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Global Science and Innovation Cluster: Boston–Cambridge

This Outlook provides an overview of the science and innovation cluster in Boston, MA. Boston is one of the world's leading clusters, renowned for its combination of academic excellence, cutting-edge research, and dynamic innovation ecosystem.

According to the Global Innovation Index (WIPO cluster rankings), Boston–Cambridge is among the world's top innovation-intensive clusters when measuring patents, scientific publications, and more recently, venture capital activity. Other STINT reports are in the making to introduce several of these top-ranking clusters globally.

Anchored by globally recognised institutions such as Harvard University and the Massachusetts Institute of Technology (MIT), the region attracts top talent, research funding, and corporate investment. Its universities, hospitals, and research centres are tightly interwoven with industry, creating fertile ground for breakthroughs in fields ranging from biotechnology and life sciences to digital technologies and advanced manufacturing. The cluster's innovation capacity is further reinforced by strong venture capital presence and a vibrant start-up culture, making Boston–Cambridge a global hub for knowledge creation and commercialisation.

Sweden has a strategic interest in understanding and connecting with Boston's research and innovation landscape, given the ongoing development of collaborations with local universities and firms.

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Summary

The Boston–Cambridge region is widely recognised as a leading centre for research and innovation in the United States. The cluster brings together universities, hospitals, companies, and start-ups closely together, with Harvard and MIT as central actors. Research strengths include biotechnology, medicine, engineering, and emerging fields such as artificial intelligence and climate technologies. This concentration of institutions and talent has enabled steady knowledge exchange and commercialisation of research, supported by venture capital and public funding.

Global rankings underline the scale of activity. In the 2025 Global Innovation Index, Boston–Cambridge was ranked 9th in the world by overall S&T output, and 3rd in intensity relative to population. Federal research grants to the region's universities and hospitals remain substantial, while local venture capital continues to fund biotech, health, and hard technology. At the same time, challenges are apparent. Lab and housing costs are high and transport systems face capacity issues. These structural issues shape the debate about the future direction of the cluster.

Swedish engagement with the Boston–Cambridge area reflects the cluster's role as a reference point in science and innovation policy. Swedish universities and companies are active in collaborations in medicine, life sciences, and engineering, and some firms maintain a local presence. The region's combination of research capacity, innovation infrastructure, and access to capital makes it an important node for international partnerships. For Sweden, the Boston–Cambridge cluster remains a relevant space for research cooperation, academic exchange, and knowledge transfer.

General Introduction to the Region

Historic Context

The Boston – Cambridge area (also known as Greater Boston, particularly Cambridge, Kendall Square, Longwood, and adjacent municipalities) has long been a nexus for higher education, scientific research, and innovation. Its institutions, infrastructure, and policy environment have evolved over more than a century to form a dense cluster in which universities, hospitals, start-ups, corporate labs, and capital converge.

The foundations of Boston – Cambridge's research infrastructure date back to the 19th century. Harvard University (founded 1636) and MIT (founded 1861) emerged as major research universities, with early development in basic science, engineering and later medicine. In the early 20th century, firms such as Arthur D. Little played a role in industrial chemistry and consulting labs, pioneering the idea of consulting research and development (R&D) laboratories (the "industrial laboratory" model) in the region.

Following the Second World War, in the 1950s – 60s, Boston benefited from a substantial increase in federal research funding in the United States, especially in biological sciences, medicine, and engineering. The post-war period saw the establishment and expansion of research hospitals (e.g. Massachusetts General Hospital, Brigham and Women's), medical schools, and investments in biotechnology, particularly after the molecular biology revolution (e.g. recombinant DNA in the 1970s). Kendall Square evolved from an industrial and railroad corridor to a research and biotech hub as land use shifted, universities expanded, and zoning permitted life science facilities and labs.

In parallel, the rise of venture capital, biotechnology firms (Biogen, Genzyme, etc.), and federal policy initiatives in scientific funding over the late 20th century – such as the National Institutes of Health (NIH) and National Science Foundation (NSF) – further supported the growth of research-intensive firms and university spin-offs. By the turn of the millennium, Boston – Cambridge had become one of the world's leading life sciences clusters, while also growing in computing, AI, robotics, and environmental technologies.[1]

Comparisons to the Silicon Valley cluster are hard to avoid. Studies from the 1990s on the Boston region, also commonly referred to as the Route 128 cluster, highlighted a strong dependence on federal funding, large established firms, and relatively closed R&D environments, often linked to defence-related research. Scholars argued that these characteristics contributed to weaker internal networks and less informal knowledge exchange compared with Silicon Valley. While these observations remain relevant as historical context, it is more difficult to make the same claim about today's Boston – Cambridge cluster. Over time, deliberate efforts to strengthen collaboration, entrepreneurship, and university – industry interaction appear to have altered the region's dynamics. Moreover, Boston – Cambridge is smaller in geographic scale and more densely concentrated than Silicon Valley, a factor that may support closer interaction and informal exchange among researchers, firms, and institutions. As a result, although federal funding continues to play a significant role, the cluster today exhibits more varied structures and stronger internal connectivity than earlier analyses of Route 128 would suggest.[2]

Basic Facts and Research & Innovation Metrics

Several metrics are helpful to understand the region's scale and position in the global S&T landscape.

