

How New England Became America's Innovation Engine



New England, located in the northeastern corridor of the United States, has long been the cradle of innovation, serving as a focal point for nearly every technology-driven industry in the country's early history. From maritime craftsmanship in the 1600s, to innovation in the textile industry in the 1700s, to sewing machine mills boom of the 1800s, to the rise of the early automotive industry at the turn of the 1900s. But as with the case of the earliest automobiles, a breakthrough innovation in one area can cannibalize one technology, paving the way for explosive business growth. Today, New England is at the forefront of major advances in Life Sciences and a leader in

commercializing innovations in Robotics, AI, fintech and clean technology. However, it wasn't always this way.

From the post World War II economy through the early 1980s, Massachusetts was far from a haven for innovation. The nickname for the state in the 1970s was "Taxachusetts." The New England economy through the end of the 1970s mirrored that of post-war England—rife with economic stagnation, high unemployment, and labor and racial strife. From the outskirts of Cambridge, outside of Boston, stretching north to the border states of New Hampshire and Vermont, textile factories were emptying and moving to China. Only neighboring Connecticut to the south propped up by its proximity to New York City's financial hub, was doing well. Despite M.I.T. being home to modern radar, arguably the most important determinant of the Allies' victory against Germany in WW2, there was little momentum after the war to support Massachusetts' economy. From the 1950s through the 1970s, the state was infamous for the Irish Mafia, and high taxes. Commercially speaking, Massachusetts was dead.

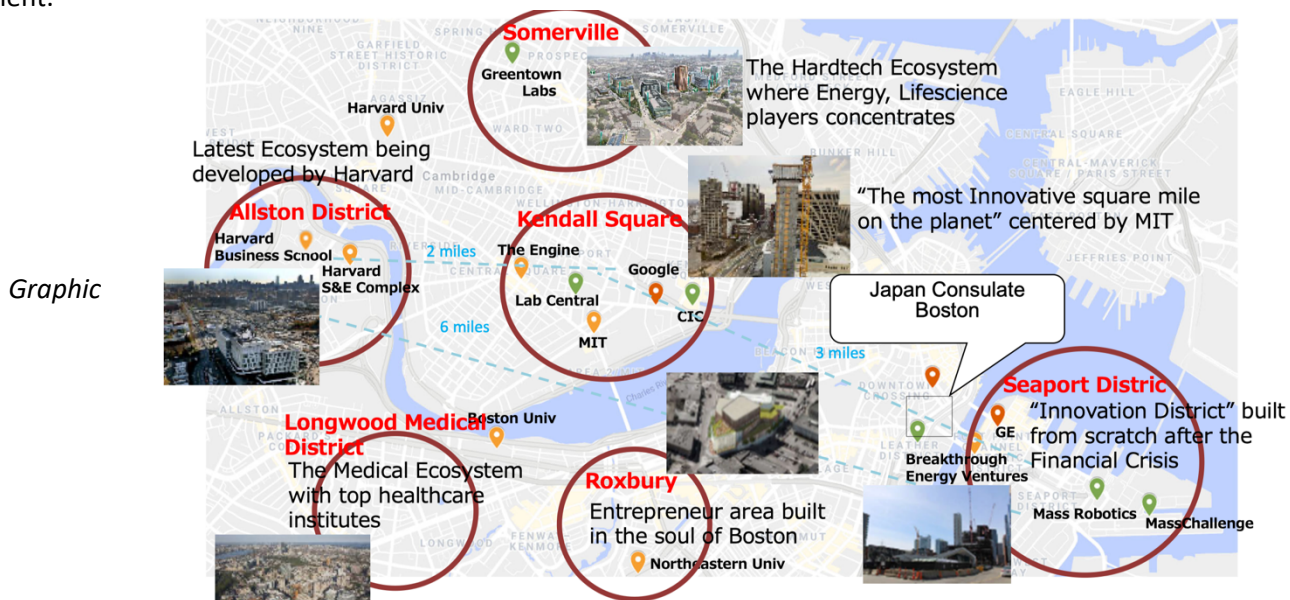
Even the most talented engineers and scientists graduating from MIT and the surrounding universities could not find employment. But empowered by the latest advances in computing, backed by new solid-state electronics, the smartest graduates started their own companies, launching exciting state-of-the-art hardware and software enterprises such as Symbolics, Thinking Machines, Apollo Computer, Wang, Lotus, Data General, and Digital Equipment Corporation. The region's growth was further supported by steady investments through the end of the Cold War in applied research by defense contractors BBN, Draper Labs, MITRE, Raytheon Corporation and others. The rapid turnaround in the state's economy gave rise to the "Massachusetts Miracle"—record economic growth leading to a sense of economic invulnerability. The economic prosperity of Massachusetts was so glowing that it served as a platform for then-governor Michael Dukakis to launch his presidential campaign in 1988.

However, the roaring 1980s did not last long. Before the decade-end, recession hit the state hard, forcing it to cede its glory to Silicon Valley. Today, Silicon Valley, including the San Francisco Bay Area, is the largest innovation hub in the world, with the highest level of venture capital funding by nearly every measure. Silicon Valley has the most exits by startups and the highest valuations, contributing over \$2.5 trillion in total value to the Bay Area's economy from 2021 through 2023, according to the Global Startup Ecosystem Report 2024 by Startup Genome. The corresponding value for the nearest runner-up, New York City, was \$695 billion. Total venture capital funding over the same period in the Bay Area exceeding \$315 billion. Intriguingly, in the Bay Area the average exit time for tech startups measured at 8.3 years—almost 20% shorter than the global average 10.3 years. In the Valley, investments in startups launching business in software, internet enterprise, social media and AI have been cornerstone of Silicon Valley's vibrancy.

