 to $3,000 per student venture.

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The $10 million N.XT Fund at Northwestern aims to support innovations that are "too advanced for federal funding but too early for private investment."

3 ACADEMIC PROGRAMS   ● ● ● ● ● ●

"Expose many, enable a few, and enhance all"

A large component of our research examined academic programs related to entrepreneurship and innovation. Course offerings campus-wide at most benchmarked universities of similar scale exceeded BU course offerings on Entrepreneurship or Innovation. University-wide, Michigan offers over 100 courses on entrepreneurship; Wash U 80 courses; University of Toronto 70 courses; and BU 44 courses. Northeastern offers double the courses offered by BU for undergraduates.

This breadth of courses includes courses on cultural entrepreneurship, design thinking, creativity, opportunity identification, as well as the traditional courses on creating business plans and entrepreneurial finance. For example, the University of Maryland's Academy for Innovation and Entrepreneurship offers the popular "Fearless Ideas Course." This course exposes students to entrepreneurial problem solving, risk taking, the challenge of managing uncertainty and the opportunity to "exercise their innovation muscles". Students of different majors team to work on real-world projects. Most classes focus on a specific topics related to entrepreneurial principles such as: Ecological Design Thinking, Becoming a Design Thinker, Public Art and Design, Innovation in Countering Violent Extremism, and Experiential Entrepreneurship.

Several universities in our sample are bringing together faculty from different colleges to develop new inter-disciplinary minors, delivering academics through experiential, immersion-style learning that engages students in-classroom and out-of-classes. Approximately 60% of the universities we benchmarked offer undergraduate minors in Entrepreneurship—many recently introduced. This group includes Carnegie Mellon, Duke, NYU, Northeastern, Northwestern, Princeton, U. Maryland, U. Michigan, U. Penn, U. Southern California, and Wash U St. Louis. Carnegie Mellon and Princeton are rolling out new minors this academic year. Among local benchmarks, Northeastern is the only university that offers an undergraduate entrepreneurship minor designed for non-business students. Neither Harvard nor MIT offer an entrepreneurial minor – neither school teaches undergraduate business.

The universities we studied are often creating entrepreneurship minors as a vehicle for inter-disciplinary education on Entrepreneurship and Innovation and sometimes this is combined with other objectives. For example, some entrepreneurship minors are specific to certain disciplines, such as the Engineering Entrepreneurship Minor at Penn, the Minor in Game Entrepreneurism at USC, or the Global Social Entrepreneurship Minor at Northeastern. USC's minors are managed by its business school in partnership with different schools on campus such as the College of Communication for the Minor in Media Economics and Entrepreneurship. USC also partners with young and established firms within their ecosystems to create new learning experiences for students in these programs. Students at NYU can enroll in a Social Entrepreneurship minor that engages faculty from public policy, economics and organizational theory. Students take two introductory courses that level-set knowledge across diverse backgrounds. Other minors are more open such as the University of Michigan 15-credit minor which offers undergraduates from any college and background to "translate ideas into real impact" in the arts, sciences, commercial, and social areas.

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Experiential learning is a key mechanism for entrepreneurship education reflected in the entrepreneurship minor programs at benchmark universities. Embedding deep in-the-field experiences such as internships, research projects with corporate partners, and developing ventures into the class curriculum takes various forms. To earn a certificate in Entrepreneurship, Duke University requires two immersive co-curricular experiences tied to innovation and entrepreneurship initiatives in civic, social, or commercial ventures. Similarly, at Washington University in St. Louis, students intern at start-ups and venture funds provide experience in various roles and perspectives related to entrepreneurial enactment.

At the graduate level, we found fewer academic programs across colleges, some target STEM students. One example is Carnegie Mellon's new Masters of Science in Technology Ventures (MSTV), administered through Carnegie's Integrated Innovation Institution. MSTV provide engineers and scientists with the tools and skills to bring new technologies to market through coursework in business and entrepreneurship and co-curricular projects at startups and established firms. MSTV is also offered as a dual degree for students earning a master's degree in biomedical or environmental engineering. Similarly, Northwestern offers a Graduate Minor in Entrepreneurship that is open to masters and PhD students from across the university.

The programs at benchmark schools are vary but the consistent themes of experiential co-curricular minors underpinned with academic research and linked to the broader ecosystem are the new norm. Successful approaches require the involvement of relevant research faculty, strong relationships with the local business community, and a commitment to multi-disciplinary, cross-campus entrepreneurship programs. For these types of programs to scale, a designated partnership or relationship capability is needed.

While Boston University has made progress incorporating experiential learning into our entrepreneurship curriculum, as noted by students and faculty alike, "we have room to improve", and need a mechanism to comprehensively deliver experiential academics centered on Entrepreneurship. A university-wide minor in Entrepreneurship and Innovation could leverage existing entrepreneurship offerings across colleges and schools at BU, allowing us to elevate our approach and differentiate our students in the marketplace.

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4 INTELLECTUAL LEADERSHIP ● ● ● ● ● ●

In the past few decades, entrepreneurship has matured as a field of social scientific inquiry both in core disciplines (e.g., psychology and economics) as well as in interdisciplinary fields such as business, public policy and law. Academic research on entrepreneurship has also been stimulated by the availability of funding from organizations like the Kauffman Foundation, and by the emergence of data sources that track entrepreneurs and their endeavors on a large-scale basis. Today, several leading business schools such as MIT, HBS, Wharton, and the London Business School include departments with entrepreneurship in their titles. Similarly, Questrom brings faculty expertise in the psychological, social, economic, and policy forces that shape entrepreneurial firms, with distinctive competencies related to design thinking, creativity, intellectual property, venture financing, and innovation ecosystems.

However, the integration of academic research into entrepreneurship programs varies widely among benchmark universities, both for campus-wide initiatives and within particular colleges. A surprising number of campus innovation initiatives operate in relative isolation from the scholarly research community. Because entrepreneurship is rooted in practice and experiential learning, directors of many campus innovation centers often do not have doctoral degrees and many courses are staffed by adjuncts with experience creating or managing startups. For example, at Carnegie Mellon, researchers from the social sciences do not play a formal role in the new cross campus Swartz Center, nor do they play a major role at Northwestern's Garage or at Harvard's iLab, both of which are quite separate from the University's primary research activities. Only a few benchmark universities (Stanford, Duke, USC, Babson) made a significant effort to incorporate research into their entrepreneurship and innovation initiatives. For those that did, the returns were substantial either in terms of contributions to the scholarly community or in assessing the university's impact and reinforcing its brand value. In a few cases, both types of benefits were realized.