The *Global Innovation Index*, published annually by the World Intellectual Property Organization (WIPO), includes a specialised "Science & Technology (S&T) Cluster" ranking that maps the world's most dynamic innovation hotspots. Up until 2024, this ranking captured regions with the highest concentrations of patent filings (Patent Cooperation Treaty applications) and scientific article outputs, using geocoded author and inventor addresses to highlight areas that excel in generating cutting-edge knowledge and

technologies.[3] While East Asian clusters such as Tokyo – Yokohama, Shenzhen – Hong Kong – Guangzhou, Beijing, Seoul and Shanghai – Suzhou dominate the 2024 ranking in absolute size, Boston – Cambridge, MA retained a prominent position. It was ranked 8th overall by total S&T output and is among the top global clusters when output intensity is measured relative to population, following Cambridge (UK) and San Jose – San Francisco.

In the 2025 edition of the Global Innovation Index (GII), WIPO introduced a significant change in methodology for its cluster/innovation hotspot rankings. A third dimension was added: venture capital (VC) deal activity, specifically the number of VC deals headquartered in regions, with data drawn from VC databases (e.g. PitchBook) over a recent multi-year period. Thus, in 2025, the cluster ranking is no longer only a function of knowledge creation (inventors + authors) but also of financial backing as reflected through VC activity. This addition gives weight to entrepreneurial and investment ecosystems in addition to patents and publications. Other changes include refined geocoding accuracy and the inclusion of more recent data windows for publications, patent filings, and VC deals to ensure comparability.[4]

In 2025, Boston – Cambridge's global innovation cluster rank is 9th in the top 100 clusters by absolute size/total innovation output. For innovation intensity (i.e., innovation output relative to population), Boston – Cambridge is ranked 3rd among global clusters in 2025.[5]

Boston – Cambridge, with a vibrant VC environment (especially in biotech, life sciences, AI, and health technology) thus benefits under the new metric. However, the addition of VC deal counts also introduces new competitive pressures. Some clusters that had lower VC investment but strong publication/patent output slipped in the rankings relative to others that have more balanced or investment-heavy profiles. For Boston – Cambridge, this means that its relative intensity (publications + patents per capita) remains important, but its ability to attract major VC deals (especially in cutting-edge areas) will become more crucial for sustaining or improving its ranking. The 2025 cluster ranking shows Boston – Cambridge still among the top clusters globally, but some US and UK clusters with high VC activity (e.g. New York City and London) have moved up in rank, partially because of this revised methodology.

On the research side, MIT, Harvard, and affiliated hospitals receive large sums from federal agencies such as the NIH and NSF, as well as from private funding sources. In the 2022–23 academic year, MIT alone received approximately USD 1.7 billion from federal sources, accounting for about 48% of its total revenue. In 2024, MIT reported over USD 2.10 billion in sponsored research expenditures, with significant shares directed toward its Cambridge campus in engineering, biological sciences, and physical sciences.[6,7]

Harvard University similarly receives substantial federal-sponsored research funding: in the 2024 fiscal year, Harvard's federal sponsored research expenditures totalled approximately USD 684 million, of which about USD 488 million came from the NIH. Most of this funding is directed toward the medical, public health, and life science schools, as well as other research divisions. In addition, Harvard reported internal funding of about USD 526 million in the 2024 fiscal year to support research operations across its schools.[8]

On the innovation side, Kendall Square is the physical central meeting space for the Boston – Cambridge cluster. Kendall Square is a neighbourhood in Cambridge, directly next to MIT, with a high concentration of lab space, specialised infrastructure, and especially translational medicine activity.[9] The startup creation rate is high around Kendall Square. LabCentral, the shared lab/incubator space in Kendall Square, for example supports around 125 biotech start-ups simultaneously and hosts approximately 1,000 scientists and entrepreneurs in its facilities.[10] While data on unicorns (start-ups valuated at over USD 1 billion) specifically emerging from Kendall Square are less centralised, Boston and Massachusetts as a whole have produced a meaningful number in recent years – one recent report estimates over 20 unicorns established in the region during that timeframe.[11]

