

**CASE STUDY**

**Kendall Square & MIT:  
Innovation Ecosystems and  
the University**

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*“To create a new way of supporting the first stage – from idea to investment – a coalition of funders from the public, for-profit and not-for-profit sectors could ... provide what universities alone cannot: the physical space, mentorship and bridge-funding for entrepreneurs to turn new science into workable products, up to the point that they meet venture capital’s five-year threshold for the journey from investment to an impact on the market. This would make investing in tangible or tangible-digital hybrid innovations no riskier than investing in the purely digital.”*

- MIT President, Rafael Reif, 2015<sup>1</sup>

On the eastern edge of its campus, Massachusetts Institute of Technology (MIT) meets East Cambridge at the intersection of Main Street and Broadway, an area known as Kendall Square (see Exhibit 1). These 10 acres,<sup>2</sup> and the much larger adjacent parcels owned by a variety of parties including MIT, comprise a business district which is home to several global technology enterprises like Amazon, Google, and Microsoft, many of the most iconic biotechnology companies (among them Genzyme, Biogen and Millennium) and global pharmaceutical companies like Pfizer, Sanofi and Novartis as well as venture capital and start-ups in a diverse range of sectors.

It was in the 1960’s, when the MIT campus began to expand eastward, that Kendall Square started to develop into the epicenter of an innovation ecosystem. Building on an April 2013, after 3 years of strategizing, MIT received approval from the City of Cambridge for a redevelopment plan “to transform 26 acres of property it owns around Kendall Square”.<sup>3</sup> This proposal, intended to tackle some of Kendall Square’s current challenges to growth and prosperity (which include high rents and a lack of “retail, lab, commercial and open spaces”<sup>4</sup>), had been several years in the making. What else should MIT do to ensure the innovation ecosystem was maintained when many issues surrounding the development fell to other stakeholders (e.g. zoning issues within the purview of the city government)? This was the question that Israel Ruiz, MIT’s Executive Vice President and Treasurer, asked himself as he considered how best to use MIT’s convening power and resources in a way that would satisfy the needs of MIT and those of the varied elements of the region. As “the chief steward of over \$17.7 billion of MIT’s financial assets and \$3.1 billion in operating revenues”<sup>5</sup> in 2015, Ruiz had to make decisions about where best to

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<sup>1</sup>[https://www.washingtonpost.com/opinions/a-better-way-to-deliver-innovation-to-the-world/2015/05/22/35023680-fe28-11e4-8b6c-0dcce21e223d\\_story.html](https://www.washingtonpost.com/opinions/a-better-way-to-deliver-innovation-to-the-world/2015/05/22/35023680-fe28-11e4-8b6c-0dcce21e223d_story.html)

<sup>2</sup> <http://www.kendallsquare.org/>

<sup>3</sup> <http://news.mit.edu/2013/kendall-square-zoning-petition-approved-0409>

<sup>4</sup> <http://news.mit.edu/2013/kendall-square-zoning-petition-approved-0409>

<sup>5</sup> <https://orgchart.mit.edu/executive-vice-president-and-treasurer>

allocate those resources to improve Kendall Square but also continue to ensure MIT's place in a broader regional and global economy.

Did the answer lie in more university-provided space for startups? Were more community spaces to promote stakeholder interactions the answer? Perhaps the availability of the Volpe building and land parcel adjacent to MIT's east campus and Kendall Square was a really opportunity for change. Additionally, Ruiz had to consider whether physical space and real estate were really the only levers of change that MIT had at its disposal. Should MIT provide funds for start-ups or scale-ups in the area? How else could MIT convene the innovation community so that the vibrant innovation ecosystem was strengthened? Could it provide a more effective interface for entrepreneurs and corporations? What should Ruiz propose within MIT, as well as the various external constituents?

### **Innovation Ecosystems: Defining Terms**

Innovation ecosystems are complex, and while innovation science is emerging as a field<sup>6</sup>, definitions of key concepts can vary. Therefore, the following section defines the concepts based on MIT's own scholarly research in this field.<sup>7</sup>

Innovation-driven enterprises (IDEs) are start-ups whose competitive advantage and growth potential is driven by innovation. Unlike small and medium enterprises (SMEs) which require little startup capital and are handicapped in their ability to grow quickly by a lack of clear competitive advantage, an IDE leverages novel ideas and new technologies to establish rapid revenue and job growth potential after initial investment (see Exhibit 2). Local (MIT) examples of IDEs include Alnylam,<sup>8</sup> Hubspot,<sup>9</sup> PillPack<sup>10</sup> and Zipcar.<sup>11</sup>

'Innovation ecosystems' are an interconnected set of people and resources (and their physical environment) that provide the context for innovation-driven enterprises to start, grow and scale. Perhaps the most famous innovation ecosystem in 2015 is Silicon Valley, but many others exist around the world, including Kendall Square/Boston, New York, Singapore, Tel Aviv

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<sup>6</sup> See MITii Lab for Innovation Science website page <https://innovation.mit.edu/science>

<sup>7</sup> <http://innovation.mit.edu> and <http://reap.mit.edu>

<sup>8</sup> <http://www.alnylam.com/our-approach/about-alnylam/>

<sup>9</sup> <http://www.hubspot.com/internet-marketing-company>

<sup>10</sup> <http://www.betaboston.com/news/2015/06/03/pillpack-raises-50m-to-help-open-storefronts-and-launch-mobile-app/>

<sup>11</sup> <http://www.theverge.com/2014/4/1/5553910/driven-how-zipcars-founders-built-and-lost-a-car-sharing-empire>

and London. These systems rely upon both innovation capacity (iCap) -the capacity to develop new to the world ideas- as well as entrepreneurial capacity (eCap) - the capacity to start and grow new-to-the-world enterprises.

In the MIT innovation ecosystem 'stakeholder model' there are 5 key groups that are critical in building and utilizing the ecosystem outlined: entrepreneurs, risk capital, large corporations, government and universities (see Exhibit 3). In an ideal innovation ecosystem, these five stakeholders are all tightly interconnected and work through collective action and convening to produce the necessary conditions for IDEs and support their growth (see Exhibit 4). Among those groups with this power to convene the stakeholders are industry associations, some government-affiliated groups, and key start-up programs such as incubators and accelerators.

### **MIT: From Its Founding to Emergence of Kendall Square**

As a “world-class educational institution”<sup>12</sup> famous for its rigorous academics in engineering and science as well as its contributions to modern technology and industry, MIT’s mission reached into the New England economy and well beyond to focus on problems and challenges of global significance.

MIT has long had a significant regional impact. In 2015, MIT employed over 11,840 people, 1,021 of whom were faculty members.<sup>13</sup> Each year MIT educates approximately 11,300 students across its 168 acre campus and 5 schools (Architecture and Planning; Engineering; Humanities, Arts and Social Sciences; Management; Science). Additionally, MIT’s traditional focus on mens et manus (MIT’s motto meaning “mind and hand”) has produced impressive alumni who are changing the world through their research, entrepreneurial spirit, and innovation. A newly completed 2015 study of MIT alumni indicated that over 30% of alumni-founded firms were in Massachusetts, with almost 10% in Cambridge alone – the single densest concentration of MIT alumni founded start-ups in the world!<sup>14</sup> Over 1,000 companies were identified by respondents as currently active in MA (with a response rate of 20% suggesting that the number is likely much higher).<sup>15</sup> Local companies like Millennium, Genzyme, and Raytheon continue to contribute to the

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<sup>12</sup> <http://web.mit.edu/facts/origins.html>

<sup>13</sup> <http://web.mit.edu/facts/faculty.html>

<sup>14</sup> Cite new Roberts, Murray and Kim working paper.

<sup>15</sup> <http://web.mit.edu/facts/entrepreneurship.html>

Massachusetts economy even though they are no longer independent (or their MIT founder no longer alive).

### *MIT's First Home and Mission*

MIT's contribution to the regional economy was a deliberate and important part of its mission. In 1846, William Barton Rogers (1804-1882, see Exhibit 5), a natural philosophy professor at the University of Virginia, penned a letter to his brother in which he detailed his idea for a new polytechnic school in Boston that would emphasize the practical but be built upon scientific rigorous foundations.

“The true and only practicable object of a polytechnic school is, as I conceive, the teaching, not of the manipulations and minute details of the arts, which can be done only in the workshop, but the inculcation of all the scientific principles which form the basis and explanation of them, their leading processes and operations in connection with physical laws. I doubt not that such a nucleus-school would, with the growth of this active and knowledge seeking community, finally expand into a great institution comprehending the whole field of physical science and the arts with the auxiliary branches of mathematics and modern languages...”<sup>16</sup>

In the founding of MIT, Rogers observed the “ever-enlarging web” woven from connections between scientific discovery and the growing industries of the day – farming, manufacturing, and railroads<sup>17</sup> – and sought to create an institution where students would understand as well as practice the entire innovation process from discovery to impact. Thus began MIT's tradition of positioning itself to serve the world by translating knowledge into solutions to real societal problems. This vision was realized through a then-novel integration of education and research, with a key advance being to create physical spaces emphasizing laboratory instruction – thereby connecting theoretical learning with hands-on application: *mens et manus*. Rogers hoped that his university would prepare and train the next generation of scientists and engineers to serve the technical needs of the emerging U.S. industrial revolution through “the most earnest co-operation of intelligent culture with industrial pursuits.”<sup>18</sup>

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<sup>16</sup> Letter, William Barton Rogers to Henry Darwin Rogers, March 13, 1846, William Barton Rogers Papers (MC 1), Institute Archives and Special Collections, MIT Libraries.

