

Greater Boston as a Global Competitor

By Andrew Mikula



Pioneer's Mission

Pioneer Institute is an independent, non-partisan, privately funded research organization that seeks to improve the quality of life in Massachusetts through civic discourse and intellectually rigorous, data-driven public policy solutions based on free market principles, individual liberty and responsibility, and the ideal of effective, limited and accountable government.



This paper is a publication of Pioneer Opportunity, which seeks to keep Massachusetts competitive by promoting a healthy business climate, transparent regulation, small business creation in urban areas and sound environmental and development policy. Current initiatives promote market reforms to increase the supply of affordable housing, reduce the cost of doing business, and revitalize urban areas.



Pioneer Health seeks to refocus the Massachusetts conversation about health care costs away from government-imposed interventions, toward market-based reforms. Current initiatives include driving public discourse on Medicaid; presenting a strong consumer perspective as the state considers a dramatic overhaul of the health care payment process; and supporting thoughtful tort reforms.



Pioneer Public seeks limited, accountable government by promoting competitive delivery of public services, elimination of unnecessary regulation, and a focus on core government functions. Current initiatives promote reform of how the state builds, manages, repairs and finances its transportation assets as well as public employee benefit reform.



Pioneer Education seeks to increase the education options available to parents and students, drive system-wide reform, and ensure accountability in public education. The Center's work builds on Pioneer's legacy as a recognized leader in the charter public school movement, and as a champion of greater academic rigor in Massachusetts' elementary and secondary schools. Current initiatives promote choice and competition, school-based management, and enhanced academic performance in public schools.

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Introduction

In January 2016, General Electric announced the relocation of its world headquarters from Connecticut to Boston.¹ GE's announcement cited the economic and intellectual vibrancy of Greater Boston as a key motivating factor in its decision-making:

We want to be at the center of an ecosystem that shares our aspirations. Greater Boston is home to 55 colleges and universities. Massachusetts spends more on research & development than any other region in the world, and Boston attracts a diverse, technologically-fluent workforce focused on solving challenges for the world. We are excited to bring our headquarters to this dynamic and creative city.²

Boston's recruitment of GE was heralded as evidence that the city had arrived on a global stage. While critics cited the company's struggles and the use of tax credits and infrastructure investments to attract it, GE's 2016 announcement was a bookend on a period of concern about Boston's loss of corporate headquarters, a "hollowing out" perhaps best symbolized by Manulife's 2003 corporate buyout of John Hancock. In the intervening dozen years, Boston faced down a hard recession and its business community turned from concern over hemorrhaging corporate headquarters to ensuring that the region can retain the incredible talent and opportunities that had been developed here. General Electric's more recent struggles have not dampened optimism or economic growth in the region. Such relocations are likely more based on core strengths than targeted government incentives, and after GE downsized its Boston headquarters the company refunded much of its tax break package.³

Moreover, GE joined an impressive list of more than 80 prominent corporations headquartered in Greater Boston, including Fidelity Investments, State Street Corporation, Global Partners, Gillette, TJX Corporation, Stop & Shop, Houghton Mifflin Harcourt, Reebok, Sanofi Genzyme, Bose, MITRE, Boston Scientific, Dell Technologies, Staples, Dunkin', Keurig, Mediatech, Teradyne, Thermo Fisher Scientific, TripAdvisor, Bain & Company, Liberty Mutual, Partners HealthCare, Sonesta International Hotels Corp, Wayfair, and others.⁴ Since 2016, defense contractor Raytheon has also moved to the area from Connecticut.⁵

Today, Greater Boston, which encompasses the Route 128 and Interstate 495 beltways, is an economy that rivals Hong Kong's in size.⁶ Many businesses located here are not only international leaders, but also highly dependent on relationships across the globe. Numerous industries and factors are critical to Boston's ability to compete globally. At first glance, the industries might include financial services, higher

educational institutions, health and life sciences, technology, specialized consulting, and law firms capable of complex transactions. Factors include movement of people and goods; the ability to provide desirable quality of life to recruit and retain talent; a business environment attractive to investors, business formation, and job creators; and the ability to develop skills and talent locally. *This paper is meant to create a framework for policymakers to measure how Massachusetts competes in a globalized economy.*