The Milken Institute is a US-based, non-partisan economic think tank that produces a range of data-driven policy reports and indices aimed at evaluating regional and global competitiveness. One of its flagship tools, the State Technology and Science Index (STSI), has been published since 2002 and assesses the ability of US states to foster and sustain a technology-based economy. The index ranks states across five subdimensions – Research and Development Inputs, Human Capital Investment, Risk Capital and Entrepreneurial Infrastructure, Technology and Science Workforce, and Technology Concentration and Dynamism – making it an often-cited benchmark for measuring state-level performance in science, technology, and innovation. In the 2022 STSI, Massachusetts ranked 1st overall among US states, 1st in Research & Development Inputs, 1st in Human Capital Investment, 4th in Risk Capital & Entrepreneurial Infrastructure, 4th in Technology & Science Workforce, and 6th in Technology Concentration & Dynamism.[12]

Some recent trends pertaining to research and innovation seem to persist, namely the biotech boom, scaling pressure, and lack of space. Demand for lab space, translational medicine, and clinical trial capacity has increased. With growth comes constraints: the cost of real estate and lab space in Cambridge and Boston is high; housing costs, transportation infrastructure, and workforce diversity are limiting factors. Universities and municipalities are under growing pressure to balance expansion of research facilities with affordability, zoning, and environmental constraints.

Analysts estimate that Kendall Square and surrounding areas may add tens of millions of square feet of drug pipeline facilities by 2025.[13] This expansion seems to have had an effect. As of early 2025, lab vacancy rates have risen to approximately 28% statewide, with Boston at 38% and Cambridge at 23%, up from just 1.3% in 2021.[14] Despite this increased availability,

the cost of real estate and lab space in Cambridge and Boston remains high, especially for prime locations like Kendall Square. This high demand and limited supply have led to intense competition for space, pushing emerging biotech firms to seek more affordable options in suburban areas.

On the funding side, venture capital investment in Massachusetts remains significant but has shown signs of cooling. In 2024, Massachusetts-based firms raised approximately USD 5.9 billion in venture capital – down from prior years – and the largest raise was by Flagship Pioneering at USD 2.6 billion. Other large Cambridge funds include Atlas Venture and The Engine, particularly focused on biotech and "hard tech."[15] Biotech firms in Cambridge and Boston continue to receive substantial portions of the state's overall funding; in the first half of 2022 alone, they raised USD 2.2 billion, making up about 43% of Massachusetts biotech funding in that period. Beyond traditional biotech and medicine, there is increasing activity in AI, data science, robotics, synthetic biology, climate technologies, and sustainability research.[16,17]

Overview of the Research Landscape

The Boston metropolitan area, and in particular the Boston – Cambridge axis, has long been recognised as one of the world's most concentrated centres of higher education and research. The region is home to a diverse set of universities and research institutions, which together form a dense and interconnected research ecosystem. This ecosystem is characterised by the coexistence of world-class universities, specialised research hospitals, independent institutes, and a supportive network of public and private organisations that foster knowledge creation and innovation.[18]

Among the major universities in the region are Harvard University, the Massachusetts Institute of Technology (MIT), Tufts University, Boston University, Northeastern University, and the University of Massachusetts Boston. These institutions each contribute in distinctive ways to the overall research landscape. Harvard University is known for its strength across the humanities, social sciences, law, and medicine, while MIT is globally associated with science, engineering, and technology.

The clustering of universities, hospitals, and research institutes in the Boston – Cambridge area creates a dense and interconnected S&T cluster. The strength of this cluster is not only a matter of quantity but also of integration. The close geographic proximity of leading universities such as MIT and Harvard, combined with specialised medical research centres and a dynamic private sector, generates extensive knowledge spillovers. Students and faculty members frequently collaborate across institutional boundaries, and the presence of venture capital firms and startup incubators ensures that research is often translated into commercial applications.

Harvard University

Harvard University, established in 1636, is the oldest institution of higher education in the United States and remains one of the most influential. With a student body of more than 20,000 across undergraduate, graduate, and professional programmes, Harvard has maintained a strong tradition of excellence in research and teaching. Its contributions span across disciplines, with global recognition particularly in law, business, political science, economics, medicine, and public health.

Harvard's influence in the sciences is reinforced through its affiliations with leading hospitals such as Massachusetts General Hospital, Brigham and Women's Hospital, and Dana-Farber Cancer Institute, forming part of the Harvard Medical School network. These institutions are integral to Boston's reputation as a global leader in medical research. Harvard University has also produced a number of Nobel Prize laureates, with over 160 laureates affiliated through teaching, research, or study.[19]

In international rankings, Harvard consistently places at or near the top. In the QS

World University Rankings 2024, it ranked 4th globally, while Times Higher Education ranked it 4th as well.[20,21]

Massachusetts Institute of Technology (MIT)

MIT was founded in 1861 in response to the growing industrialisation of the United States and was originally modelled on European polytechnic universities. Today it is one of the world's foremost research institutions, particularly recognised for its leadership in science, engineering, and technology. MIT has approximately 11,000 students and over 1,000 faculty members engaged in a wide range of research activities.