<sup>17</sup> <http://libraries.mit.edu/archives/mithistory/pdf/objects-plan.pdf>

<sup>18</sup> <http://libraries.mit.edu/archives/mithistory/pdf/objects-plan.pdf>

On April 10, 1861, his idea and immeasurable hard work finally came to fruition when “Boston Tech” was incorporated by the Commonwealth of Massachusetts. In its founding charter, the Massachusetts Acts of 1861, Chapter 183, Rogers’ guiding principles as he wrote them decades before were reiterated, and the institute was established with the mission to be **“a school of industrial science [aiding] the advancement, development and practical application of science in connection with arts, agriculture, manufactures, and commerce.”**<sup>19</sup> Four years later on February 20, 1865, the first students attended class at the Mercantile Building on Summer Street in Boston.<sup>20</sup> Over the next 25 years, a series of buildings occupying Boston’s Back Bay area were constructed for Boston Tech (see Exhibit 6), including the first and most famous Rogers Building which opened in 1865 (see Exhibits 7 and 8).

### *Moving to Cambridge in 1916 - “The Technology Plan*

Over time, the Institute’s physical footprint expanded, and the need to find a new location capable of handling the innovation infrastructure of the school was apparent. After then-President Richard Maclaurin’s election in 1909, a new space for the Institute was identified among the factories of Cambridge, across the river from Back Bay and accessible via the Harvard Bridge (see Exhibit 9). It lay on the edge of Kendall Square (which derives its name from the Kendall Boiler and Tank Company, a steam boiler business founded in 1880 by Edward Kendall which used to occupy the building located at 275 Third Street in Cambridge - see Exhibit 15).<sup>21</sup>

As the MIT campus expanded eastward, erecting new buildings and starting new initiatives in the life sciences, so too did the city of Cambridge around the campus begin to develop, particularly around Kendall Square. This original 50 acre site was purchased thanks to a \$500,000 donation from a chemistry department alumnus, Thomas Coleman du Pont, under the condition that the first building of the new campus would be dedicated to the study of chemistry. Ultimately, though, it was a significantly larger donation in the sum of \$2.5 million made by the George Eastman, founder of the Eastman Kodak Company, that made the move and construction of the main educational complex possible.<sup>22</sup> After “The New Technology”

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<sup>19</sup> <http://libraries.mit.edu/archives/mithistory/pdf/1861%20Charter.pdf>

<sup>20</sup> <https://libraries.mit.edu/archives/research/collections/collections-mc/mc1.html>

<sup>21</sup> <http://kendallboiler.com/our-history>

<sup>22</sup> <http://www.pbs.org/wgbh/amex/eastman/peopleevents/pande15.html>

campus, as it was known, was built in 1916 (see Exhibit 10), Boston Tech moved and became the Massachusetts Institute of Technology.

MIT's expansion (see Exhibit 11) was catalyzed by progressively stronger partnerships with industry – a decision described in President Maclaurin's "Technology Plan" of 1919. With leaders from General Electric, Bell Labs, and others serving on Institute advisory committees, the evolution of MIT's partnership model ensured that its research focused on questions relevant to the real world, and that students were well trained for making an impact in the corporate workforce.

Ultimately, MIT emerged as an innovation powerhouse in the late 1920s and 1930s when MIT's ninth president, Karl Taylor Compton, insisted that this keen industrial awareness be paired with exceptional institutional strength in advanced scientific research. This commitment to basic science as the foundation for education and innovation remains central to MIT's mission and identity.

#### *WWII Expansion into the 1970s*

In the early 1940s, MIT distinguished itself at a time of global crisis. Only months prior to the 1941 attack on Pearl Harbor, President Franklin Roosevelt created the Office of Scientific Research and Development, naming as its director Vannevar Bush, an MIT professor and former dean of MIT's School of Engineering. In that role, Bush harnessed the power of MIT to provide America's military research with both a sense of direction and a sense of urgency.<sup>23</sup>

MIT responded by erecting MIT's Building 20 in 1943 and organizing the now-legendary Radiation Laboratory (Rad Lab) and Instrumentation Laboratory, which contributed some of the most foundational technical ideas of the 20<sup>th</sup> century (see Exhibits 12-14). Wartime radar, inertial guidance systems, microwave technology, and the framework for modern-day personal computing all grew out of these efforts – not to mention the guidance and computer systems that enabled NASA's Apollo rockets to take United States' astronauts, including MIT alumnus Buzz Aldrin (ScD '63), to the moon and back safely and reliably. During the height of the war, over 4,000 staff were employed by the Rad Lab, a reflection of the influx of over 55,000 army personnel who came to the MIT campus during WWII to contribute time and skills. After the

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<sup>23</sup> Dizikes, Peter, "A Difference Maker," *MIT News*, February 16, 2011, <http://web.mit.edu/newsoffice/2011/timeline-bush-0216.html>.

conclusion of the war, the Rad Lab was succeeded by the Research Laboratory of Electronics (RLE) on campus. The Instrumentation Laboratory became Draper Lab, a nationally recognized nonprofit research and development laboratory, and MIT Lincoln Laboratory (a key part of the national defense research infrastructure) was created as a defense research organization and moved out to Lexington to a 75 acre site.<sup>24</sup>

The 1950s had seen a dramatic rise in research funding for U.S. universities led by the advocacy of Vannevar Bush in his famous “Science: Endless Frontier” report which made the case for the power of basic research to drive economic growth. This led to an expansion of MIT’s own science and engineering activities. In April 1961, MIT held its centennial anniversary, celebrating over 100 years of success in science and technology just one month before President John F. Kennedy set forth his mission before a Joint Session of Congress that the U.S. should send a man to the moon. It had been Kennedy’s intention to take advantage of the declining industrial activities around MIT in East Cambridge, and establish NASA’s mission control center in Kendall Square on a parcel between Broadway and Binney Streets known today as the “Volpe block” (so named after Massachusetts Governor John A. Volpe). However, the center’s location was eventually moved to Houston, Texas (before President Kennedy’s assassination and the leadership of Texan Lyndon B. Johnson, despite what popular lore says). This left large land parcels empty until the 1990’s. “It was really a blighted area. There was no private investment going on. Manufacturing in Kendall had deteriorated. You had all these old factories that hadn’t been modernized, and businesses were going out to the suburbs,”<sup>25</sup> noted Thad Tercyak, Cambridge Redevelopment Authority Associate Director 1968-1990.

Filling the gap in East Cambridge left by the decline of local industry, MIT continued to expand, moving toward Kendall Square with the construction of such buildings as the Grover M. Hermann Building (1965) which houses the Dewey Library and the Eastgate Residence Hall (1967).

### **Kendall Square: An Innovation Ecosystem**

Groundbreaking advances in the 1970’s which allowed scientists to document and alter genomes of organisms in ways that had never been done before, often characterized as “recombinant DNA (rDNA) research”, led to a national debate regarding the appropriate level of

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<sup>24</sup> <https://www.ll.mit.edu/about/about.html>

<sup>25</sup> <http://www.bostonglobe.com/metro/2014/02/02/underused-parcel-kendall-square-could-put-better-use-government-would-sell/MIXAawAL7tqYvGssmwpJjN/story.html>



regulation and oversight by agencies and governments. In 1976, the world turned its eye to Cambridge as MIT and Harvard were two of the nation's leading universities in this space, and the City of Cambridge was initiating "the country's first regulations involving genetic research."<sup>26</sup> After heated public debates, the ordinance was finally issued in 1977, but it was written with only "small-scale academic research in mind."<sup>27</sup>

Four years later, the regulations had to be revisited when large life sciences corporations began setting up shop in Kendall Square, but by this time the attitudes and opinions of lawmakers in the City of Cambridge had shifted substantially. Thanks in large part to the work of MIT Institute Professor Phil Sharp, who held a series of educational seminars about rDNA research in Cambridge, there was a much greater understanding among all parties about the intent of the research, the potential hazards that existed and the benefit this work could bring to the Cambridge innovation ecosystem (see Exhibit 16).

By the late 1960's and early 1970's pressure was put on MIT and on most universities to become serious economic contributors in return for public aid for both schools and students. This happened to coincide with U.S. President Richard Nixon's signing of the National Cancer Act of 1971, which kicked off the "war on cancer" in America. Just 3 years later, MIT opened the new Center for Cancer Research (CCR, now known as the Koch Institute for Integrative Cancer Research) in a refurbished candy factory building which allowed the biology department to increase by 10 faculty members.<sup>28</sup>

"The [19]80's brought several other major changes in the life sciences community at MIT,"<sup>29</sup> writes MIT Institute Professor Phil Sharp. Among these was the 1982 formation of the Whitehead Institute for Biomedical Research, founded through an endowment made by industrialist and philanthropist Jack Whitehead, and the creation of the Biotechnology Processing and Engineering Center, which was funded by the National Science Foundation.

By the turn of the century, MIT had positioned itself as a leader in the United States and the world in biology and biotechnology research thanks to its world-class facilities and growing faculty. In 2001, it would take steps to solidify that position as a leader in the life sciences through the founding of the McGovern Institute, which "seeks to advance the understanding of brain

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<sup>26</sup> Lipson, Sam. "The Cambridge Model." Genewatch: Vol 16, No. 5.

<sup>27</sup> Lipson, Sam. "The Cambridge Model." Genewatch: Vol 16, No. 5.

<sup>28</sup> <http://web.mit.edu/fnl/volume/183/sharp.html>

<sup>29</sup> <http://web.mit.edu/fnl/volume/183/sharp.html>

functions such as recognition, perception, and decision making”<sup>30</sup> and is funded through an endowment by Pat and Lore McGovern.

Among the most notable new life sciences companies in Cambridge were Biogen and Genzyme. Biogen, the first company to receive an rDNA license from the City of Cambridge<sup>31</sup>, was co-founded by Sharp, and its headquarters was placed on Binney Street, where it is still located in 2015. Genzyme is a biotechnology company founded in 1981 in Boston before eventually moving their headquarters to Kendall Square in 1990. Genzyme performs research in the following main 6 areas: lysosomal storage diseases, renal disease, orthopedics, transplant and immune diseases, oncology, and genetics and diagnostics.