Babson has long held an international perspective on entrepreneurship, as evident in their ongoing leadership of the Global Entrepreneurship Monitor (GEM) report, initiated in 1999 as a joint venture of Babson College and the London Business School. GEM has surveyed millions of nascent entrepreneurs in more than 100 countries over the past 18 years. Led by in-country researchers, GEM seeks to study the behavior of individuals with respect to starting and managing a business. GEM data provides information on entrepreneurial demographic trends but is not a longitudinal panel study, limiting scholarly contribution. Although this report targets practitioners rather than scholars, Babson's brand and reputation on entrepreneurship has been greatly enhanced by this effort. Babson College faculty also collaborate on books on entrepreneurial education that involves and engages faculty broadly. A recent book, Evolving Entrepreneurial Education, Innovation in the Babson Classroom (2015, Emerald Group Publishing), includes chapters written by 45 faculty across the campus, providing a broad perspective on entrepreneurship. This effort helps connect faculty to the school's mission and creates brand value. Babson also holds the Babson College Entrepreneurship Research Conference (BCERC), ostensibly the premier international conference for the development, discussion, and presentation of entrepreneurship research, and produces the publication of Frontiers of Entrepreneurship Research (FER), a compilation of the conference proceedings and of the top 40 papers presented each year at (BCERC).

Schools like Toronto, Berkeley, UNC, and Maryland all have an Academic Faculty Director in Entrepreneurship who is a well-known entrepreneurship scholar but there is often a lack of breadth of such scholars. Few schools have leveraged faculty talent to create a thought leadership strategy or research agenda tied

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to the university's initiative, as has Babson, with the exception of Wharton. Wharton's Mack Institute for Innovation has provided over $3.1 million in funding toward more than 400 projects that advance its clearly conveyed innovation and entrepreneurial research priorities. Over 17 corporate partners from firms like Computer Associates, Cisco, Merck, NASA and FedEx support the center's agenda. The Mack Institute offers research grants to faculty and doctoral students and holds an annual research conference on topics such as leading and organizing for innovation, and capturing value from innovation.

Four other schools that have effectively produced thought leadership that provided both scholarly contributions and enhanced the brand value of the school are Duke, MIT, USC and Stanford. Duke's Innovation and Entrepreneurship Initiative includes a research think tank with an intriguing dual role—to provide a campus-wide hub "where great research about entrepreneurship is conceived, discussed and explored" while also leveraging student programs and competitions as "useful laboratories where social scientific theory can be tested." In addition to informing the design of student programs at Duke, the think tank aims to build thought leadership on how innovation and entrepreneurship is encouraged and enabled in individuals, institutions, and ecosystems. USC's Greif Center for Entrepreneurial Studies offers a seminar series and annual conference, makes $5,000 faculty research awards and bestows a "research impact award" to the scholar with the most impactful entrepreneurship article published six years prior. The Greif Center has also created a university-wide network of research faculty and doctoral students doing scholarly work related to entrepreneurship.

For Stanford, integrating research on innovation and entrepreneurship with practice was both a pragmatic and strategic concern. Stanford has one of the longest running entrepreneurial programs and feels that research is very important to connecting their activities to the heart of the university's mission. Their perspective is that "if you are not plugged into the scholarly core of the university then it is easy to get marginalized, we have seen that in other schools...a strong research arm gives tremendous credibility to what we do." They have been able to support research and forge connections between the entrepreneurs flowing through their program and the doctoral students and professors interested in doing research on entrepreneurship. For example, Professor Chuck Eesley at Stanford Engineering has crafted a research agenda focused on the role of the institutional and university environment in high-growth, technology entrepreneurship with some success—researching the entrepreneurial outcomes of alumni at MIT, Stanford and Tsinghua University. This kind of research has incredible value to the school: a 2012 study estimated that companies formed by Stanford entrepreneurs generate world revenues of $2.7 trillion annually and have created 5.4 million jobs since the 1930s. "Stanford alumni and faculty have created 39,900 companies since the 1930s, which, if gathered collectively into an independent nation, would constitute the world's 10th largest economy" .

Similarly at MIT, Ed Roberts and colleagues have produced extensive research examining both the propensity of MIT alumni to engage in entrepreneurship over time and as well as MIT's impact on the regional and broader economy—research that not only produces new knowledge about entrepreneurship and regional ecosystems, but also illuminates the university's impact. For example, Roberts and colleagues found that over 20% of alumni survey respondents started one or more for-profit ventures, almost a quarter of them in Massachusetts. This type of alumni research was not encouraged at schools like NYU where alumni data was not shared with faculty. Hsu, Rogers and Eesley suggest that the role of universities in fostering entrepreneurship via students and alumni "still needs systematic analysis" (2007). After all, the largest output from universities is not patents but people and understanding their entrepreneurial trajectories is important to assessing the value and impact of the university's efforts.

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"A strong research arm gives tremendous credibility to what we do."

—STANFORD TECHNOLOGY VENTURE PROGRAM DIRECTOR

Finally, we noted that several universities invested in key database subscriptions to advance entrepreneurial research on industries and firms for both students and faculty alike. Schools like Michigan and UNC invest in data subscriptions to sources like VentureXpert and in patent mapping and visualization tools that can enable students to better assess the competitive entrepreneurial landscape. BU Questrom only subscribes to databases like CapitalIQ, which uses publicly available data from press releases to obtain information about entrepreneurial companies and sources of financing rather than reliable data on the valuations of startups across rounds. As both students and faculty become serious about engaging in entrepreneurship, universities will need world class data tools to support entrepreneurial analysis, decision making and research.

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5 ALUMNI ENGAGEMENT

The universities we studied all recognize the value that alumni can bring to students through mentoring, connections, and the provision of experiential learning through internships and other fieldwork. Some schools take a very informal approach, connecting students with mentors and conducting little tracking and monitoring of student/mentor interactions. Other schools, such as Cornell, MIT, and Harvard pursue a highly curated approach; this is the approach we have taken and which we will build upon. In these more formalized mentoring programs, mentors' motivations and expectations are verified as appropriate, with no intent or to reap personal or professional gain. Indeed, one of the most active topics at the recent GCEC national entrepreneurship conference related to the processes by which universities manage the nature and ethics of their mentoring systems.

Engagement with alumni also takes the form of alumni involvement on discussion panels and in the classroom in direct supportive interactions with students. Alumni expertise applied to judging panels in competitions and in-class presentations is highly valued by alumni, students, and professors.

Some alumni also work with universities to develop highly integrated programs for the benefit of students. For example, some investment firms take on a significant number of students in programs designed to give the students direct experience in developing of investment recommendations. Others engage in systematic approaches to the provision of internships to students, or in students' participation in major team competitions. An example of this is the Adams Apprenticeship Program at the University of North Carolina. Alumni sometimes assist in the sponsorship of competitions providing, for example, cash for prizes with the goal of helping new ventures move forward with their plans. For example, the University of Maryland's Cupid's Cup, now in its 10th year of operation, was funded by Kevin Plank, the alumnus founder of Under Armour.

In some universities, alumni are called upon to participate as members of independent advisory boards, such as the newly formed Advisory Group at Georgetown, whose 11 members pay $25K to be on the board for a one year term.

Alumni recognition also plays a part in the overall dynamics of maintaining alumni relationships. Many schools hold "Entrepreneur of the Year" award ceremonies in which alumni are recognized for their high achievements, contributions to students, and contribution to the university. These events, usually attended by students, alumni, and faculty, give all parties a good opportunity to further develop and cement relationships. Examples of this are the "Alumni Entrepreneur Hall of Fame" efforts conducted at Babson College, the University of Missouri-Kansas City, the University of Tennessee, and Virginia Tech, where high-achieving alumni can be honored in a meaningful and lasting way.