MIT has long been associated with groundbreaking technological advances, from the development of radar during World War II to more recent progress in artificial intelligence, biotechnology, and renewable energy. It is also recognised for fostering entrepreneurship, with alumni founding companies such as Intel, Dropbox, and Bose Corporation. MIT's faculty and alumni have been awarded over 100 Nobel Prizes, demonstrating its sustained global contribution to scientific and technological discovery.[22]

In terms of rankings, MIT is consistently positioned at the top. It ranked 1st in the QS World University Rankings 2024 and 3rd in the Times Higher Education World University Rankings 2024. These rankings reflect MIT's research productivity, global influence, and extensive collaborations.

Other Major Institutions

While Harvard and MIT are often the most visible institutions, Boston's research landscape extends far beyond these two universities. *Boston University* is one of the largest independent universities in the United States, with a strong profile in biomedical research and a major teaching hospital, Boston Medical Center. *Tufts University*, located in nearby Medford and with a strong presence in downtown Boston, is internationally recognised for its School of Medicine, the Fletcher School of Law and Diplomacy, and the Friedman School of Nutrition Science and Policy.[23] *Northeastern University's* cooperative education programme is closely linked to its applied research orientation, and the institution is especially strong in cybersecurity, robotics, and data science.[24] The *University of Massachusetts Boston* contributes to social policy and environmental studies, with research often tied to the city's urban challenges.[25] Collectively, these universities form a critical mass that drives the academic and scientific output of the region.

Large-scale Research Infrastructure

The Boston – Cambridge S&T cluster does not host hard science facilities, such as accelerators, observatories, or supercomputing centres like CERN's Large Hadron Collider or the European Spallation Source in Sweden. Major research infrastructure is instead focused on biomedical, life science, and materials innovation. One of the most significant is the *Broad Institute of MIT and Harvard,* a world-leading centre for genomics and biomedical research that brings together researchers from both universities to work on large-scale projects in human genetics, cancer, and infectious diseases.[26] *The Dana-Farber Cancer Institute* represents another cornerstone of the region's biomedical research infrastructure, with extensive research programmes in oncology and molecular medicine.[27] Additionally, Boston hosts numerous specialised laboratories, advanced computing centres, and innovation hubs that serve both academic and industry researchers.

In this sense, Boston's large-scale research infrastructure differs from the "big science" model of physics, but similarly acts as magnets for collaboration with industry, academia, and government partners relying on shared access to maintain the cluster's scientific and technological competitiveness.

Policy Shifts and the Boston – Cambridge Research Ecosystem

During the first Trump administration (2017–2020), the directions taken by federal science policy had potential implications for regions like Boston – Cambridge that are heavily dependent on federal grants. Proposals were made to slash funding for major science agencies, like the NIH, NSF, and the Department of Energy's Office of Science, tighten immigration and visa policies, especially H-1B and OPT programmes, and reduce regulatory frameworks in environmental and climate science. While many of the proposed budget cuts were resisted or reduced through congress, there was a sense of uncertainty among academic and research institutions about the stability of federal support.[28,29]

However, the reality suggests that while Massachusetts and especially Boston – Cambridge faced these headwinds, their impact was mitigated by several factors. First, many lines proposed for deep cuts were restored or reduced in proposed severity through congressional negotiation, so actual funding flows, especially from NIH, continued to grow in many years of the first Trump presidency, though often at slower rates than in previous decades. Second, the strong presence of private sector R&D, state and philanthropic funding in the region and institutions with large endowments provided some buffer. Third, policies like state incentives, local zoning efforts, and public/private partnerships continued to move forward, albeit sometimes more cautiously.

The Boston – Cambridge area is again facing pressures from federal policy under the current Trump administration. One of the major points of concern is proposed or enacted cuts to NIH funding, especially changes in how "indirect costs"/ overhead are reimbursed. Indirect costs cover institutional infrastructure, upkeep, administrative support, lab maintenance, etc. Massachusetts research institutions indicate that these cuts threaten hundreds of millions of dollars in funding and could lead to reductions in staffing, delayed grants or research projects, or layoffs.[30]

In 2025, the Trump administration attempted to cut more than USD 2.2 billion in federal research grants to Harvard University, citing concerns that the institution had failed to meet government demands related to governance, academic

programmes, and the handling of anti-semitism on campus. Harvard challenged these actions in court, arguing that the funding cuts were unlawful and represented retaliation in violation of the First Amendment and federal statutes. A US district court judge ruled in favour of Harvard, finding that the administration's actions were "arbitrary and capricious" and ordering the restoration of the frozen grants.[31]

While the court decision resolved the legal freeze, the broader impact of the dispute has introduced uncertainty regarding federal grant stability. Harvard has stated that the litigation underscores the risk that policy shifts – executive orders, regulatory demands, or administrative reviews – pose to research institutions that depend on large, multi-year federal funding streams.