This rise of the life sciences sector in Kendall Square is mirrored by a simultaneous decline in one of Boston’s other innovation ecosystems, the famous Route 128. In the early 1980’s, a community north of Boston along Massachusetts Route 128 was booming as a technology center that rivaled Silicon Valley thanks to its success in minicomputers and mainframes (see Exhibits 17 and 18). “In the 1980’s...Silicon Valley and Route 128 looked very similar – a mix of large and small tech firms, world class universities, venture capital, and military funding,”<sup>32</sup> writes technology entrepreneur and academic Vivek Wadhwa. At the time, Boston as an innovation ecosystem was unable to compete, but as Route 128 began to fall inferior to Silicon Valley as popular technology began leaning towards personal computing, the life sciences industry played a valuable role in “rebooting” Boston’s ecosystem in a more local way.

### **The Early Twenty-First Century**

For the next decade, the MIT Investment Management Company (MITIMCo) real estate team, which is responsible for “supporting MIT through returns generated from investing the Institute’s financial resources,”<sup>33</sup> focused expansion efforts into Kendall square. Chief among these is One Broadway Center, known by campus nomenclature as “Building E70.” Inside the rather unimpressive-looking façade lives numerous companies and organizations critical to Kendall Square’s innovation output, including the Cambridge Innovation Center (CIC). Founded

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<sup>30</sup> <http://web.mit.edu/fnl/volume/183/sharp.html>

<sup>31</sup> <http://tech.mit.edu/V134/N16/kendall.html>

<sup>32</sup> <http://techcrunch.com/2009/10/31/the-valley-of-my-dreams-why-silicon-valley-left-bostons-route-128-in-the-dust/>

<sup>33</sup> <http://www.mitimco.org/>

by Tim Rowe, a Sloan MBA alumnus, CIC is a co-working space on the 14<sup>th</sup> floor of E70 which offers start-ups a place to convene, work, and grow.<sup>34</sup>

Another organization similar to CIC is Lab Central, a facility offering wet lab space whose mission is to “help create the next generation of powerhouse biotech companies by providing entrepreneurs and innovative life-sciences startups with the space and resources they need to test out, challenge, and nurture early ideas.”<sup>35</sup>

Outside companies and organizations that came to Kendall Square during this time only served to strengthen its position as a critical locale in the Massachusetts economic landscape. These include the establishment of a British consulate office in 2002 (now on Broadway), the Microsoft New England Research & Development Center in 2007, a branch of Google in 2008, and a Facebook office in 2013.

### *Kendall Square Redevelopment*

By 2010, Kendall Square had developed into the focal point of the Cambridge innovation ecosystem, but new challenges were arising. In particular, massive rents made growth challenging, as did a lack of space for start-ups. New companies wishing to be close to the innovation in this space had to relocate nearby to the communities of Somerville and Davis Square.

It was at this point in time that MIT began rethinking the future of Kendall Square and how they could help in its redevelopment. In the spring of 2010, MIT announced to its community that it would begin considering redevelopment options for parcels it owned around Kendall Square, and on July 20, initial ideas were presented to the Cambridge Planning Board. Among the original suggestions for the spaces included a yoga studio, public art, and more retail and dining options. Steve Marsh, the managing director for real estate for MITIMCo said at the time, “There has been no shortage of great ideas for how to create more vibrant spaces in Kendall Square.”<sup>36</sup> Input was also sought from the Kendall Square Association, which represents over 100 organizations in the area.

In April 2011 MIT submitted its first rezoning petition, but opposition emerged from interested parties – including some from MIT faculty members. Biology professor Jonathan King

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<sup>34</sup> <http://cic.us/who-we-are/>

<sup>35</sup> <http://labcentral.org/about/mission/>

<sup>36</sup> <http://news.mit.edu/2010/kendall-update>

was one of the most vocal in this debate, citing that the land proposed for redevelopment should not be leased out to industry tenants but should be reserved for academic purposes only. The land “is much more valuable for academic use than is land that is further away. One needs to take into account the potential non-fiscal value of land to MIT in any long-term decisions,”<sup>37</sup> King stated.

MIT allowed the 2011 rezoning petition to relapse in 2012 and went to work gathering additional input before drafting a new zoning approval for 1.1 million square feet of land surrounding Kendall Square which was submitted on April 2, 2013 to the Cambridge City Council. During the meeting’s public comment period, Biogen co-founder and MIT professor Phil Sharp gave his support for the proposal and recommended its approval “so that MIT and Cambridge can continue to shape Kendall Square to enhance its attractiveness as a place to live and work as well as enhance the ability of MIT to attract and train the best students and faculty.”<sup>38</sup>

The plan, which was described as “very different” from the 2011 plan by City Councilor and Ordinance Committee Chair David Maher, was approved on Monday, April 8, 2013 (see Exhibit 19).<sup>39</sup> “MIT has done an outstanding job of listening to the Planning Board, the Council and the community and drafting a petition that reflects that. What is going on today is a direct result of what we have expressed and collective work to reshape Kendall Square and what it can be,” said Maher.<sup>40</sup> The redevelopment project construction began in 2015 after MIT completed additional permitting and building design, and it will continue for the next several years (see Exhibits 20-21).

### **Looking to 2020 and Beyond: The Future of MIT and Kendall Square**

As the redevelopment of Kendall Square pushes forward, an understanding of the history between universities (MIT and others) and their neighboring stakeholders can teach a lot about how the planning of physical space needs to be done properly to maintain an innovation ecosystem.

Advising Israel Ruiz, MIT’s Treasurer, do you believe the plan currently in construction is the same as that you would have proposed? What other resources does Kendall Square need to survive that it is now lacking? How can MIT as the university stakeholder provide the guidance to

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<sup>37</sup> <http://blogs.nature.com/boston/2012/07/13/gown-v-gown-mit-students-faculty-question-kendall-square-plan>

<sup>38</sup> <http://news.mit.edu/2013/president-deans-faculty-ask-city-to-approve-zoning-proposal-0402>

<sup>39</sup> <http://news.mit.edu/2013/kendall-square-zoning-petition-approved-0409>

<sup>40</sup> <http://news.mit.edu/2013/kendall-square-zoning-petition-approved-0409>

craft the space as necessary? Should MIT act as just a platform for resources, or should it be a 'backbone organization' that convenes the stakeholders and key individuals to influence the development of the physical space? Does MIT have an opportunity to consider other ways in which it might support the surrounding innovation ecosystem aside from physical space? Should MIT provide other resources? Over and above physical infrastructure for interaction and engagement, how else might MIT support the innovation ecosystem? How could MIT provide a better cultural and contractual interface for other stakeholders?

## EXHIBITS

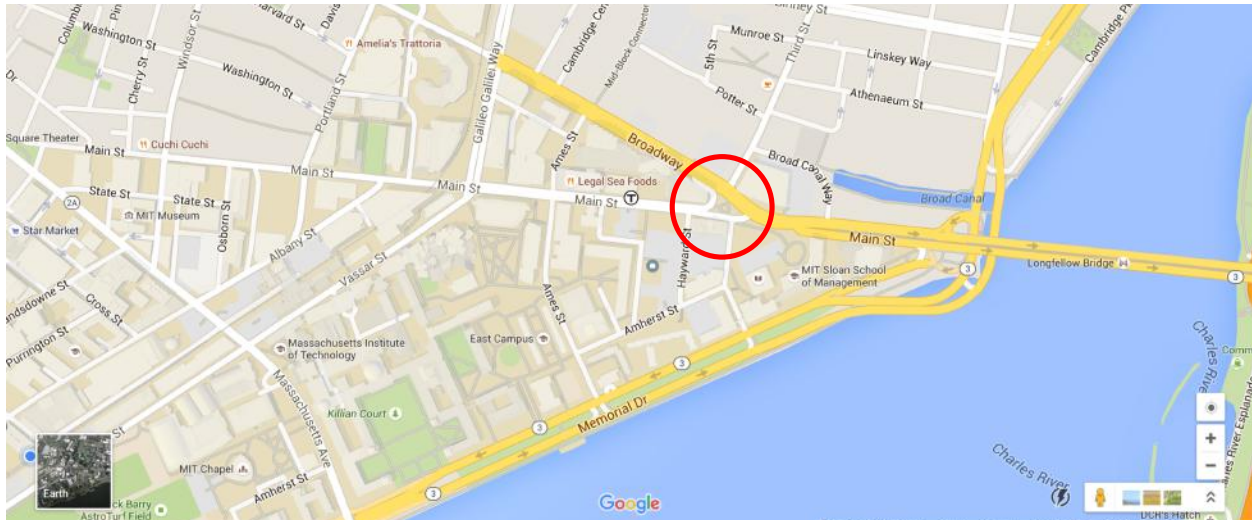


Exhibit 1: Kendall Square, Cambridge, Massachusetts  
Emphasis, Intersection of Main Street and Broadway  
(Source: maps.google.com)

## Not all Start-Ups are Equal: Two distinctive types - SMEs & IDEs

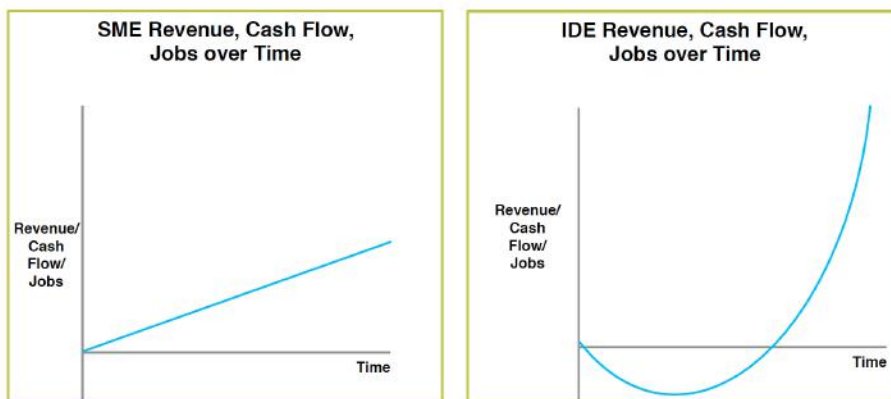


Exhibit 2: Graphical Distinction Between SMEs and IDEs  
(Source: Aulet and Murray, 2013)