Cornell combines their annual alumni award ceremony with a conference called the Entrepreneurship Summit in NYC, which alumni pay to attend. Alumni benefit not just from the award ceremony but, from networking with each other.

In short, all universities involve alumni in mentoring students and judging student venture competitions. Some create synergy with events that recognize entrepreneurial and innovative alumni, regardless of their home school. These events foster substantive connections between current students and alumni and among alumni of different cohorts. An advanced model weaves alumni engagement into experiential learning as is done with the Adams Apprenticeship.

The Adams Apprenticeship at UNC-Chapel Hill is a highly selective, 12-month program for undergraduate juniors and first year graduate students. Launched in 2015 with a naming gift, the program matches 20-25 student entrepreneurs per year to alumni advisors. The program includes coursework, experiential treks to New York City and San Francisco, tailored mentoring, and an annual gala at the UNC campus with alumni to honor graduates and select the new cohort. Both alumni and students benefit from these substantive connections.

CRAFTING THE VISION

1. Creating the Conceptual Framework
2. Creating Collaborative Innovation Space
3. Governing the Campus Initiative
4. Addressing all Campus Stakeholders
5. Broader Boston Ecosystem
6. Executing on the Vision

Through benchmarking we learned how multiple universities structured their entrepreneurial and innovation initiatives to achieve campus-wide goals. Drawing from this variety of approaches, we offer a set of specific recommendations to enhance innovation and entrepreneurship for all stakeholders at BU.

Some of these recommendations align with existing efforts to improve undergraduate general education, technology transfer and relationships with industry. Because we do not yet have the space to actualize all of these recommendations and we appreciate that acquiring this space may be a long-term prospect, we offer these recommendations with an eye to what can be accomplished in the near and long term.

A framework is needed to penetrate interdisciplinary silos and open the doors to innovation.
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BU would benefit from a specific named and branded initiative like: "Innovate@BU"

CREATING THE CONCEPTUAL FRAMEWORK—INNOVATE@BU
The first near term recommendation is to craft and brand a BU-specific conceptual framework and map of campus resources that aligns with the different phases of the innovation and entrepreneurial process. This conceptual map would help orient both students and faculty to the resources available in terms of geography and need area and be branded with BU's distinctive approach toward innovation and entrepreneurship. In preparing for this report, we identified where entrepreneurship and innovation lives at BU but not where and when students need it. A framework is needed to penetrate interdisciplinary silos and open the doors to innovation.

Two examples of such frameworks are Innovate Carolina's branded effort that segments entrepreneurial and innovative activity into the phases of catalyze, prepare, collaborate, translate and align, and NYU's framework that organizes activities into the phases of inspire, educate, connect, accelerate and fund. A Faculty Entrepreneurial Network (FEN) will help converge on the appropriate framework for BU and assess how courses and activities offered by all schools at BU align with this framework. The benefits of such a framework are tremendous as it will provide students and faculty with a common language and understanding of how different disciplines and campus resources contribute across the entire innovation process. For example, if BU's first phase was ideate, the College of Communication class, "Creating New Ideas" might fit there, while the College of Fine Arts class on "Cultural Entrepreneurship" might fit in an educate or inspire phase and the Questrom class on "Creating New Ventures" and Venture Competition might fit in an iterate or launch phase. This conceptual work will also help identify any curriculum gaps.

Once this map is created, BU would benefit from a named and branded initiative like: "Innovate@BU" (a placeholder term for the FEN to work with). The Director of the Martin Trust Center shared that a key component of success for MIT's Innovation Initiative was ensuring that all their constituents: students, faculty, and the broader Cambridge ecosystem, knew of the resources available and accessible to supporting their entrepreneurial goals. They also shared that it was essential to demonstrate how these resources and assets had discernable missions, but were connected within the larger framework of MIT. This advice was reinforced by Judith Cone, Vice Chancellor for Innovation, Entrepreneurship and Economic Development at UNC.

CREATING COLLABORATIVE STUDENT INNOVATION SPACE

We recommend that a significant new collaborative space (8,000–12,000 sq. ft.) be dedicated to support student entrepreneurship and collaboration as soon as possible as our benchmarking data reveals that we are under scaled to meet our objectives. This space should be centrally located on independent ground, open to all students for most of the day and night and adaptable to students' evolving needs. When universities assess where to locate their innovation space, they typically choose a site that is geographically unaffiliated with any one school in order to convey an open invitation to all disciplines. This space would be dedicated to students' pursuit of ideas (rather than homework) and include "soft" prototyping tools to complement the more sophisticated technology housed at EPIC.

This space should be adaptable to host speakers, support small teams as well as large scale collaboration and be free from the constraints of existing catering relationships to permit a more informal style of engagement. We recommend further engagement with all stakeholders and a branding committee to solidify a name for this space. An open and flexible floor plan is key with appropriate soundproofing. Engaging cross-campus schools in the design will increase a sense of ownership and engender a relationship with the space: graphic and information design students could hold a contest to create a logo and identity; a wall could be dedicated for a mural by fine arts students; a rotating student gallery space could be created for visual arts and a space allocated for our "Hall of Fame" alumni inductees. We also recommend one idea borrowed from NYU - the creation of a wall for students to find collaborative partners from other disciplines.

In considering space options, BU benefits from three favorable conditions that many benchmark universities do not have. First, most undergraduate students are collocated in a very dense area (78% live on campus or within 1 or 2 miles). Second, most universities with similar enrollments of BU (like UNC and Maryland) are geographically distributed and lack this nexus of campus activity. Third, most universities do not have access to real estate central to one of the most thriving entrepreneurial ecosystems in the world and armed with a direct link to public transportation (NYU and MIT are exceptions). Our ready access to a thriving city center is an important and under-leveraged asset that most universities lack. These traits should be leveraged to achieve strategic advantage and impact.

A location in Kenmore Square could achieve all of these objectives and accomplish three more: 1) Create a highly visible and recognizable gateway to the BU campus; 2) create a walkable connection between the Charles River and the medical campus; and 3) provide a bridge to an emerging innovation district in Kenmore Square, thereby connecting the University to the Boston entrepreneurial ecosystem. Situating this center in Kenmore Square would provide local business leaders, investors, and entrepreneurs and alumni with an easy way to visit the campus and have meaningful interactions with students.

Once this space is established, programming would need to be created in collaboration with student entrepreneurial clubs. Initially, faculty and staff would be responsible for leading programming but, over time, we expect students to assume leadership opportunities and adapt the space to their needs. This Center could also be a platform for faculty who want to offer pop up classes on specific topics without credit and or deliver bootcamps in advance of competitions.