The dramatic changes seen across the region's economy in the past few decades are the result of global actors, opportunities, and pressures, but they are also the result of intentional policy decisions made by city, regional, and state leaders. As the economies around the world are increasingly globally interconnected and competitive, over time Pioneer seeks to put forward suggestions as to *how policymakers and business leaders can ensure that Boston sustains and enhances this competitiveness.*

The Term "Global City"

Variations of the term "global city," most notably "world city," have existed in academic literature since the 19th century.⁷ Still, in an economy that is increasingly connected at every level, being globally competitive takes on a different value. In fact, when Saskia Sassen published her 1991 introduction to the concept of a global city, she chiefly used economic language.

Sassen writes that global cities are to offer "highly concentrated command points in the organization of the world economy," "finance and... specialized service firms," "sites of...the production of innovation," and "markets for the products and innovations produced," all by definition.⁸ In a precursor to the modern list-based format of global city rankings, in 1970 Swiss Bank UBS compared the cost of doing business among 72 different cities.⁹ Before the rankings were frequently marketed to lay readers, they also attempted to engage multinational corporations on company finance issues related to their workers' location.¹⁰

Since Sassen, the definition of a global city has proven quite malleable, often including criteria like political engagement, the popularity of sporting events, and others that seem far-flung from a city's role in the international economy. This approach may, in turn, prove valuable for the business world, which often must assess the location preferences of its clientele and employees in order to grow its brand. In a 2015 study of world city rankings methodologies, The Chicago Council on Global Affairs writes that "an analysis of a city's performance in [a variety of] indicators will make clearer where the needle can be moved—and where to look for best practices."¹¹ Various consulting firms, policy institutes, research firms, and other

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non-profit organizations regularly publish lists of global cities, intending to capture some combination of economic power, social capital, cultural vibrancy, and other factors that can be framed as competitive between cities.¹²

In using global city rankings to identify opportunities for livability improvements, it is this compartmentalized approach to analysis that proves most prudent. The Chicago Council on Global Affairs suggests that cities not only “use comprehensive rankings... to get a detailed sense of their performance” but also “look beyond the topline numbers to the underlying indicators...and identify their strengths and weaknesses.”¹³ In this paper, Pioneer scrutinizes Boston through the lens of many different parameters that are common indicators of economic performance, quality of life, human capital obtainment, and innovation across these rankings. We examine some of the more prominent global cities lists below for the purpose of evaluating the standing of Boston, Massachusetts within this analytical paradigm.

Review of existing metrics

Kearney, a self-described “global management” consulting firm, has published rankings of global cities since 2008.¹⁴ Within that ranking system is both an index of present performance and a future-minded “outlook” guide. While Kearney’s rankings are considered holistic, they tend to weight economic and educational factors more heavily than social, cultural, and political variables. The five broad categories of factors used in the main index are, in order of most to least important, business activity, human capital, information exchange, cultural experience, and political engagement. Kearney notes that cities that have risen in the rankings tend to improve the most in the business activity, human capital, and information exchange categories.¹⁵

The outlook index, however, is composed of evenly weighted measures of personal well-being, economics, innovation, and governance.¹⁶ Within this index, improvement in economics and governance seem to be catalysts for higher status within the global city framework.