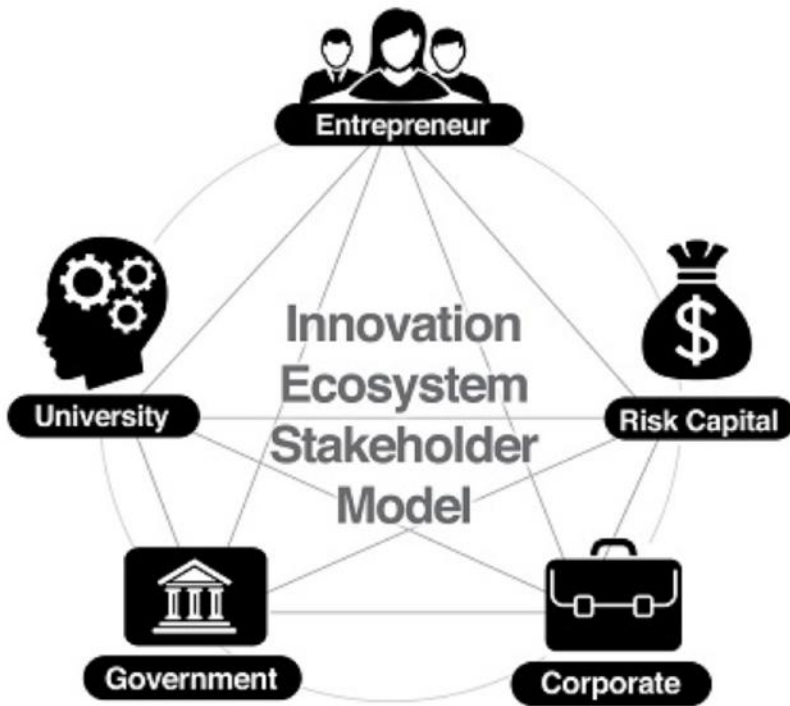


Exhibit 3: MIT Innovation Ecosystem Stakeholder Model

(Source: MIT REAP)

## MIT REAP IDE Ecosystem Framework

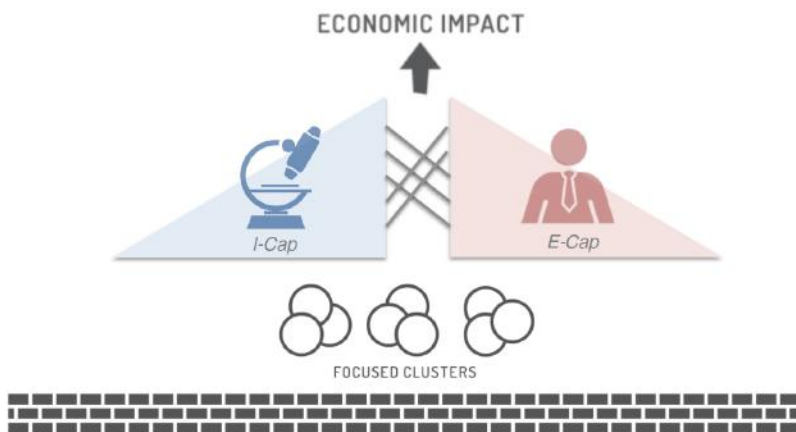


Exhibit 4: MIT REAP IDE Ecosystem Framework

(Source: MIT REAP)



Exhibit 5: William Barton Rogers, 1804-1882

(Source: [libraries.mit.edu/mithistory/william-barton-rogers-1804-1882](http://libraries.mit.edu/mithistory/william-barton-rogers-1804-1882))

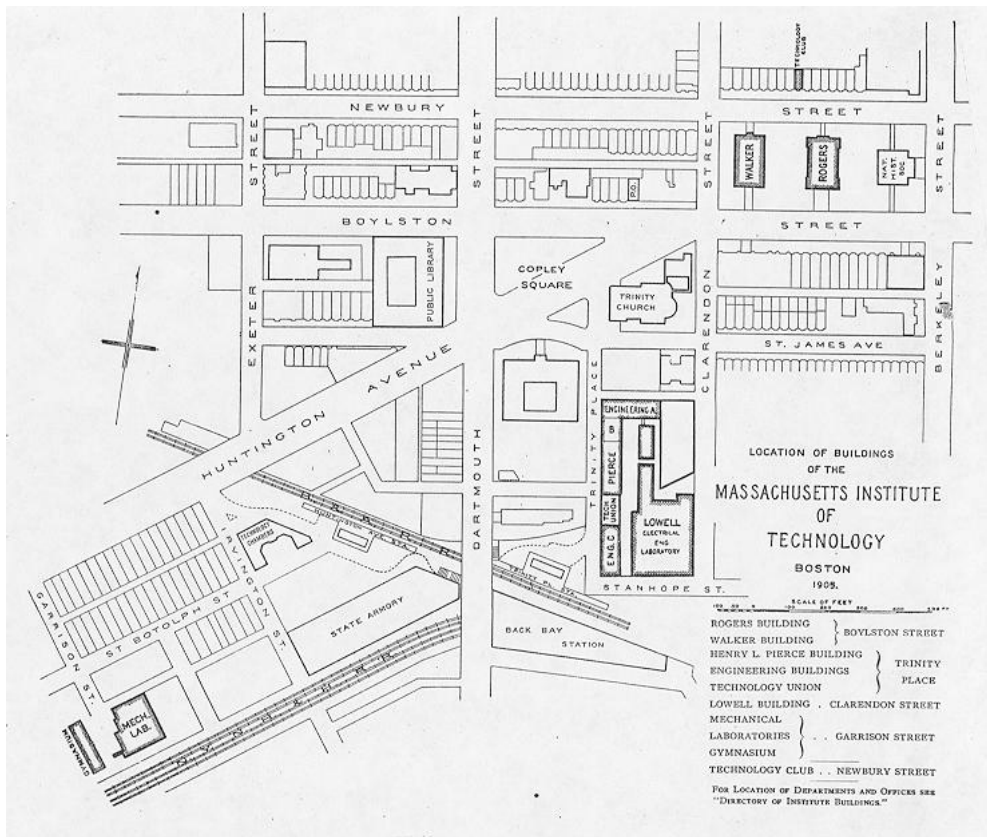


Exhibit 6: Map of MIT ("Boston Tech"), 1905

(Source: [libraries.mit.edu/archives/exhibits/maps/index.html](http://libraries.mit.edu/archives/exhibits/maps/index.html))





Exhibit 7: Rogers Building

(Source: [https://en.wikipedia.org/wiki/Campus\\_of\\_the\\_Massachusetts\\_Institute\\_of\\_Technology#/media/File:Rogers-building.jpg](https://en.wikipedia.org/wiki/Campus_of_the_Massachusetts_Institute_of_Technology#/media/File:Rogers-building.jpg))

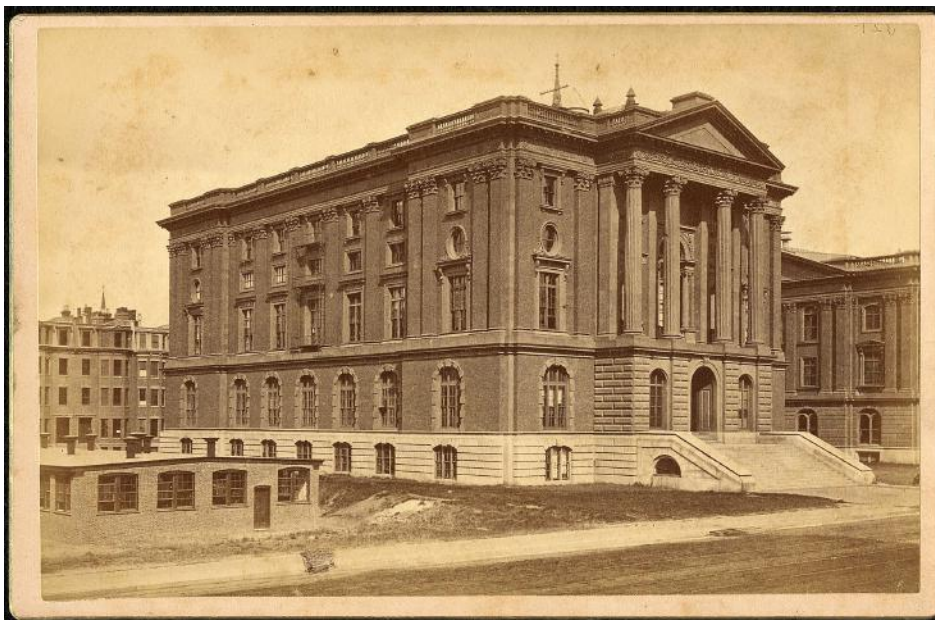


Exhibit 8: Rogers Building,

(Source: <http://www.jcosmas.com/aspimages2/asp-194c.jpg>)