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GOVERNING THE CAMPUS INITIATIVE

In diffusing entrepreneurship cross-campus at a large university like BU, a number of governance models are possible, ranging from independent centralized governance, to diffused, and lastly steward models. Recognizing that the end goals are to advance the awareness of entrepreneurship across all schools and to develop an entrepreneurial mindset in as many students as possible, the governance model selected needs to align with the university's organization and culture. In addition, since we are second movers with respect to our benchmarked universities, it makes sense to build from the strengths we have established.

Independent Centralized

The Kauffman Initiative, which funded 14 universities (including benchmarks Washington University in St. Louis, University of North Carolina – Chapel Hill, and Georgetown University), required an independent university office of Entrepreneurship to receive a campus grant and this is one reason why these schools operate with fairly centralized models today. A centralized model fosters efficiency in resource allocation, creates synergies and synchronicities in curriculum, and offers a neutral focal champion, while permitting individual schools to develop entrepreneurship courses tuned to their academic area. On the down side, sustainability of the initiative is hindered if there is no champion from the entrepreneurship research discipline and efforts can become decoupled from research over time.

Diffused

A diffused model places multiple entrepreneurship centers in different schools. Among our benchmark schools, this model is evident at MIT, Stanford and the University of Toronto. These models allow for an organic development of discipline-specific flavors of entrepreneurship, letting a thousand flowers bloom. However, there may be a dilution of the meaning of entrepreneurship across the campus; is the term defined enough to inculcate a common understanding that facilitates inter-disciplinary engagement? Redundancies may occur where centers overlap in their services and there is a dispersion of resources that could otherwise be unified for greater impact. Schools like NYU and MIT admit these redundancies exist but this may not be a luxury BU can afford. This lack of coordination can also create confusion for donors, faculty, students and external stakeholders.

Steward

The third model entrusts a steward to oversee entrepreneurship and the most common is a business school. As a steward, the business school can leverage both the depth and breadth of expertise offered by its faculty across all functions (marketing, strategy, accounting, finance, organizational behavior, information systems) and ensure close alignment with a research agenda as is done at Northeastern, Maryland, Wharton, and USC. While this model takes advantage of the center of gravity in a business school, some disadvantages exist. Scaling business school entrepreneurship faculty to handle the expansion of entrepreneurial teaching may be difficult to manage without support from other schools. Another concern is that some students may see business schools as too instrumental and not attuned to the needs of, say, a cultural entrepreneur. This concern can be attenuated with the creation of an advisory council that represents the interests of the broader university.

The governance model selected needs to align with the university's organization and culture.

RECOMMENDATIONS

To leverage current momentum, we recommend that Questrom remain the steward of entrepreneurship at BU for the following reasons:

Leverages relationships created over the last two years by Questrom entrepreneurship faculty in the Colleges of Arts and Sciences, Communication, Engineering, Fine Arts, Hospitality, and Medicine; Communication, and Fine Arts

Builds on the success of the BUzz Lab, which already successfully runs multiple cross-campus programs;

Maintains close alignment with research faculty and ecosystem relationships in place — fostering integration and synergy with curriculum innovations such as the entrepreneurship minor.

To be successful, the creation of a campus-wide initiative needs to be a collaborative effort - sensitive to the needs of different type of entrepreneurs across different disciplines. Therefore, we recommend the creation of two different mechanisms to create broad representation. First, we recommend the creation of a Faculty Entrepreneurship Network (FEN) composed of faculty who all teach courses related to entrepreneurship.

The first biannual meeting of FEN was held on December 8, 2016 and the faculty were very excited about their involvement. The energy and enthusiasm for this project was compelling and we think it is vitally important that all faculty and students engage in the stewardship of this Initiative. Second, if the University as a whole is to invest in the Innovation Center, then it will benefit from a Deans' Advisory Council that is representative of the colleges engaged. Cornell is working toward all of its schools contributing toward their entrepreneurship center (eLab) and we would be wise to do the same.

We recommend that Questrom remain the steward of entrepreneurship at BU.

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Create a Faculty Entrepreneurship Network.

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Create a Deans' Advisory Council engaging all schools.

ADDRESSING ALL CAMPUS STAKEHOLDERS

To advance the diffusion of this innovation initiative, we considered how to address the varying needs of students, alumni, faculty, and constituents in the greater Boston ecosystem.

<u>STUDENTS</u>

There are several recommendations for students that can be pursued to cultivate the entrepreneurial mindset:

1. **Create a University-wide undergraduate entrepreneurship and innovation minor available to all students.** Our benchmarking revealed that many universities now offer this, but several local competitors (such as HBS and MIT) do not (most likely because these two schools do not offer undergraduate business education). This would not only be a competitive differentiator for BU but also help our undergraduates pursuing a liberal arts education whose career paths are less clear, by enabling them to graduate with a set of supplemental skills to help craft their careers.

   By our assessment, the 6th capacity of the General Education requirement (Intellectual Toolkit) encompasses much of what we consider to apply to the entrepreneurial mindset (critical thinking, research and information literacy, teamwork/collaboration, creativity/innovation, and life skills). Thus, most of the coursework that would encompass the Entrepreneurship minor would qualify as a pathway to realizing the Intellectual Toolkit requirement for Gen Ed which would enhance feasibility for more students. To make such a minor a reality, registration across schools would need to be simplified and existing listed prerequisites reassessed. Another issue to be addressed is differences between schools operating with 3 versus 4 credit classes. A simple option is to offer a series of one credit classes in key skill areas such as "Crafting Effective Presentations" to equip students to solve the problem themselves.

   If there is a desire to move quickly on this recommendation, existing classes across campus could be leveraged and sequenced to create the minor according to specific tracks starting in 2017. In the long term, the minor would benefit from a common gateway class that benefits from the Innovate@BU conceptual framework and provides a common language for the minor which would require a launch in 2018 or 2019. We appreciate that it will take time to develop and scale such a gateway class. However, the benefits to existing students may be so great that the minor could launch in advance of the gateway class.

2. **Offer entering students exposure to entrepreneurship and innovation as part of campus socialization.** Schools like Princeton and Wash U that are serious about exposing students to entrepreneurship and innovation start the conversation early so as to pique students' interest and stimulate demand while they have time to adjust their course plans. Creating some real estate in the campus orientation onboarding process to familiarize all students with entrepreneurial and innovation concepts could go a long way toward affecting the rest of their journey at BU.

The Entrepreneurship minor could qualify as a pathway to realizing the Intellectual Toolkit requirement for Gen Ed.

3. **Introduce an annual student entrepreneurship and innovation conference.** We suggest that the University support all students in organizing a week of events that draws attention to the entrepreneurial resources offered on campus and across Boston and allows other colleges and student groups to hold complementary events. This annual event would become cornerstone to the Innovate@BU Initiative to increase awareness and recruit students early in the academic year to whet their appetites for more challenging programming in the spring. Engagement with corporate sponsors like GE and Microsoft could elevate the conference campus-wide.