Another area of impact is via state agency and public health funding. This ripples into the research cluster, because many research projects in applied health science, epidemiology, and environmental science depend on state-federal funding flows and partnerships with governmental agencies. Immigration and visa policies also continue to play a role. Local officials have raised concerns that restrictions and uncertainty around visas, green cards, and international student/researcher mobility may reduce Boston's attractiveness to foreign talent. Such talent is a critical input for many labs in life sciences, AI/computation, and engineering.

Some reports suggest scientists are considering opportunities abroad, which could make talent shortages worse.[32]

Looking ahead, the Boston – Cambridge cluster is likely to be shaped by broader structural and geopolitical shifts. Declining public trust in academic institutions in the United States may, over time, affect political support, funding stability, and international attractiveness. At the same time, leading universities in the region have historically demonstrated a strong capacity for adaptation, including by diversifying funding sources, strengthening ties with healthcare systems and industry, and articulating societal relevance more clearly. These dynamics suggest gradual adjustment rather than an immediate systemic disruption. China's rapid advancement in technology and medicine adds another layer of complexity, increasing global competition for talent, research output, and influence. Heightened geopolitical tensions have also resulted in stricter rules related to research security, data governance, and international collaboration, particularly in fields such as artificial intelligence, biotechnology, and advanced medicine. For Boston – Cambridge, this may lead to more selective international engagement and a stronger emphasis on partnerships with countries perceived as strategically aligned.

Overview of the Innovation Landscape

The Boston – Cambridge region has long been recognised as one of the world's most dynamic and productive innovation ecosystems, especially in biotechnology, pharmaceuticals, artificial intelligence, robotics, and digital health. While the area's research universities such as Harvard and MIT provide a strong scientific foundation, the innovation landscape is defined by a rich interplay between academic institutions, corporate R&D centres, venture capital firms, and public – private partnerships.

One defining feature of the Boston ecosystem is the close relationship between academia and industry. Universities such as Harvard, MIT, Northeastern, and Boston University actively pursue partnerships with private companies, ranging from sponsored research agreements to co-developed innovation hubs. *MIT's Industrial Liaison Program (ILP),* for example, has connected global corporations with faculty and labs since the 1940s, fostering long-term collaborations in engineering, computing, and life sciences.[33] *Harvard's Office of Technology Development,* meanwhile, has established partnerships with biopharmaceutical firms to advance translational research in genomics, immunology, and cancer therapeutics.[34]

Boston's hospitals also play an integral role. Institutions such as Massachusetts

General Hospital (MGH), Brigham and Women's Hospital, and Dana-Farber Cancer Institute are not only centres for clinical care but also engines of research and innovation. Many of the region's biotech startups originate from discoveries made in these hospitals' research labs.

This mix creates an environment in which scientific discovery can be rapidly translated into entrepreneurial ventures. International offices such as Swissnex and Innovation Centre Denmark reflect the global interest to connect on-site with Boston's ecosystem.

Harvard Innovation Labs

The Harvard Innovation Labs are central to the university's contribution to the innovation landscape. Opened in 2011, the i-Labs were designed to provide a shared resource for Harvard's twelve schools, breaking down silos and encouraging interdisciplinary entrepreneurship.[35] Since their founding, the i-Labs have supported over 3,000 ventures, ranging from digital platforms to biotech startups.[36]

The Pagliuca Harvard Life Lab, launched in 2016, is of particular importance for early-stage life science ventures. It provides co-working wet lab space, shared equipment, and access to advisors in a collaborative setting. The Launch Lab X GEO extends the i-Labs' reach by offering alumni entrepreneurs a global accelerator programme. Collectively, these initiatives have expanded Harvard's role beyond education and research to become a major contributor to Boston's innovation ecosystem.

Cambridge Innovation Center

The Cambridge Innovation Center (CIC) has become one of the most recognisable symbols of Kendall Square's innovation boom. Founded in 1999 by entrepreneur Tim Rowe, the CIC began as a flexible office space for startups but quickly evolved into a major hub for innovation support. Today, the CIC in Cambridge hosts more than 1,000 companies and organisations, ranging from early-stage startups to corporate innovation teams.[37]

Beyond office space, the CIC provides programming, networking, and access to investors. Its Venture Café programme, initiated in 2010, has become a global network of weekly gatherings where innovators meet to exchange ideas, fostering a culture of open innovation. The CIC has since expanded internationally, with locations in Europe, Asia, and Latin America, but Cambridge remains its flagship site.[38]

MIT Regional Entrepreneurship Acceleration Program (REAP)

One particular local initiative has a clear international perspective, and in practice is spreading the innovation culture of the Boston – Cambridge cluster outside the United States. The MIT Regional Entrepreneurship Acceleration Program (REAP) is a global initiative launched in 2012 under the MIT Sloan Executive Education and the MIT Innovation Initiative. Its mission is to assist regions worldwide in accelerating economic growth, job creation, and social progress through what REAP calls innovation-driven entrepreneurship.