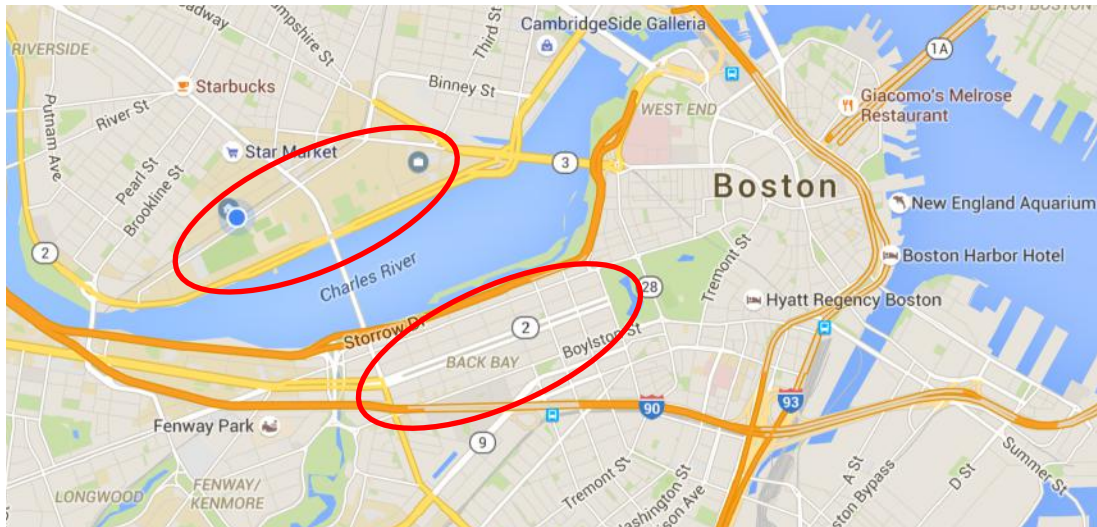


Exhibit 9: Boston and Cambridge, Massachusetts  
 Upper Emphasis: Cambridge, MIT Campus  
 Lower Emphasis: Back Bay, Boston Tech/Original MIT Campus Location  
 (Source: maps.google.com)

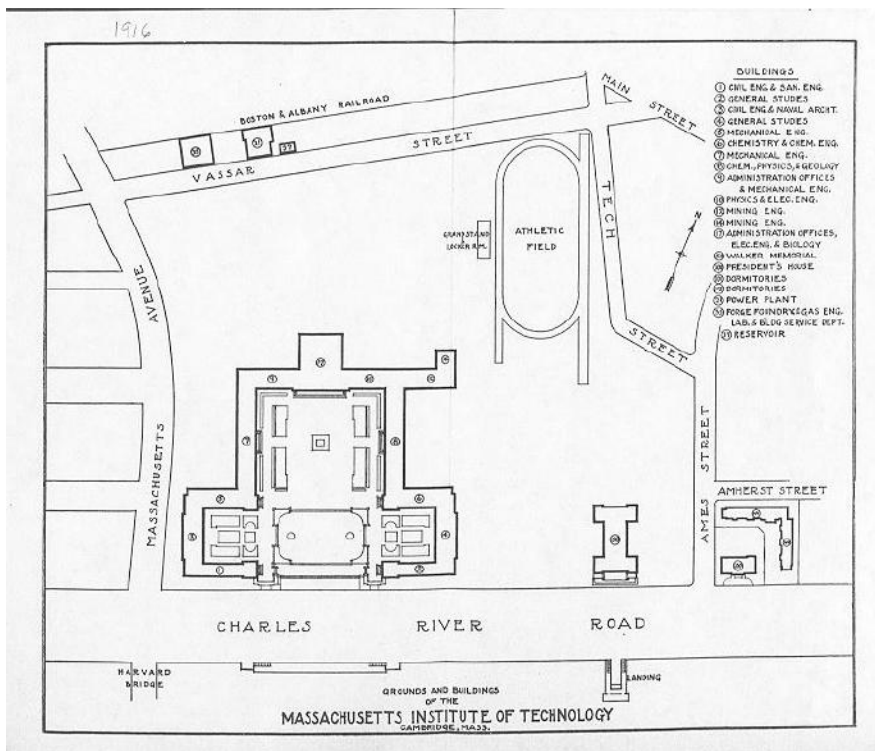


Exhibit 10: Map of MIT, 1916  
 (Source: <https://libraries.mit.edu/archives/exhibits/maps/index.html>)

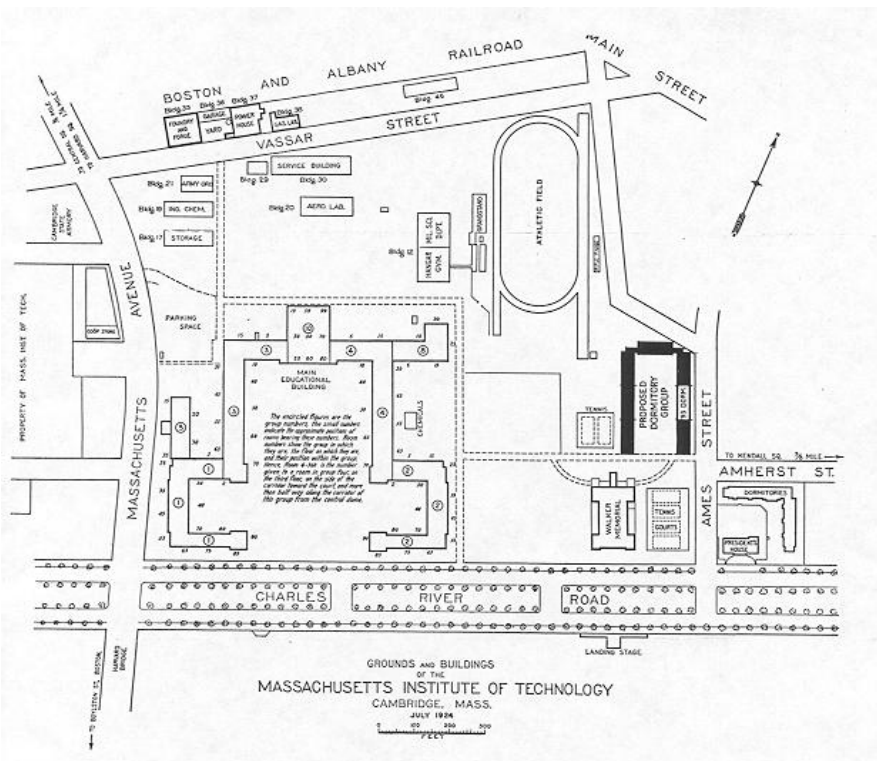


Exhibit 11: Map of MIT, 1924

(Source: <https://libraries.mit.edu/archives/exhibits/maps/index.html>)



Exhibit 12: Building 20, MIT Campus, Home of Rad Lab from 1943 to 1945

(Source: <https://www.ll.mit.edu/about/History/RadLab.html>)



Exhibit 13: Building 20, MIT Campus, “Trucks ... Deliver Materials and Remove Radar Sets”

(Source: <http://web.mit.edu/physics/about/history/1940-1945.html>)



Exhibit 14: Radiation Laboratory Dome, Overlooking Charles River

(Source: <http://web.mit.edu/physics/about/history/1940-1945.html>)



Exhibit 15: Kendall Boiler and Tank Company

(Source: <http://kendallboiler.com/our-history/>)

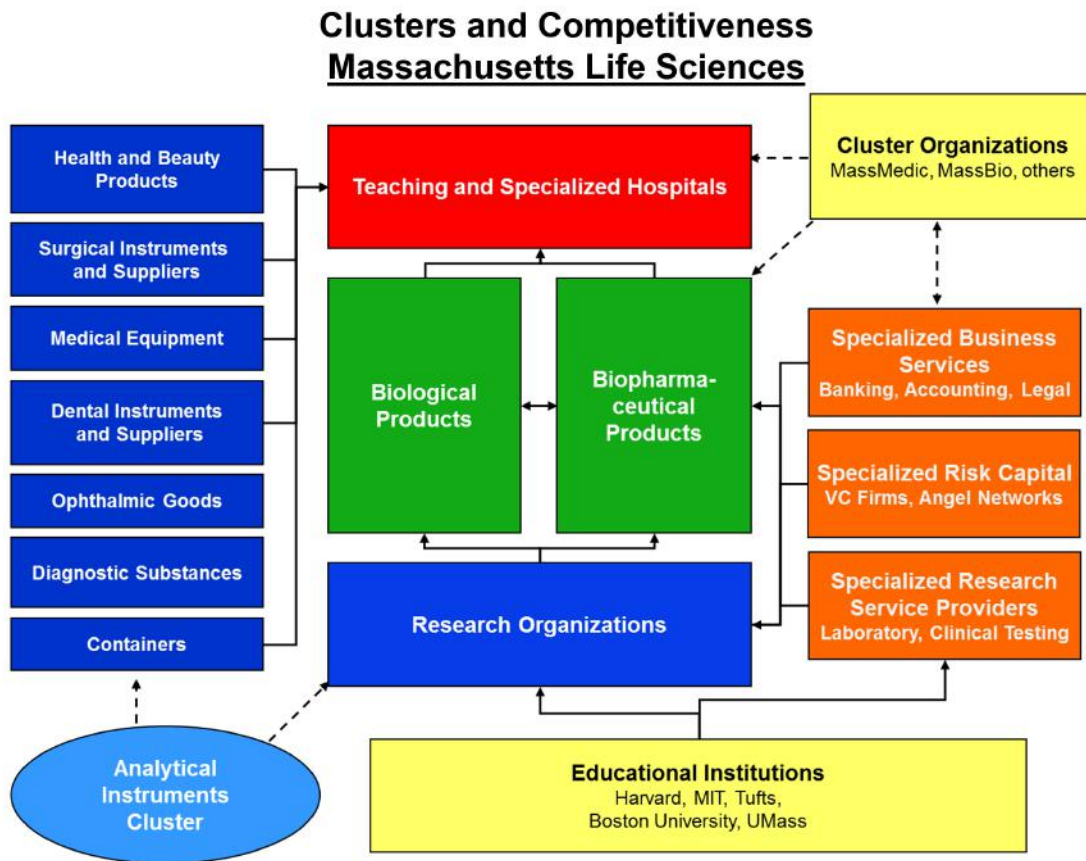


Exhibit 16: Clusters and Competitiveness, Massachusetts Life Sciences

(Source: Michael Porter, Massachusetts Competitiveness Report)