4. **Create a cross-campus Entrepreneurship Fellows program.** A main objective of a Fellows program is to develop an interdisciplinary community of entrepreneurially-minded undergraduate students. Fellows would apply for admittance into a highly selective program, predicated on demonstrated interest and passion for Entrepreneurship in its myriad forms (e.g. social entrepreneurship). Fellows would be exposed to exclusive in-classroom curricula, direct access to guest speakers, alumni, mentors and advisors, and out-of-class experiences that could include working with local incubators, entrepreneurs or dedicating time to build a start-up, or involvement in social ventures or entrepreneurial units within corporations. The fellows would also be responsible for working at the the student center and supporting student clubs on programming and promoting the entrepreneurial mindset within their schools.

5. **Create a student prototyping grant fund to be administered by EPIC and the BUzz lab until the student innovation center space opens.** We suggest creating a fund that will support student creation of prototypes of their new-to-the-world ideas, technology, devices, and products. A modest amount of $500 per student could make the difference between an idea on paper and an idea one can hold in one's hand—enabling students to be better prepared for entrepreneurship competitions on campus and in the larger ecosystem. NYU offers $500 prototyping grants and Northeastern and Carnegie Mellon have similar programs. Dedicating a specific fund for "makers" will help diffuse our Innovate@BU program across students with diverse backgrounds.

6. **Create a campus-wide annual Social Innovation Competition with ecosystem partners.** Multiple schools benchmarked (USC, Cornell) agreed that social impact and entrepreneurship "must be included" in our vision and that a cross-campus challenge is an excellent way to engage students. While many schools have adopted the approach of directing students to global grand challenges (which we applaud), as an urban school, we have several grand challenges in our own back yard – like helping Boston Public Schools increase their retention and graduation rates. We suggest selecting a specific topic and engaging students in crowdsourcing the solution – this could be done through a combination of online means combined with face-to-face gatherings with the support of an open platform like Openideo or tied in to existing cross campus challenge work. Relevant institutes like Susillo and BU's Initiative on Cities could also partner with Innnovate@BU Initiative.

A modest amount of $500 per student could make the difference between an idea on paper and an idea one can hold in one's hand.

7. **Collaborate with Ecosystem partners to create and pilot a student internship program.** Students are eager for practical experience and internships can enhance their future employability as proven by Northeastern's Co-op program and reinforced by our alumni. Questrom is launching a pilot "embedded internship" program with MassChallenge Pulse, a digital health accelerator program, this spring. MassChallenge is a globally recognized 4-month accelerator that is distinctively consonant with the priorities of BU as it does not take equity in participating startups but rather provides a purely educational/mentoring service. This new Fenway-based accelerator received over 300 applicants for its 6 month accelerator and will accept only the top 15 applicants. We will place a team of Health MBA interns with these startups, with the guidance of a doctoral student, who will spend time on site supporting these firms in order in exchange for course credit. In addition, for 15 years, Questrom has placed about 40 Norwegian graduate students at local startups where they work for the summer gaining experience. BU could partner with key leaders in the ecosystem like MassChallenge or Learn Launch to offer similar active learning experiences for those undergraduates who qualify.

8. **Student Startup Grant Fund.** The BUzz Lab has designed a non-equity grant-based seed fund, to launch in Spring 2017, to provide seed grants up to $5K to BU student and alumni teams. The objective of these grants is to stimulate entrepreneurship on campus and provide investing experience to student partners who would source and present "deals". The final decision to grant would be made by an advisory board made up of experienced alumni. The fund would initially be seeded by an alumni donation.

Questrom is launching a pilot "embedded internship" program with MassChallenge Pulse, a digital health accelerator program, this spring.

ALUMNI
Many recommendations for alumni can be advanced without the creation of the student innovation center space but will be enhanced when it is developed.

1. **Relaunch alumni mentoring program.** Our current alumni mentoring program has been effective in finding alumni willing to mentor teams and acting as spot mentors for our recent speed-mentoring event. This no-commitment event had an impact on our student entrepreneurs and exposed them to the potential of alumni mentoring: "We wanted to express how grateful we are to you for organizing the Speed Mentorship Event yesterday evening. We gained so much insight that we are going to use it to further develop our startup. It is not every day we can engage with top professionals as a resource. We have a newfound drive to continue pushing forward and for that we want to say thank you once again". By creating new connections between more senior alums and younger alums, we can engage alumni in a new way—encouraging senior alumni to lift their fellow alums up. With increased resources, we can devote professional attention to the matching of mentors and mentees and foster new connections in a way that is more robust and scalable.

2. **Form an alumni advisory board.** Several schools that we studied have created alumni councils or networks that offer services to alumni and provide a forum for feedback on innovation and entrepreneurial initiatives. Similar to the Georgetown and Cornell model, BU could cultivate an advisory board of alumni willing to support and help build Innovation at BU. This board would be very helpful in building our partnerships in the ecosystem as well as providing the Innovate@BU Initiative independent council and guidance.

3. **Launch annual "Hall of Fame" award for successful alumni innovators.** These awards could be announced at an annual Alumni Innovation & Entrepreneurship Conference every year. Alumni could be selected by other alumni. The BUzz Lab piloted this event in the spring of 2016, and had a great turnout from students and alumni. Many other schools offer an alumni award for entrepreneurship or innovation. For example, Cornell began honoring notable entrepreneur alumni with awards in 1984 (Sanford Weill) and has done so every year since, combining this with a conference ("Entrepreneurship Summit") that alumni pay to attend and hear the awardee keynote speech along with other luminaries.

4. **Conduct Alumni Research.** Given the strides that Stanford and MIT have made in understanding the entrepreneurial pursuits of their alumni, we recommend that a few scholars work with the Innovate@BU Research Director and with BU's Development Office to design and implement a survey of all alumni to trace their entrepreneurial trajectories. These data can provide both scholarly contribution as well as reveal BU's largest impact as it is achieved through its graduates.

With increased resources, we can devote professional attention to the matching of mentors and mentees and foster new connections in a way that is more robust and scalable.

FACULTY & SCHOLARLY COMMUNITY

1. **Create a Faculty Entrepreneurship Network (The FEN).** We will ask faculty from across campus who already teach an innovation or entrepreneurship course or who are planning to do so to meet on a once a semester basis. This group will play the following roles:

   + Act as evangelists in their own schools by diffusing innovation capabilities to their own faculty and students.

   + Work as a group to recommend curricular changes and ideas, sensitive to the needs of diverse types of entrepreneurs

   + Review extracurricular programs to assess suitability for different audience

   + Assist in the development of the entrepreneurial minor and specific tracks within it

   + Advise on programming and how to engage students in ways that best complement their coursework.

   + Disseminate relevant research to align curriculums with latest developments

2. **Develop a faculty curriculum innovation grant program.** To foster the creation of additional entrepreneurship and innovation courses, we will create a faculty grant program that supports faculty on-going investment in curriculum innovation. Following an idea set in motion by Georgetown, these grants would be competitively awarded to faculty interested in refreshing their courses and infusing an entrepreneurial mindset into their discipline. This would accelerate the creation and diffusion of entrepreneurial and innovation focused courses across campus in multiple disciplines and ensure a relationship to existing streams of research.