Regions participating in REAP form multidisciplinary teams comprising representatives from five major stakeholder groups (government, universities, risk capital, entrepreneurs, and corporations). Over a two-year engagement, these teams work with MIT faculty and coaches to assess their regional innovation ecosystem, identify comparative advantages, and implement action-oriented interventions aimed at enhancing their innovation-driven entrepreneurship capacity. Workshops, action phases, data-driven diagnostics, and international peer learning are key features of the REAP engagement model. Since its founding, MIT REAP has engaged with over 70 regions globally. Notable partner regions include Andalusia (Spain), Istanbul (Turkey), Hangzhou (China), Veracruz (Mexico), and several others, but not yet anyone in Sweden.[39,40]

Specialised Accelerators and Incubators

Complementing these academic and private-sector initiatives are a number of specialised accelerators and incubators. For example, *MassChallenge*, founded in Boston in 2009, is a nonprofit accelerator that provides zero-equity support to high-impact startups across industries. It has supported thousands of ventures, many in health and life sciences, and has expanded to several international locations.[41] Similarly, *LabCentral*, launched in 2013, provides shared laboratory space and resources for biotech startups, enabling early-stage companies to operate without having to raise the significant capital usually needed for standalone labs.[42]

Corporate R&D Presence

The innovation landscape of Boston is further strengthened by the presence of major multinational corporations with R&D operations in the region. Companies are attracted by the dense concentration of talent, leading universities, and the strong venture capital community.

In the life science sector, *AstraZeneca* maintains a significant presence in Cambridge, operating its US headquarters and R&D facilities in Kendall Square. This hub focuses on oncology, cardiovascular, and metabolic research, and is closely linked with academic collaborations.[43] Similarly, *Novartis Institutes for BioMedical Research (NIBR)* established its global research headquarters in Cambridge in 2002, employing thousands of scientists across multiple therapeutic areas.[44] *Pfizer* and *Sanofi* also have extensive labs in the region, contributing to Boston's global reputation as the world's leading biotech cluster.

In the technology sector, Boston has attracted leading firms such as *Google, Microsoft, IBM*, and *Amazon*. Google's Cambridge office focuses on artificial intelligence and cloud computing research.[45] Microsoft operates its New England Research & Development (NERD) Center, a major hub for AI, software, and cybersecurity.[46] IBM has invested in research partnerships with MIT, particularly through the MIT–IBM Watson AI Lab, launched in 2017 to advance artificial intelligence research and its applications in industry.[47] Amazon also maintains teams in Boston focused on Alexa, robotics, and machine learning.[48]

Venture Capital Firms and Investment
Venture capital plays a central role in Boston's innovation economy, particularly in the life science sector. When venture capital is working properly, the VC firms provide not only capital but also expertise, networks, and management capacity, enabling startups to grow and scale. Several of the world's leading venture funds focused on life sciences are headquartered in the city.

Polaris Partners, founded in 1996, invests across healthcare and technology, with a strong focus on biotech and medical devices. It has backed several companies that emerged from Boston's academic institutions.[49] *Atlas Venture*, also headquartered in Cambridge, specialises in early-stage biotech investments and is known for its model of creating and incubating companies directly in collaboration with local scientists and entrepreneurs.[50] *Third Rock Ventures*, established in 2007, has a similar approach, often founding companies around breakthrough science emerging from Harvard, MIT, and Boston hospitals.[51]

RA Capital Management focuses primarily on life sciences, managing both public and private investments in biotech and pharmaceuticals.[52] *Bain Capital Life Sciences,* part of the larger Bain Capital group, invests in companies developing transformative therapies and platforms, leveraging Boston's ecosystem to identify opportunities.[53]

Foreign Nations' Interest and Presence
Boston's innovation ecosystem also hosts strong international representation, reflecting its global reach. Several foreign governments operate dedicated science and innovation offices in the region to connect their researchers and companies with local partners.

Switzerland's *Swissnex Boston*, established in 2000, was the first Swissnex office worldwide and serves as a platform for collaboration in education, research, and innovation.[54] It connects Swiss universities, startups, and policy makers with Boston's institutions, creating a two-way flow of knowledge and talent. Similarly, *Innovation Centre Denmark (ICDK) Boston*, launched in 2007, promotes Danish research and technology collaboration, particularly in life sciences, clean tech, and digital technologies.[55,56] Other countries, including Germany, the United Kingdom, and Canada, maintain consular or trade offices with a strong focus on science and innovation in Boston.