Boston tends to perform better on outlook variables than the main index, and was listed as the world leader in the concentration of top universities in 2018 and 2019, a variable used in the outlook listings. The city was also designated as a member of the “Global Elite,” a group of 17 cities that appeared in the top 25 positions in both the outlook and main indices. Boston ranked 8th in the outlook rankings and 24th overall in 2018, further rising to 7th and 21st in 2019, respectively.¹⁷ In the initial 2008 ranking, Boston was 29th overall, yet had a notably high human capital score for its position.¹⁸

Of the 44 cities considered in the GPCI 2018 report, only four have higher rental housing prices than Boston.²²

Similarly to Kearney’s index, the *Global Power City Index (GPCI)* approaches the task of ranking global cities holistically, capturing cities’ “comprehensive power to attract people, capital, and enterprises from around the world.”¹⁹ The GPCI identifies its main indicators as “economy, research and development, cultural interaction, livability, environment, and accessibility.”²⁰ The GPCI also includes “actor-specific” rankings that describe the best cities for working professionals, visitors, and other actors. The 2018 GPCI report highlights North American cities’ recent improvement in economic and environmental measures relative to others.

Boston ranked 25th overall in 2019 and 20th in 2018. The city also ranked 20th on the 2009 index, although its ranking was significantly lower from 2012–2017. Categorically, Boston scores relatively high on research and development indicators. The 2019 report specifically cites Boston’s universities as some of the best in the world, and the 2018 report mentions the city’s substantial support for new businesses. However, Boston falls behind on livability, accessibility, and cultural interaction.²¹ Of the 44 cities considered in the GPCI 2018 report, only four have higher rental housing prices than Boston.²² Relatedly, Boston is described as a relatively inadequate place to be an artist or even visitor, although its actor-specific “resident” score is high relative to its livability ranking.

Given the complexity of analyzing cities from the perspective of these different actors, some rankings focus entirely on the livability of cities in their criteria. While de-emphasizing economic parameters, such rankings can still contain a wide variety of metrics concerning education, infrastructure, affordability, healthcare, environment, crime, political stability, and more. The *Economist Intelligence Unit’s* Liveability Report analyzes individual cities across a wide variety of metrics, using qualitative labels ranging from “undesirable” to “acceptable.” Boston gets its lowest scores on crime, climate, and some cultural indicators, while its education score is perfect.²³ However, it’s notable that the EIU includes a wider variety of individual parameters for cultural and environmental factors than for education, healthcare, or infrastructure.

Numeric livability rankings are also prevalent in the literature. Consulting firm Mercer, for example, ranked Boston 36th worldwide in livability in 2019, compared to 35th in 2018 and 37th in 2008.²⁴ The relative stability of Boston in these rankings is perhaps an indication of the importance of market power to drive trends in global city measures. Several other helpful global city indices focus exclusively on financial power and trade.

The *Globalization and World Cities Research Network (GaWC)* publishes an annual index of cities based on “business

service connections” to hundreds of other cities.²⁵ Boston was ranked as a “Beta+” in 2018, compared to a lesser-status “Beta” in 2008.²⁶ The analysis also included “Alpha”-caliber cities such as New York and “Gamma”-level cities such as Cincinnati. While the specific criteria for this ranking is left vague, it is helpful to see the evaluation from such a particular angle. In Table 1, we summarize Boston’s performance in the Kearney, GPCI, and GaWC indices from 2008 to 2018.

Table 1: Summary of Boston’s recent rankings on influential global city indices

Year	Kearney ²⁷	Global Power City Index ²⁸	Globalization and World Cities Index ²⁹	Mercer ³⁰	Schroders ³¹
2008	29	–	Beta	37	–
2009	–	20	–	35	–
2010	19	20	Alpha-	37	–
2011	–	16	–	36	–
2012	15	27	Alpha-	35	–
2013	–	31	–	–	–
2014	21	30	–	–	–
2015	23	23	–	34	–
2016	24	27	Beta+	34	24
2017	21	25	–	35	3
2018	24	20	Beta+	35	6
2019	21	25	–	36	5

Analogous to the GaWC in its focus on economic indicators for global cities is investment advising firm **Schroders**. The Schroders rankings are notable for their consistent high placement of Boston, which the company attributes to promising employment numbers in its 2019 edition.³² Boston ranked 5th in 2019 and 6th a year earlier despite the inclusion of absolute population numbers in the analysis, which notably disadvantage Boston relative to Tokyo, London, and New York.³³ Other heavily weighted indicators of “economic vibrancy” that Schroders uses include gross domestic product (GDP), retail sales, median household income, and education quality, and Boston scores particularly high for the latter two.³⁴ Still, the inclusion of absolute numbers, geographic information, and other parameters largely beyond the control of local business leaders and politicians warrants a more targeted approach to this analysis that focuses on areas for reform and commendation, not merely recognizing luck.