3. **Hold an annual global scholarly research conference on entrepreneurship ecosystems.** We suggest the BU cultivate a research identity on entrepreneurship ecosystems based on not only where we sit but given the research competencies of the faculty. Scholars from across the world would be invited to an annual call for papers and competitively selected to present their work. The organizing committee would award a prize. The best papers could be selected to produce a book. USC has supported the West Coast Entrepreneurship and Technology Research conference for several years acquiring great recognition in this area.

4. **Host the GCEC national entrepreneurship conference.** The GCEC is a global organization of University entrepreneurship and innovation centers. Each year, one university hosts the annual conference which brings together innovation and entrepreneurship managers from around the world. Once the Student Innovation Center is created, hosting the GCEC conference would be a way to debut this center to the entire network of university centers at once. This would be a big undertaking of resources but BU would derive great benefit from the exposure and it would showcase the Innovate@BU Initiative to the rest of the entrepreneurial academic community.

The Faculty Entrepreneurship Network (The FEN) will recommend curricular changes and ideas, sensitive to the needs of diverse types of entrepreneurs.

BROADER BOSTON ECOSYSTEM

1. Create an open enrollment short Entrepreneurship course. In conjunction with the Questrom Executive Leaning Center, we recommend the development of short 1 to 2 day course in entrepreneurship. An example participant might be a mid-career executive who has an idea and would like to launch a business. We would promote this through the 4,000 subscribers to the BUzz lab newsletter and through our ecosystem partners.

2. Partner with MIT and Northeastern on a student entrepreneur social event. Both alumni and our local neighbors encouraged BU to leverage existing resources rather than create everything from scratch. We think that a cross university social event for student enterpreneurs might foster cross pollination and new kinds of ties. An event like this with a compelling youthful speaker could rotate across campuses.

3. Create an entrepreneurship and innovation ecosystem partner program. This will enable us to have a consistent and focused way of providing value and extracting value from our partners and permit us to host entrepreneurship events with ecosystem partners. We have relationships with several partners but do not have a consistent way of forming and evaluating these relationships.

4. Create a strategic partnership with the City of Boston. We recommend that the University raise its existing working collaboration to that of a strategic partnership with the City. Working with the city we identified three areas for collaboration:

+ **Produce an annual report on the "State of innovation and Entrepreneurship in Boston".** The City of Boston has data available and is willing to partner with us to conduct research on an annual basis into metrics critical to the Boston innovation and entrepreneurship ecosystem. We believe this could become an essential document for city officials, the Press and others in Boston entrepreneurship and innovation ecosystem—especially helpful to the city in recruiting new firms to base their operations here. This initiative could also help elevate BU's position in the Boston entrepreneurial community.

+ **Develop entrepreneurial and innovation targeted programming.** The city has targeted initiatives ongoing like the Roxbury Innovation District and WEBos which targets female entrepreneurs. The BUzz lab could help provide programming for these audiences to help the city meet its goals of disseminating innovation to all populations.

+ **Leveraging city challenges as "live cases".** Noting the urgency of some of the city's challenges with respect to housing and public education and the need to cultivate student motivation to work on these challenges, we could partner with the city by creating live cases on problems in students' own neighborhoods that students could work on through relevant coursework.

The City of Boston has data available and is willing to partner with us to conduct research on an annual basis into metrics critical to the Boston innovation and entrepreneurship ecosystem.

EXECUTING ON THE VISION

As our benchmarking analysis demonstrates, a team comprised of full time staff and faculty is required to run most campus wide innovation initiatives and university entrepreneurship centers. We recommend the following roles and governing bodies for the new campus wide Innovate@BU Initiative and the Student Innovation Center.

Innovate@BU will provide direction, focus, resources and support to link and amplify the innovation and entrepreneurial efforts across BU's 17 schools and colleges. A broader aim is to cultivate an entrepreneurial mindset throughout the BU student body and enhance student access to and exposure to innovative and entrepreneurial courses, programs and experiences. Innovate@BU will be administered by the Questrom School of Business in support of the entire BU community.

BU Student Innovation Center

An essential element of Innovate@BU, the BU Student Innovation Center will provide collaborative work space open to BU students of all disciplines and dedicated to the pursuit of new ideas and ventures by providing "soft" prototyping tools as a complement to the technology housed at EPIC. This space will be adaptable to host speakers, and support small teams as well as large scale collaboration. We envision starting the center with a few key staff roles and that additional support positions may be added as student demand grows.

LEADING INNOVATE@BU

Director, Innovate@BU

A full-time faculty role reporting to the Dean of the Questrom School of Business. Responsibilities will include creating and designing the initiative's conceptual framework, strategic planning, relationship management with key donors and partners and steering Innovate@BU to ensure its programmatic relevance and impact across campus. The Director will sit on the Deans' Advisory Council and the External Advisory Board and also chair the Faculty Steering Committee. A program manager or coordinator will assist the Executive Director in executing on the branding, diffusion and implementation of the conceptual framework and helping manage relations with participating schools, alumni, donors, and partners.

GOVERNANCE

Innovate@BU Deans Advisory Council

The Deans Advisory Council's (DAC) will provide guidance on the programming and direction of the Innovate@BU Initiative. Members will include the Deans of schools and colleges, a designee from the Provost's Office and the Faculty Director of the Innovate@BU initiative. The chair of the DAC will be appointed with a two year term from among the various participating deans from outside of Questrom School of Business. The DAC will meet at least once a year to review the strategic direction of Innovate@BU, review activities and programs planned for the coming year, assist with fund raising and offer their insights.

Innovate@BU External Advisory Board

This External Advisory Board will be comprised of significant donors and supporters of the Innovate@BU initiative, including alumni, friends and corporate sponsors, and will meet once or twice a year to advise on strategy, programming and funding.

A team comprised of full time staff and part time faculty is required to run a center for student innovation and entrepreneurship that serves the entire campus.

FACULTY ENGAGEMENT

Faculty Steering Committee

The Faculty Steering Committee will be comprised of faculty Innovation Champions leading entrepreneurship and innovation efforts within their respective schools and colleges. The committee will be chaired by the Director of Innovate@BU and each school and college will appoint a representative to the steering committee. The Steering Committee's role will be to enhance coordination of entrepreneurship and innovation efforts across campus and help foster the launch of collaborative events and programs as part of the Innovate@BU initiative.

The Faculty Entrepreneurship Network (The FEN)

The "FEN" will be an open and inclusive community network for all BU faculty with pedagogical, programmatic, or research interests in innovation and entrepreneurship. This group will meet once a semester and help disseminate information about Innovate@BU pedagogy, programs and extra-curricular within their own schools and facilitate awareness and linkages to existing innovation efforts. The FEN's efforts will be supported by a web portal and a community mailing list managed by the Student Innovation Center.

ADVANCING INNOVATE@BU

The following positions will report to the Director of Innovate@BU:

Managing Director—BU Student Innovation Center

This full-time staff role will oversee building usage, operations, activities and programming. The Managing Director will be responsible for fostering broad student engagement and working toward measurable outcomes for infusing an entrepreneurial mindset campus wide. This role exists at many centers including the Harvard iLab, the Northwestern Garage, NYU's Leslie ELab, the Duke Foundry and MIT's Martin Trust Center. Although a full-time staff role, the Managing Director will maintain a secondary teaching appointment to maintain connections with students. The Managing Director is responsible for generating new programs aligned with Innovate@BU.