# Average Entrepreneurial Quality in Massachusetts, By Municipality, 2007-2012

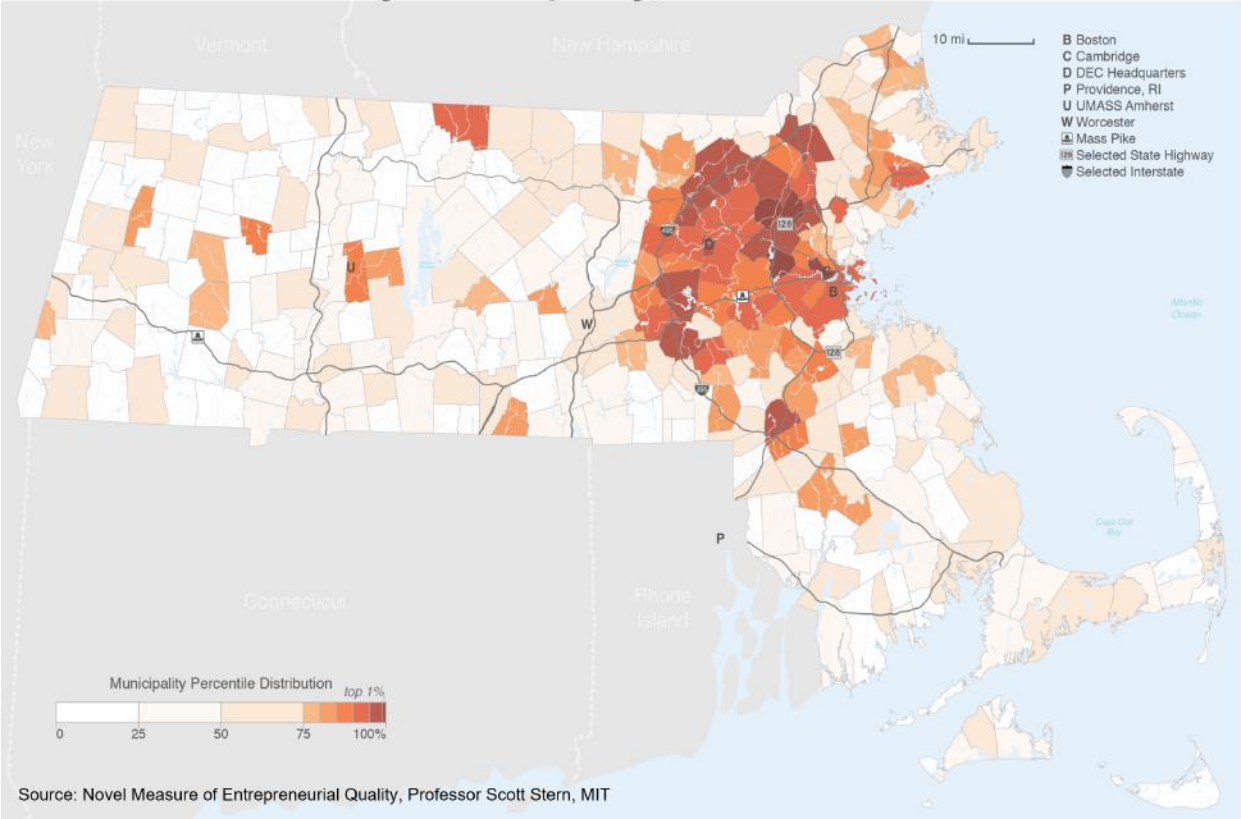


Exhibit 17: Avg Entrepreneurial Quality in Massachusetts by Municipality, 2007-12  
(Source: Novel Measure of Entrepreneurial Quality, Scott Stern)

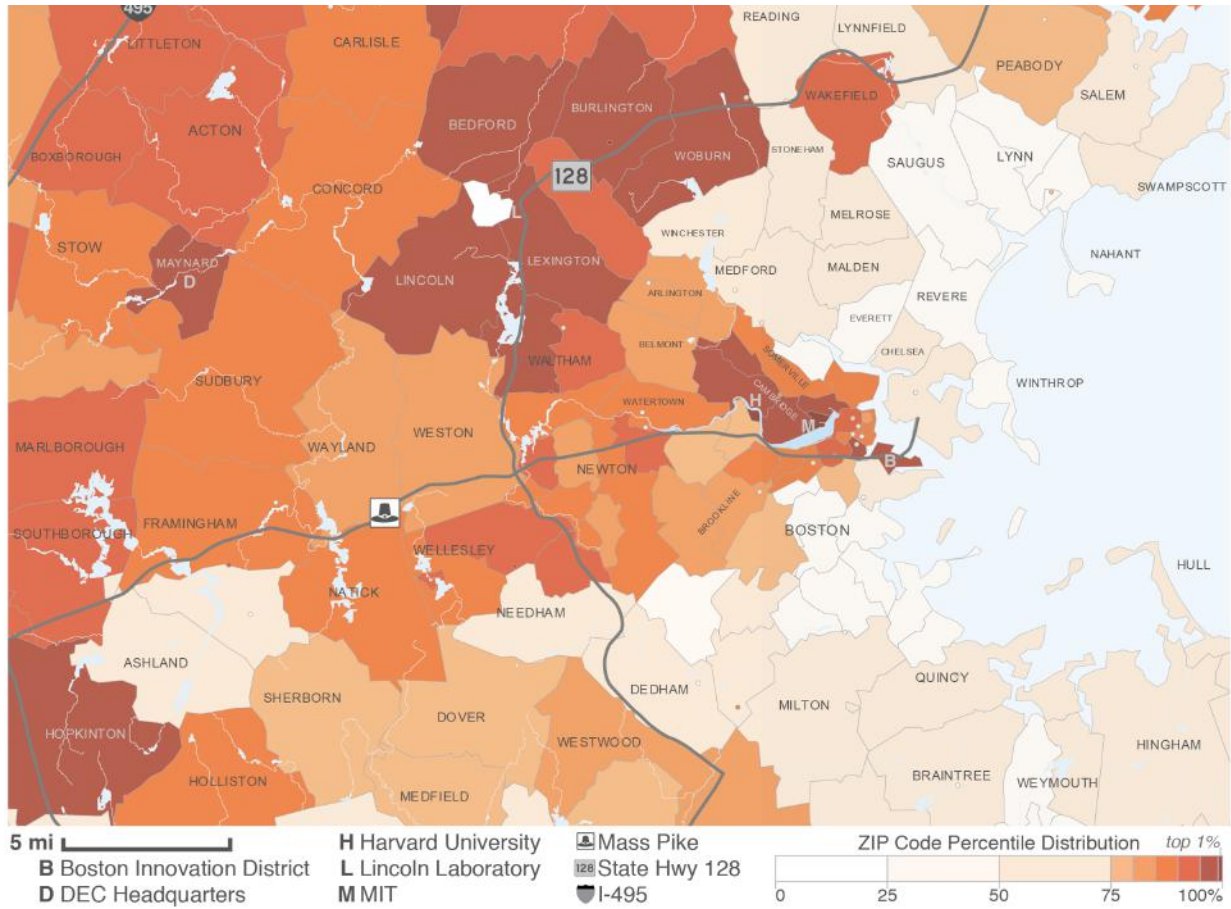


Exhibit 18: Avg Entrepreneurial Quality in Massachusetts by Municipality, 2007-12

(Source: Novel Measure of Entrepreneurial Quality, Scott Stern)



Exhibit 19: Aerial View of MIT, Redevelopment Area Highlighted in Red, 2013

(Source: <https://spnewsletter.wordpress.com/2013/03/22/coming-soon-kendall-square-redevelopment/>)

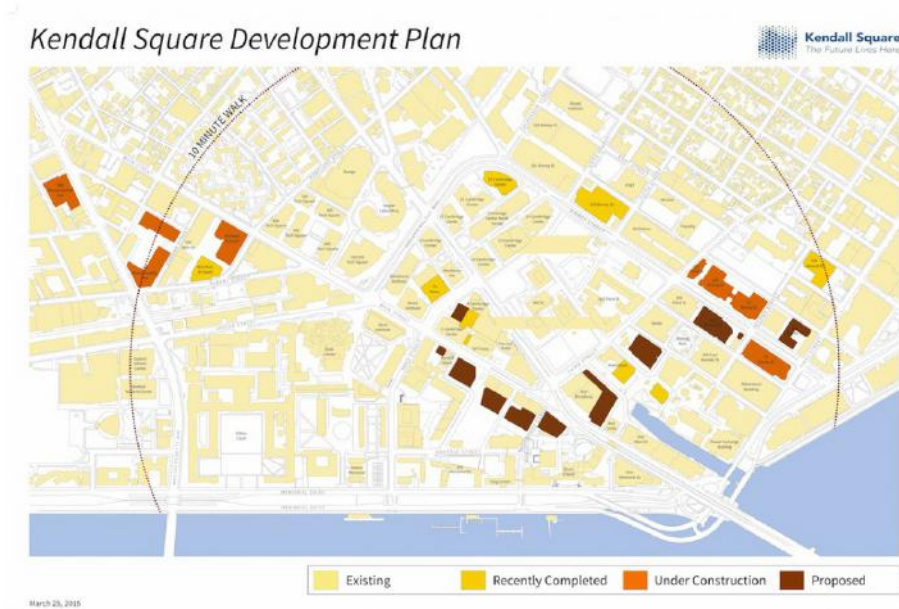


Exhibit 20: Kendall Square Redevelopment Plan, March 2015

(Source: <https://www.kendallsq.org/visit-our-neighborhood/planning-and-development/>)