Collaboration with Sweden

For Swedish actors, Boston offers access to research infrastructure, venture capital markets, and global biomedical networks. The Boston cluster provides several attractive value propositions especially for life science research and innovation: proximity to hospitals, labs, startup infrastructure like Kendall Square, and access to US capital – elements essential for translating life science discoveries into therapeutics and medical technologies.

From Boston's perspective, institutions like MIT and Tufts retain positive perceptions of Sweden as a reliable partner offering high R&D intensity and innovative capacity. Additionally, and more generally, Sweden's high R&D intensity and reputation in sustainable technology, nanotechnology, and life sciences reinforce its standing in Boston's innovation ecosystem.[57] Besides AstraZeneca, no solid evidence was found of large, research-intensive Swedish firms with a substantial R&D presence in the Boston – Cambridge cluster.

AstraZeneca, on the other hand, has made Boston a central hub for its US R&D activities. Its US research headquarters is located in Waltham, MA, just outside of Boston, with additional facilities and collaborations in Cambridge's Kendall Square. Key therapeutic areas focused on in Boston are oncology and cardiovascular, renal, metabolism, and respiratory diseases. AstraZeneca's investment in Boston has also extended into partnerships with leading universities and hospitals, where joint research projects accelerate translational medicine and early-stage clinical development. The scale of the company's presence in Boston is considerable: it employs several hundred staff in research, clinical trials, and regulatory affairs across

the Greater Boston area.[58,59]

Aside from AstraZeneca, there are only a small number of Swedish companies with visible, ongoing research-intensive operations inside the Boston–Cambridge cluster. Several Swedish life-science and medtech companies do have US subsidiaries, sales/distribution offices, or small local teams in Massachusetts (for customer support, business development or commercialisation). Examples include:

- **BICO Group** (previously Cellink) has been active in the US market and maintains a Boston-area presence as part of its global commercial footprint. BICO's US operations include regional commercial and technical teams to serve life-science customers and collaborators in the cluster. This presence is primarily commercial and platform/distribution oriented, though it supports research use of BICO's bioprinting and lab-automation products across local labs and start-ups (Cellink/BICO, 2024).[60]
- **Funnel**, a Stockholm-based marketing data platform, has established an office in Boston, signalling broader Swedish interest in data-driven software markets (Funnel, 2025).[61]
- **Genovis**, a Lund/Gothenburg area technology firm, has established a US subsidiary in Cambridge, MA for its US operations. Genovis's US footprint is oriented to sales, technical service, and partnerships rather than large internal R&D facilities in Boston.[62]

On the academic front, examples of partnerships between Boston's universities and Swedish counterparts are more prevalent through several initiatives:

- **The Stockholm Environment Institute (SEI)** maintains a research centre affiliated with Tufts University, focusing on sustainable development, policy analysis, and capacity building. Its mission remains to conduct interdisciplinary research and engage with decision-makers, civil society, and local communities on pressing environmental and sustainability challenges. SEI US works on issues of energy, water, climate policy, equity, development, and sustainability broadly. It also builds capacity through training, collaboration, and employing decision-support tools for planning and policy.[63]
- **Karolinska Institutet (KI)** has one of Sweden's most extensive networks of scientific collaboration with the United States. A major channel of collaboration has been with Brigham and Women's Hospital/Harvard Medical School in Boston, including memoranda of understanding signed in 2022 for joint work in precision medicine, AI in clinical data, neuroscience, and immunology. KI also maintains active exchange programmes for doctoral students and postdoctoral researchers with Harvard Medical School.[64]
- MIT and **KTH (Royal Institute of Technology)** launched the MIT–KTH Senseable Stockholm Lab in 2019, with backing from the Stockholm Chamber of Commerce and Newsec. This collaboration employs AI, big data, and sensing technologies to improve urban sustainability in Stockholm. It brings together researchers from urban planning, engineering, and computer science. The original announcement in 2019 indicates a planned five-year period for the lab's major initial phase.[65]

To complement the qualitative and institutional analysis, a bibliometric review was conducted using SciVal (Elsevier). SciVal enables analysis of co-authored scientific publications based on indexed journal articles and conference papers. For this report, co-publications between Swedish universities and Harvard University and the Massachusetts Institute of Technology (MIT) were examined over the ten-year period 2015–2024.

The results show a steady and significant increase in co-publications between Harvard and Swedish universities over the period studied. Total output grew by approximately 75% between 2015 and 2024, indicating a strengthening research relationship. The majority of these joint publications are concentrated among a small number of Swedish institutions. KI accounts for the largest share, followed by Uppsala University, Lund University, Stockholm University, and KTH Royal Institute of Technology. This distribution reflects Harvard's strong emphasis on medicine, public health, and life sciences, where KI in particular is a natural counterpart.