Research Director

The Research Director will be a secondary appointment for a tenured faculty member in Questrom School of Business. The Research Director will lead a team of post-doctoral students and research assistants in conducting ongoing entrepreneurial ecosystem analysis and support students' entrepreneurial efforts that require analysis of external data. Databases such as VentureXpert and CB Insight will support this effort. Ideally, this role will be synergistic with a scholarly research program on innovation and entrepreneurship and enable impactful scholarly publications in addition to the ecosystem report. The Research Director will also partner with others within the Initiative to organize scholarly conferences on innovation and entrepreneurship that showcase the Innovate@BU initiative.

Under the direction of a Research Director, two post-doctoral students could conduct an analysis of the Boston ecosystem.

Curricula Director

This will be a secondary appointment for a teaching or tenure track faculty member in Questrom School of Business. The Curricula Director will be responsible for overseeing the creation of a gateway class in Innovation and Entrepreneurship; infusing Entrepreneurial and Innovation content into student orientation; leading the design and launch of the Entrepreneurship minor; and administering the faculty curriculum innovation grant program. The Curricula Director will work with the Innovation Champion on the Faculty Steering Committee from each school and college and link with the General Education committees and the Center for Teaching and Learning to infuse entrepreneurial research and principles across programs. The individual in this role will need to strongly identify with the need to innovate and cultivate an entrepreneurial mindset in undergraduate education across the university, and have a deep understanding of millennials and those born digital.

Alumni and Donor Engagement Director

This full-time staff position will be responsible for establishing and strengthening relationships with donors, alumni, corporate sponsors and eco-system partners including Mass Challenge. The Alumni and Donor Engagement Director will seek alumni and donor financial support and opportunities to enrich students' exposure and access to experiential learning opportunities.

Student Startup Program Manager

This full-time staff role will report to the Managing Director of the BU Student Innovation Center and coordinate the startup grant, incubator and accelerator programs for student entrepreneurs who are moving their ideas from the classroom to launch. At some schools, like Northeastern, this role is carried out by a full-time student coop. One idea to ensure relevance and engagement with the student community would be to employ a recent BU graduate in this role. Responsibilities will include managing operations of the summer accelerator, new venture competition, mentoring programs and office hours. The person in this role will also act as a liaison with student entrepreneurship groups to service their space needs.

Marketing and Events Coordinator

This position will be responsible for the promotion and coordination of Student Innovation Center events including speaker series, competitions, bootcamps, etc.

INNOVATE@BU INITIATIVE STAFFING—LONGER TERM VIEW
The longer term plan calls for 6 full time faculty or staff roles, 2 secondary appointments for tenure track academic service roles and two post-doctoral students as Innovate@BU gains traction.

PROJECTED FUTURE ROLES	TYPE OF ROLE
Innovate@BU Initiative (3 full time, 2 secondary appointments)	
Director, Innovate@BU	Full time role within Questrom School of Business for tenured or teaching faculty/Full time staff
Research Director + two post-doctoral students	Secondary appointment for tenured professor
Alumni & Donor Engagement Director	Full time staff
Curricula Director	Secondary appointment for tenured or teaching faculty
BU Student Innovation Center (3 full time)	
Managing Director, BU Student Innovation Center	Full time staff within Questrom School of Business
Student Startup Program Manager	Full time staff
Marketing and Events Coordinator	Full time staff
Projected Future Roles	
Partnership Manager	Full time staff
Marketing Manager	Full time staff
Director, Social Entrepreneurship	Secondary appointment for teaching or tenured professor

PROJECTED FUTURE POSITIONS IN THE BU STUDENT INNOVATION CENTER

Partnership Manager
This full-time staff position will report to the Managing Director of the BU Student Innovation Center, responsible for building partnerships across campus and strengthening relationships with sponsors and eco-system partners including Mass Challenge. The focus will be on partnerships that will help stimulate entrepreneurial thinking with faculty and provide students with access and exposure to experiential learning opportunities. Building corporate sponsorships and maximizing synergy with existing resources such as EPIC, Spark! and the Law Clinics will be a key responsibility.

Marketing Manager
Reporting to the Managing Director of the BU Student Innovation Center, this full-time staff person will focus on the brand, identity and marketing of all Innovate@BU Initiative programs, working with BU central marketing across all communication channels including social media, the web and newsletters, as well as the coordination of events with the marketing event coordinator and student interns. The person in this role would work closely with Student Innovation Center staff to ensure that all relevant campus communities are engaged.

Social Entrepreneurship Director
Our research suggests there is no need to create duplicate infrastructure to support social entrepreneurship distinct from other types of entrepreneurship. However, a full-time faculty Program Director who maintains focus on this subject will help reach targeted students. This will be a secondary appointment for faculty teaching in this area who understand the curriculum and programs relevant to social entrepreneurship. Ideally, this person will be connected to the scholarly community on social entrepreneurship and aware of and engaged in socially focused prize and case competitions. This person will be tasked with designing and launching a campus wide social challenge and creating a path within the Entrepreneurship Minor for social entrepreneurship.