History is no guarantee of continued success in innovation. Market conditions for success can and will change quickly. The bursting of the internet bubble in 2001, the sharp decline in investment in Life Sciences in 2022-23, and very recent boom in funding for generative AI startups serve as a testament that thriving ecosystems are like living organisms. Change is a constant because there is a continuous cycles of ideas and talent. The most successful innovation ecosystems draw the best minds from across the globe, creating a magnet that feeds new ideas and an adaptive community.

Where the physical world meshes with technologies—from cell physiology to genetic engineering, from robotic systems to advanced fuels and storage devices—a multitude of factors complicates a startup’s path to a successful exit. The technologies that are going to drive economic growth and help tackle the planet’s toughest challenges include quantum computing, nanomaterials, genetic engineering, advanced membrane chemistries, low-carbon fuels, and fusion energy. These transformational technologies depend on rigorous scientific development and engineering grounded in cross-disciplinary research, established connections with industry, and smart government support. In these aspects, over the past 15 years Massachusetts stands out as a mecca for nurturing breakthrough in technology through to commercial success.

Boston, Massachusetts sits at the center of the Eastern seaboard in North America. At the foci point of the Boston innovation hub is M.I.T. and numerous world-renowned universities: Harvard, Tufts, Boston and Northeastern University and over 100 other universities, colleges – all within an 100km radius. In fact, Massachusetts has the highest concentration of bachelor’s and master’s degree holders in North America. These research and educational institutions are critical in inventing breakthrough technologies, performing cutting-edge research and generating entrepreneurial talent.



courtesy of Mitsubishi Corporation Boston Office

The heart of the Boston innovation hub is Kendall Square, considered “the most innovative square mile on the planet.” Kendall Square, adjoining MIT’s Engineering and Management Schools, is home to a wide array of advanced biomedical research labs, global pharmaceutical companies, the **LabCentral** life science incubator, the AI Institute, and the headquarters of Microsoft, Google, Amazon and Cambridge Innovation Center. Nearby is **The Engine**, a one-of-a-kind DeepTech incubator that exclusively invests in and houses emerging startups developing breakthrough solutions in quantum computing, long-duration storage, sustainable manufacturing, carbon capture, and biomedical therapies. Across the Charles River is the Seaport District, formerly a dilapidated warehouse district, now home to the state’s sponsored accelerator, MassChallenge. The Seaport District serves as a cluster for robotics startups, **MassRobotics** and many tech-focused legal and consulting firms. Immediately west next to Fenway Park, is the Longwood Medical area, where major research hospitals run field studies on new drugs and medical therapies. Back across the Charles River, just north of Kendall Square, is the largest and oldest climate technology incubator, **Greentown Labs**, founded in 2011.

Greentown Labs has been home to over 600 cleantech startups that collectively have raised over \$6 billion in capital. Greentown Labs also opened a second incubator facility in Houston, Texas, to tap into the expertise and connections of the Oil & Gas industry, with the goal of decarbonizing hard-to-abate industries and accelerating our transition to a low-carbon future.

While Boston is pulsating with innovation, it does not operate in isolation. Boston is a short distance from equally important cities with rich array of tech startups. New York City, ranked #2 in the Global Startup Ecosystem Report 2024, has over 25,000 startups and has seen over \$165 billion in venture funding since 2021. The New York metro area has a high concentration of startups in fintech, business software, lifesciences, and is home to a number of urban pilot projects. West of Boston, in upstate New York, lies Rensselaer Polytechnic Institute (RPI). RPI has installed a state-of-the-art IBM quantum processor, making it the first utility-scale quantum computer that potential position upstate New York as “Quantum Valley.”

Immediately south of Boston, Connecticut has a concentration of startups and industrial companies in fuel cell manufacturing, sustainable materials, and energy storage, supported by the Connecticut Center for Advanced Technology (CCAT). Earlier this year, Yale University launched the newest climatetech incubator, **ClimateHaven** in New Haven. Across the Canadian border, lies the Toronto-Waterloo innovation corridor. The MaRS Innovation District, located in downtown Toronto, calls itself *the world’s largest urban innovation hub*. MaRS has 12,000 affiliated Canadian startups in life sciences, AI, and transformational technologies. Given Boston’s proximity to these ecosystems, there is a free flow of talent, academic and industrial collaborations.

Back in 2008, the state’s governor enacted the Massachusetts Life Sciences Act, offering \$1 billion to boost the state’s leadership in biomedical research. As a result, today Boston is the global mecca for life science research with over \$7.7 billion invested in new startups in just 2023. All of the largest and most famous pharmaceutical companies have setup R&D centers in or near Kendall Square.

We are at a turning point in the world’s transition to a clean, low-carbon future. Global investment in renewable energy and cleantech outpaced fossil fuel investments by 80% reaching \$1.8 trillion in 2023. And the US has invested \$131 billion in emerging clean technology startups since 2018, more than all other western countries combined. Climate tech’s percentage share of overall venture capital investment is at an all-time high of 16%. Encouragely funding for climate technologies has proven resilient to yearly fluctuations seen in life sciences, software, and fintech.

In North America, Boston—not Silicon Valley—is ranked #1 in climate technology funding. Following the model that successfully developed the life sciences ecosystem, Governor Maura Healey plans to position Massachusetts as the world’s global hub for climate technology. Early in 2024, Governor Healey announced her commitment to invest over \$1 billion to create a climate technology corridor extending from Boston westward to the New York border. The early-stage startups located at Greentown Labs, The Engine, and university-affiliated startups will form the foundation for the expected boom in all areas related to climate technology as we transition to a net-zero world. Industry in Japan must look to take on a major role in Massachusetts’ thriving innovation ecosystems.

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