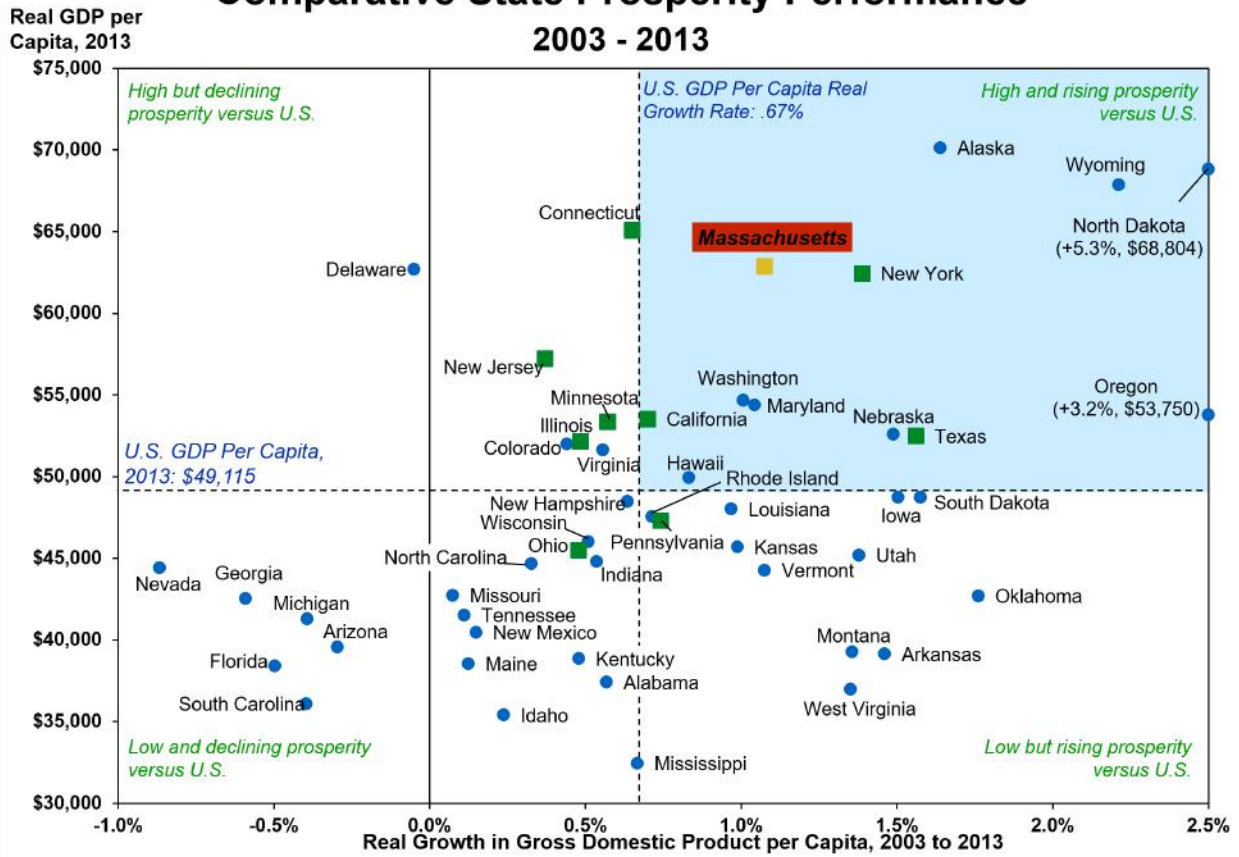


## Kendall Square Initiative



Exhibit 21: Kendall Square Initiative, Part of Kendall Square Redevelopment Plan  
(Source: <https://www.kendallsq.org/visit-our-neighborhood/planning-and-development/>)

# Comparative State Prosperity Performance 2003 - 2013



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5

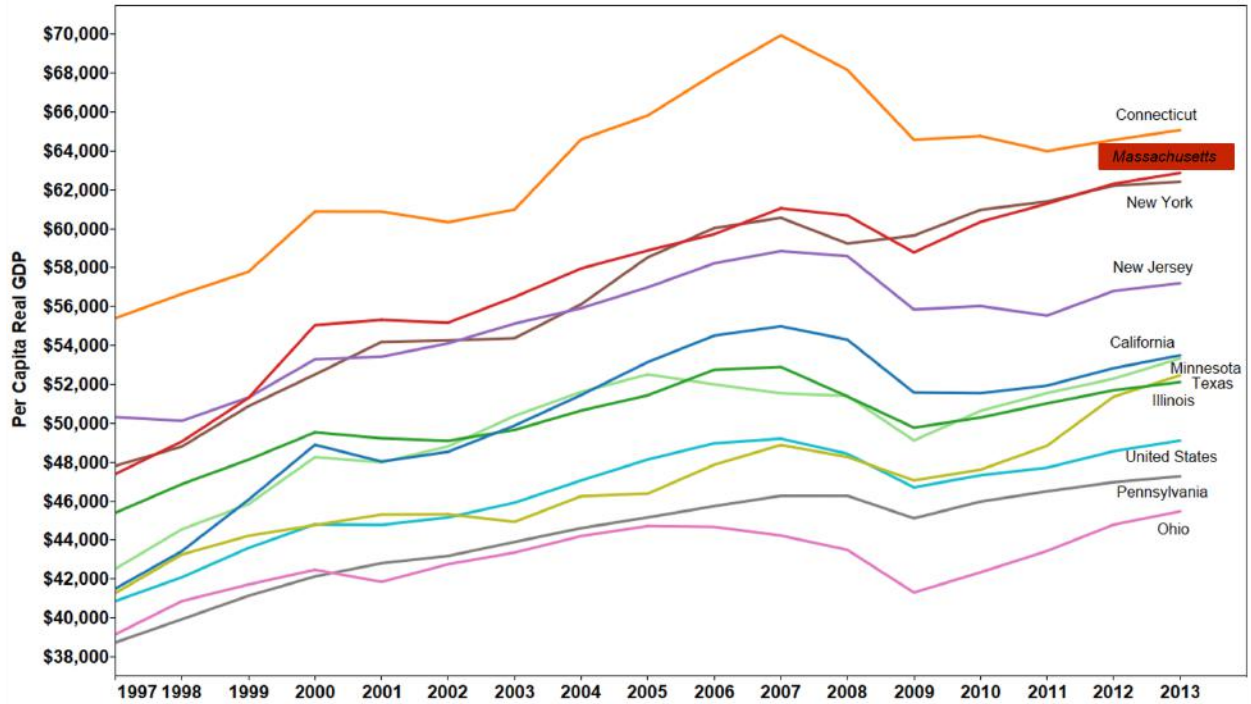
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Exhibit 17: Comparative State Prosperity Performance, 2003-2013

Note: MA Technology Collaborative top 10 innovation states highlighted

(Source: Michael Porter, Massachusetts Competitiveness Report. Data from BEA. Notes: GDP in real 2009 dollars. Growth rate is calculated as compound annual growth rate.)

## Real GDP per capita, 2001-2013 Massachusetts and Benchmark States



Source: Census BEA

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6

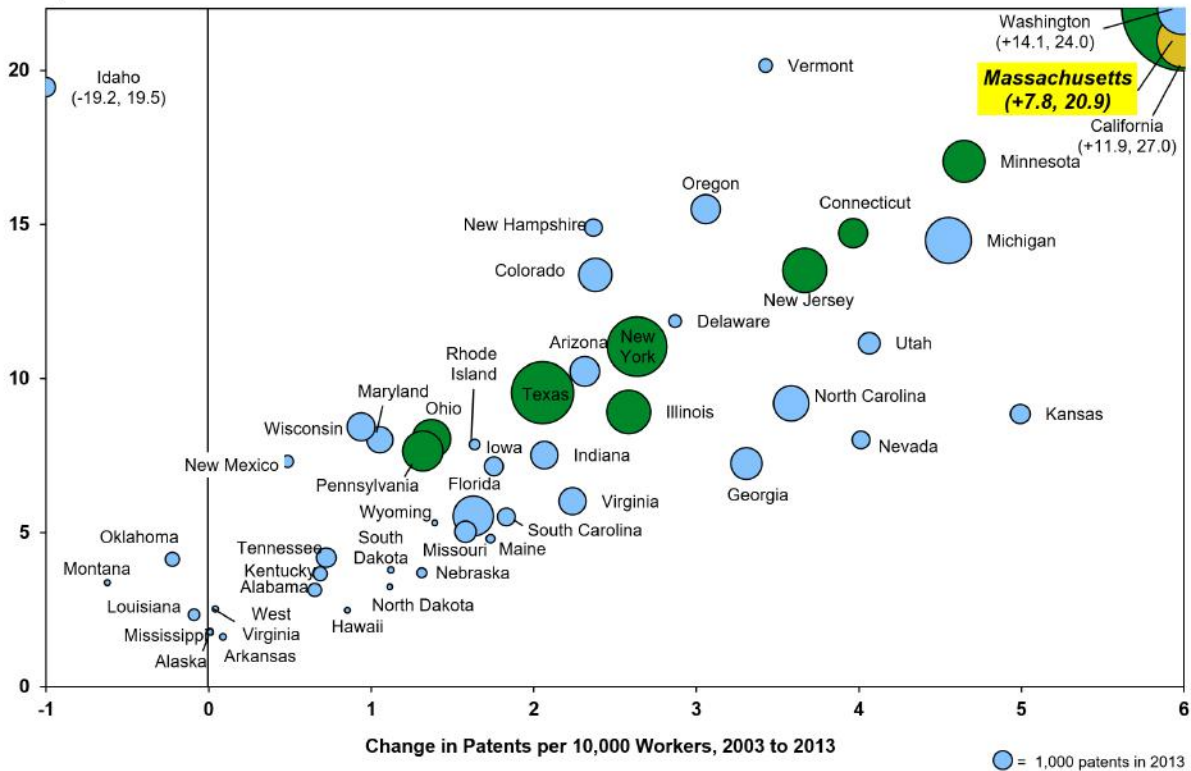
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Exhibit 18: Real GDP per capita, 2001-2013

(Source: Michael Porter, Massachusetts Competitiveness Report,  
Data: BEA)