Plan of Action 2017–2021

Organizing Innovate@BU
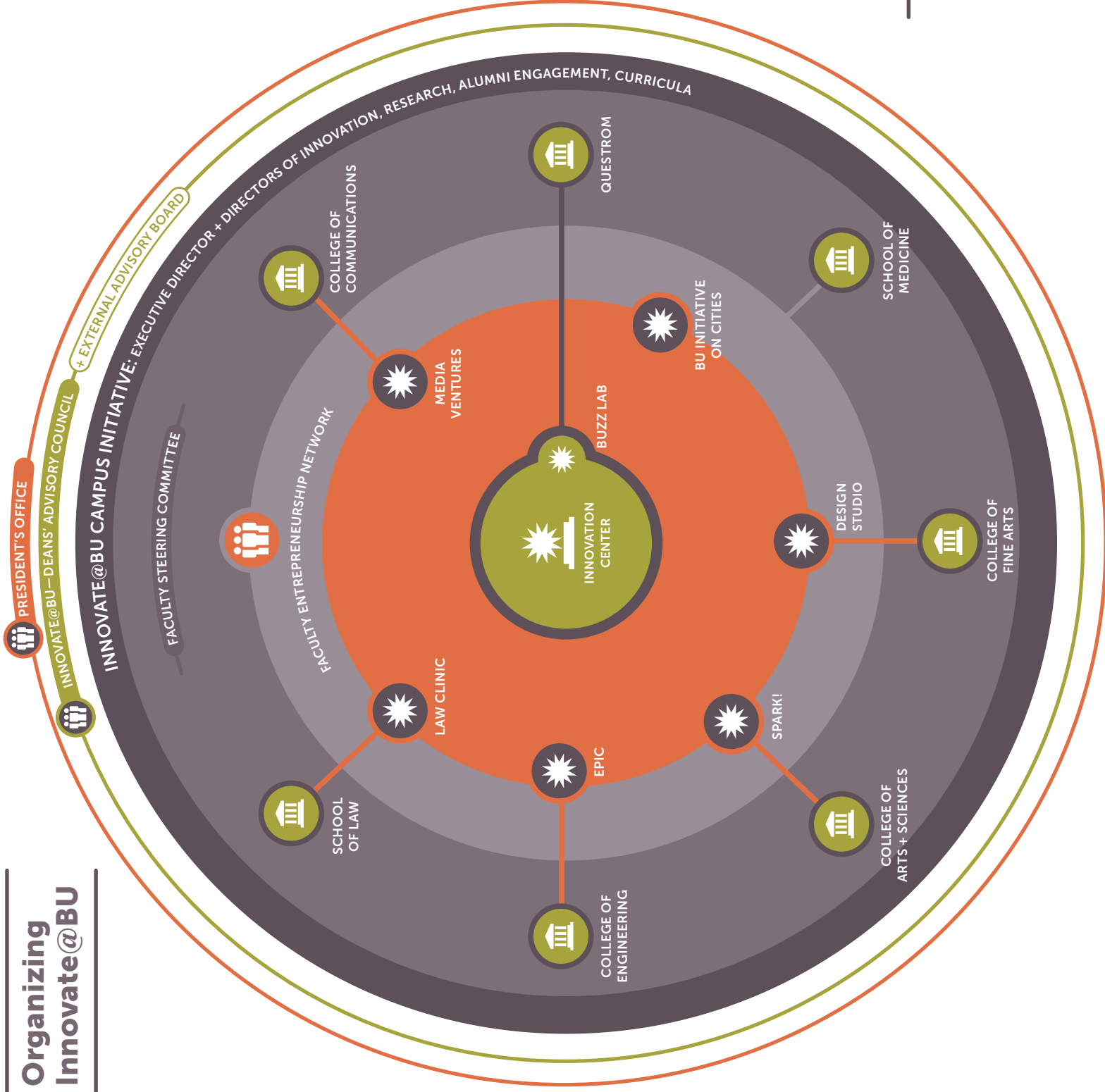
Innovate@BU Outcomes

LAUNCH
—gateway entrepreneurship and innovation class
—school-wide entrepreneurship minor
—Alumni Innovator Hall of Fame award and conference
—entrepreneurial ecosystem partner program

CREATE + CULTIVATE
—Entrepreneurial Fellows program
—social entrepreneurship
—Annual student innovation week events
—Scholarly research conference
—Entrepreneurial ecosystem report

INTRODUCE + AMPLIFY
—Reduced barriers to cross school enrollment
—Introduction of entrepreneurial concepts in student orientation
—Increased engagement in student venture competitions

COLLEGES/SCHOOLS

INITIATIVES

COHORT

PRESIDENT'S OFFICE

INNOVATE@BU—DEANS' ADVISORY COUNCIL

INNOVATE@BU CAMPUS INITIATIVE: EXECUTIVE DIRECTOR + DIRECTORS OF INNOVATION, RESEARCH, ALUMNI ENGAGEMENT, CURRICULA

+ EXTERNAL ADVISORY BOARD

FACULTY STEERING COMMITTEE

FACULTY ENTREPRENEURSHIP NETWORK

INNOVATION CENTER

BUZZ LAB

QUESTROM

COLLEGE OF COMMUNICATIONS

MEDIA VENTURES

BU INITIATIVE ON CITIES

SCHOOL OF MEDICINE

DESIGN STUDIO

COLLEGE OF FINE ARTS

SPARK!

COLLEGE OF ARTS + SCIENCES

EPIC

COLLEGE OF ENGINEERING

LAW CLINIC

SCHOOL OF LAW

Category	Fall 2017	Spring 2018	Fall 2018	Spring 2019	Fall 2019	Spring 2020	Fall 2020	Spring 2021
ALL	Recruit & Hire Academic and Program Directors for Student Innovation Center	Partner with the City of Boston	Create Student E/I Week		Student E/I Week		Student E/I Week	
		Partner with MIT on student ENT social event	Create student ENT conference					
	Create $500 Student Prototyping Fund		Create special issue of BU magazine	Host bi-annual campus wide Social Innovation Competition		Host bi-annual campus wide Social Innovation Competition		Host bi-annual campus wide Social Innovation Competition
	Create & brand Innovate@BU campus framework & conceptual map—engage graphic design students	FEN works on gateway class and minor	Dedicate central collaborative space for student E/I collaboration (Student Innovation Center)					
	Create the Faculty Entrepreneurship Network (FEN)		Develop Onsite student Programming					
			Launch Venture Lab					
			Engage Arts students on design and gallery					
UNDERGRADUATES	Create ENT UG Fellows program	Create UG ENT gateway class	Add ENT to Freshmen orientation				Evaluate UG elective outcomes and evaluate E/I requirement	
	Create Grad pilot internships with Ecosystem Partners	Create University wide UG ENT minor	Launch University wide UG ENT minor					
		Change UG Enrollment requirements for existing E/I classes to support all disciplines	Create UG apprentice program		Roll out UG internship programs with ecosystem partners			
ALUMNI		Design alumni research survey on ENT activities		Create program for Alumni Student Innovation Center usage and launch alumni survey				
		Create annual Innovator Hall of Fame award		Host annual Innovator Hall of Fame award		Host annual Innovator Hall of Fame award		
		Launch annual Alumni ENT network conference		Host annual Alumni ENT network conference		Host annual Alumni ENT network conference		

Timeline columns: Fall 2017 | Spring 2018 | Fall 2018 | Spring 2019 | Fall 2019 | Spring 2020 | Fall 2020 | Spring 2021

ENTREPRENEURS

- **Fall 2017:** Develop short ELC open enrollment E/I course for ENT & ecosystem leaders
- **Spring 2018:** Partner with City of Boston on targeted populations
- **Spring 2018:** Partner with MIT on student ENT social event
- **Fall 2018:** Create ENT Ecosystem partner program
- **Spring 2019:** Host local ENT events with ecosystem partners
- **Fall 2019:** Run short ELC open enrollment E/I course for ENT & ecosystem leaders
- **Fall 2020:** Run short ELC open enrollment E/I course for ENT & ecosystem leaders

BU FACULTY

- **Fall 2017:** Create Faculty Entrepreneurship Network (The FEN)
- **Fall 2017:** Work with Venture Lab on Innovation Analysis
- **Spring 2018:** The FEN work on gateway class and minor
- **Spring 2018:** Create faculty grant program to encourage ENT curriculum infusion

SCHOLARLY COMMUNITY

- **Fall 2018:** Hold global scholarly research conference on ENT ecosystems
- **Spring 2019:** Produce scholarly book from conference
- **Fall 2019:** Introduce annual report on Boston ENT ecosystem
- **Spring 2020:** Host GCEC (Global Consortia of Entrepreneurship Centers)
- **Fall 2020:** Host Kauffman Entrepreneurship Conference

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College of Fine Arts

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Questrom School of Business

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