Co-publications between MIT and Swedish universities display a somewhat different pattern. Growth over the ten-year period is stronger in aggregate with approximately 97%, but more uneven across years with periods of rapid increase followed by plateaus. The Swedish institutions most prominently represented in MIT collaborations are Uppsala University, KTH Royal Institute of Technology, Stockholm University, KI, and Lund University, in that order. This order points to MIT's broad disciplinary engagement, spanning engineering, physical sciences, computational research, and increasingly also life sciences.

The bibliometric findings suggest that academic collaboration between Sweden and the Boston–Cambridge cluster is gradually deepening with a small group of Swedish universities acting as the primary nodes. The data also indicate complementary collaboration profiles: Harvard–Sweden ties are more strongly anchored in biomedical research, while MIT–Sweden collaborations are distributed across a wider set of technical and scientific domains.

Discussion and Conclusions

The Boston–Cambridge cluster illustrates how research, innovation, and entrepreneurship can grow when universities, hospitals, companies, and investors operate closely. Its development over decades shows that long-term policy support, federal funding, and openness to talent from abroad have been crucial. The presence of anchor institutions like Harvard and MIT has given the region continuity and credibility.

For Sweden, there are lessons to consider. Building clusters takes time, stability, and coordination across sectors. Public investment in research needs to be paired with incentives for commercialisation. Strong ties between universities, companies, and venture capital are necessary for ideas to

scale. Physical infrastructure – lab space, housing, and transport – also plays a role in shaping how clusters expand.

There are also opportunities. Swedish actors can strengthen cooperation with Boston – Cambridge in areas where both regions have strengths, such as life sciences, digital technologies, and sustainability. Participation in joint research programmes and student exchange can deepen ties. Companies can look to Boston for access to venture capital and early adopters of new technologies.

The cluster initiative with perhaps the most focused global reach is the MIT Regional Entrepreneurship Acceleration Program (REAP). For Swedish actors interested in connecting with Boston inherently or via institutional partnerships, REAP may be a valuable entry point. By participating in REAP through Swedish regions or agencies, universities, government bodies, or private firms can engage directly with MIT faculty and global cohorts, test and implement ecosystem strategies, and connect with a community that includes Boston innovation stakeholders.

How should Swedish actors approach collaboration with Boston, particularly in the life sciences, in order to secure lasting value and avoid becoming mere suppliers to a stronger partner? To achieve long-term benefits, Swedish actors need to enter collaborations with clear strategic objectives, their own agenda, and the capacity to absorb and further develop knowledge. This means that Sweden should not only contribute data, test environments, or clinical trial capacity, but also take part in early research questions, governance structures, and commercialisation processes. In life sciences, for example, it is especially important that Swedish universities, regions, and companies build strong domestic nodes, such as through SciLifeLab, clinical research environments, and national coordination, that enable them to engage with Boston-based partners on more equal terms.

This report takes its starting point in one particular quantitative ranking of clusters, namely that done by WIPO. Through the years, the Boston – Cambridge cluster has however also been examined through qualitative and conceptual lenses. Worth mentioning is Michael Porter's work on cluster theory, which frequently highlights Massachusetts, and particularly Greater Boston, as an example of how geographic concentration of universities, firms, suppliers, and specialised services can reinforce competitiveness, especially in life sciences and advanced technologies. Porter emphasises the role of dense institutional linkages, skilled labour markets, and competition – collaboration dynamics in sustaining innovation over time, thus providing important nuances on the emergence of this cluster.[66]

S&T clusters should not be treated as "physical phenomena" that operate independently of culture, institutional design, or political context. While rankings and indices are useful for identifying where scientific and technological activity is concentrated, they inevitably simplify complex and locally embedded systems. Clusters differ not only in size and output, but also in institutional arrangements, funding structures, governance models, and historical trajectories. For example, this report argues that the Boston-Cambridge cluster is shaped by the US federal system, high university autonomy, a strong role for teaching hospitals, and deep integration with private risk capital.

In this report series, STINT uses global rankings as a starting point rather than an endpoint, adding contextual analysis to highlight both similarities and differences across clusters. This perspective is particularly relevant when drawing lessons for Sweden, where differences in funding models, healthcare systems, and state–market relations limit the extent to which cluster models can be directly transferred.

In conclusion, Boston – Cambridge offers both inspiration and practical entry points. Sweden can perhaps not replicate its model directly, but it can adapt lessons. The region remains a valuable partner for collaboration, learning, and international positioning in research and innovation.

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STINT's review panel for publications, consisting of Prof. Mats Benner and Prof. Sylvia Schwaag Serger, Lund University, reviewed the report and provided valuable feedback.