Parameters for a Targeted Analysis of Boston

Necessarily, some of the criteria, especially on indices measuring cultural experience, are subjective. There is an inevitable loss of detail when qualitative measures are expressed as numbers. Also, as mentioned above, the principal use of absolute numbers as indicators (as opposed to growth rates or per capita

values) could be seen as biasing the results against smaller cities like Boston. Furthermore, several global city models discuss environmental attributes and natural resources, but we believe the literature is too early in its development to understand how to measure the role of natural resources in global cities. Regardless, these rankings are useful for analyzing the components of the indices, not solely fostering comparison across cities.

In Figure 1 (next page), we consider the components in several of the indices listed above in order to derive a unique competitiveness analysis method that is better suited to objective and evaluative standards. While there is plenty of overlap across the broad categories utilized by various indices, the specific parameters mentioned in Figure 1 largely reflect their typical categorization. We also identify many common themes that indices tend to measure in a variety of ways. For example, the Global Power City Index has nine environmental quality indicators, implying that environmental quality is important, even though a given measure does not have holistic implications.

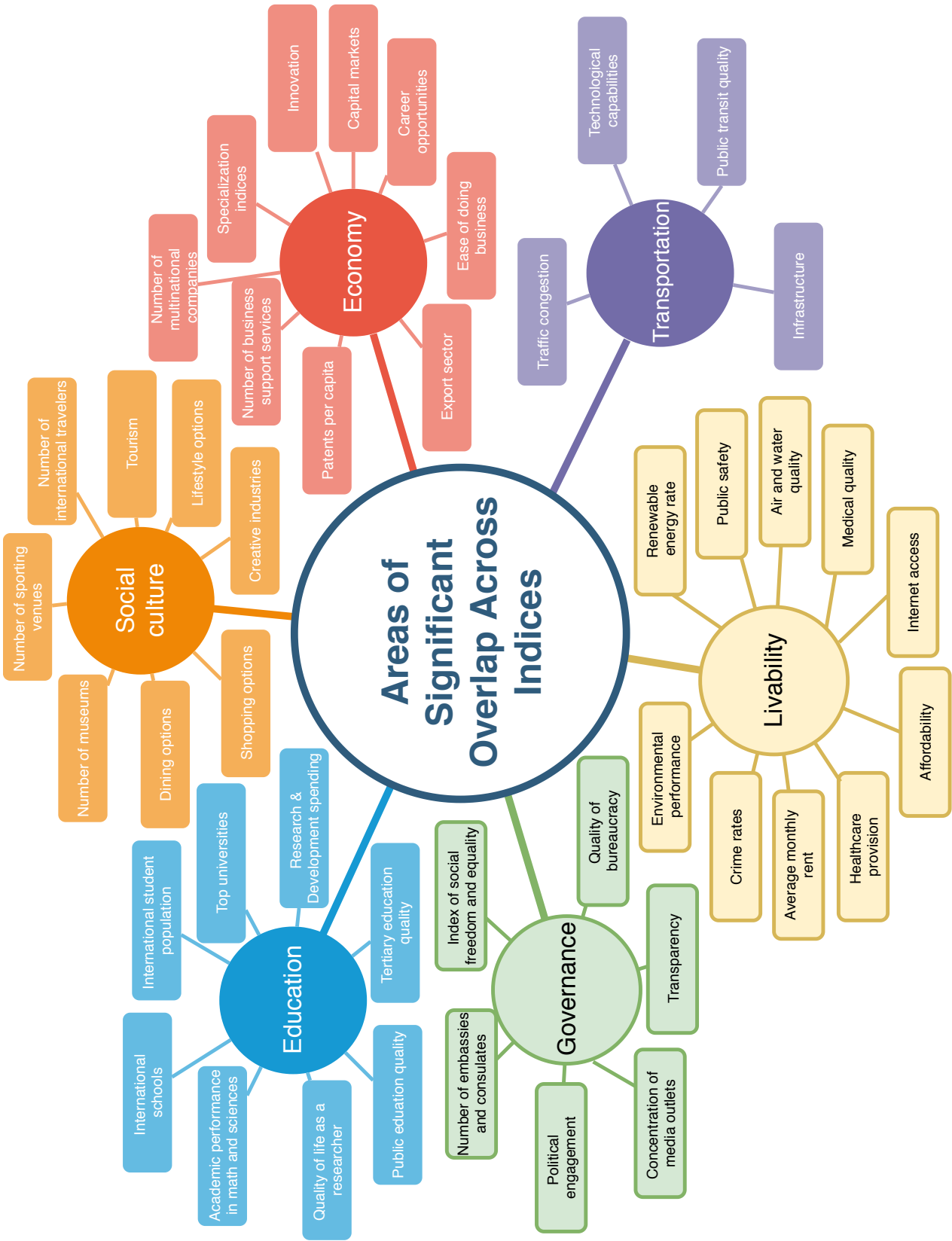
This framework for global competitiveness more closely reflects certain subcategories rather than others. We recognize the profound importance of human capital and economic parameters, but remain skeptical of (for example) the concentration of museums as an indicator of culture. Similarly, many other livability and sociocultural parameters utilized by top global city indices tend to cater to specific interests rather than overall wellbeing. Certain institutional and other indicators, such as political engagement, are chronically difficult to assess or otherwise are too broad. Others, such as public safety issues, have more of a prescriptive problem whereby their causality is unsettled in the literature. Given these observations and Pioneer’s core research strengths, the Institute’s work in improving Boston’s global competitiveness will focus on the policy areas and metrics outlined in Figure 2.