## Comparative State Innovation Performance 2003 - 2013

Patents per 10,000  
Workers, 2013



Source: USPTO utility patents granted, Census CBP.  
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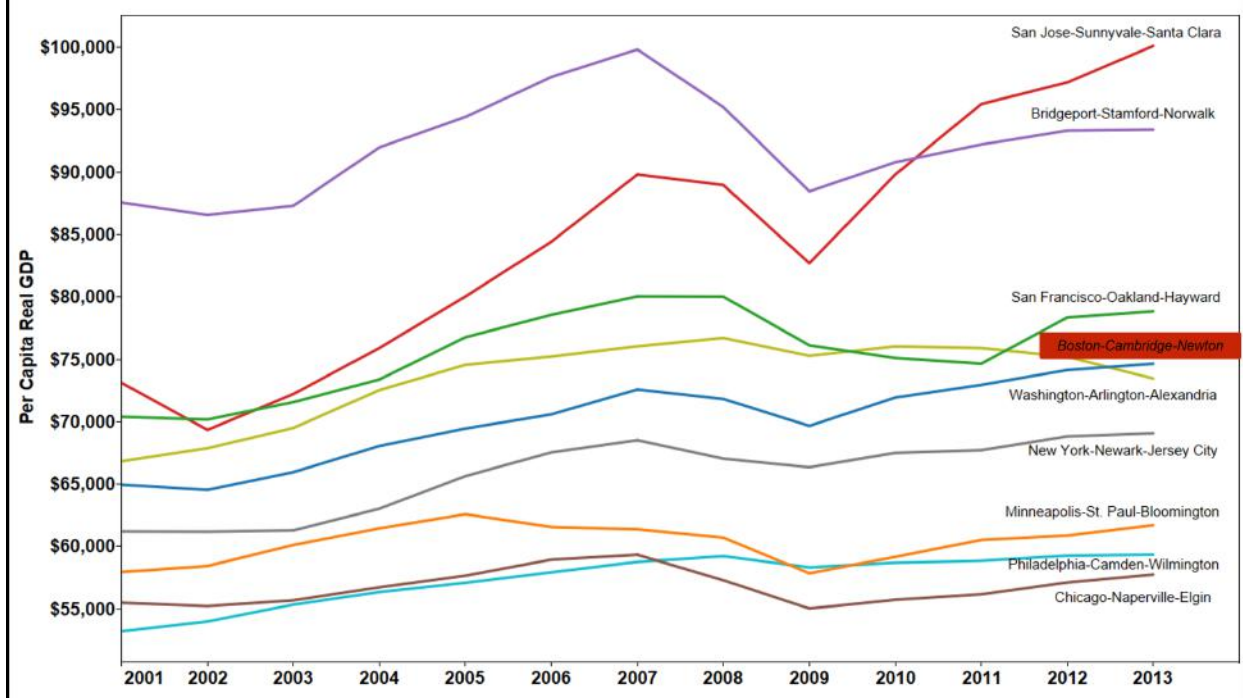
12

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Exhibit 19: Comparative State Innovation Performance, 2003-2013

(Source: Michael Porter, Massachusetts Competitiveness Report, Data: USPTO)

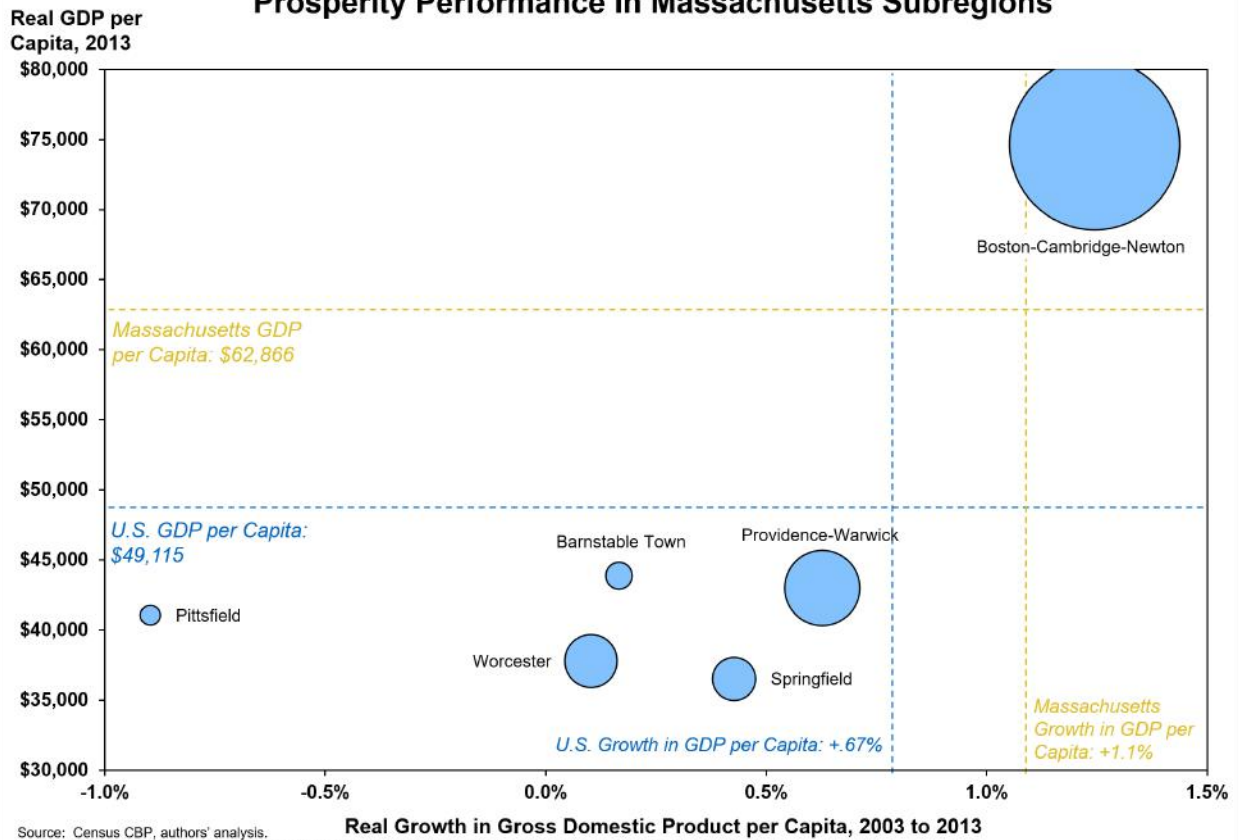
### Real GDP per capita, 2001-2013 Boston and Benchmark Metropolitan Areas



Source: Census BEA  
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Exhibit 21: Real GDP per capita, 2001-13, Boston & Benchmark Metropolitan Areas  
(Source: Michael Porter, Massachusetts Competitiveness Report)

## Prosperity Performance in Massachusetts Subregions



Source: Census CBP, authors' analysis.

Note: MSAs include only the counties within the state of focus. "Bubble" size in chart is proportional to total GDP in 2013.

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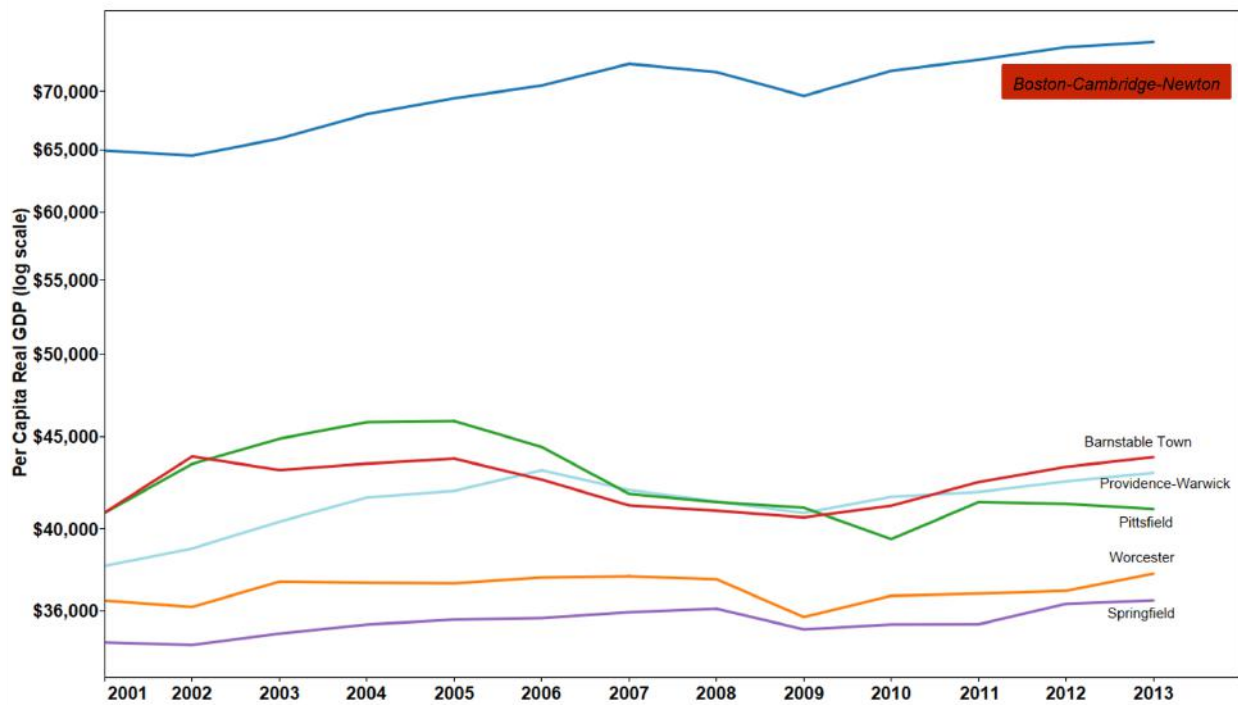
42

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Exhibit 22: Prosperity Performance in Massachusetts Subregions

(Source: Michael Porter, Massachusetts Competitiveness Report)

### Real GDP per capita, 2001-2013 Massachusetts Metropolitan Areas



Source: Census BEA  
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43

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Exhibit 23: Real GDP per capita, 2001-2013

(Source: Michael Porter, Massachusetts Competitiveness Report)