In an attempt to further evaluate Boston’s status as a global city, we subsequently examine five areas for further study: human capital, economic strength, innovation, healthcare, and transportation, selected in part because of their prominent weight in these rankings (human capital and economic strength) and because of their instrumentality to the future of Boston’s vitality (innovation, healthcare, and transportation).

1. Human capital improvement, talent recruitment, and skills development

Boston has a rich history of investment in education, which has helped to build economic resilience in the region for nearly 400 years. Harvard University and the Boston Latin School were both founded in the 1630s, and by 1648 Massachusetts had public schools in five towns.³⁵ Such early investments in human capital have allowed Boston’s economy to remain flexible in times of change. Urban

Figure 1: Areas of Significant Overlap Across Indices



economist Edward Glaeser writes that “Boston, like New York, has staged a remarkable comeback since the 1970s, a rebirth that owes as much to decisions made in the 1630s to any recent policies...[This] reinvention relied heavily on education institutions built up over centuries.”³⁶ The talents and skills of Boston’s workforce helped the city transition to a service-based economy in the late 20th century, and education will continue to have an instrumental role in ongoing efforts to foster innovation in the city’s economy.

1(A). Prevalence of top universities and international student population

Glaeser goes on to write that “Boston’s postindustrial success has been built on engineering, computers, financial services, management consulting, and biotechnology — all education-oriented industries.”³⁷ Clearly, industries that encourage (and, in some cases, require) global connections already have a fairly high concentration in Boston. This is largely because economic specialization in the region has been driven by the kinds of firms that benefit from close proximity to research universities (MIT, Tufts, Boston College, etc.), and Boston has led rankings for the quality of its universities.³⁸ Harvard and MIT are ranked as the first

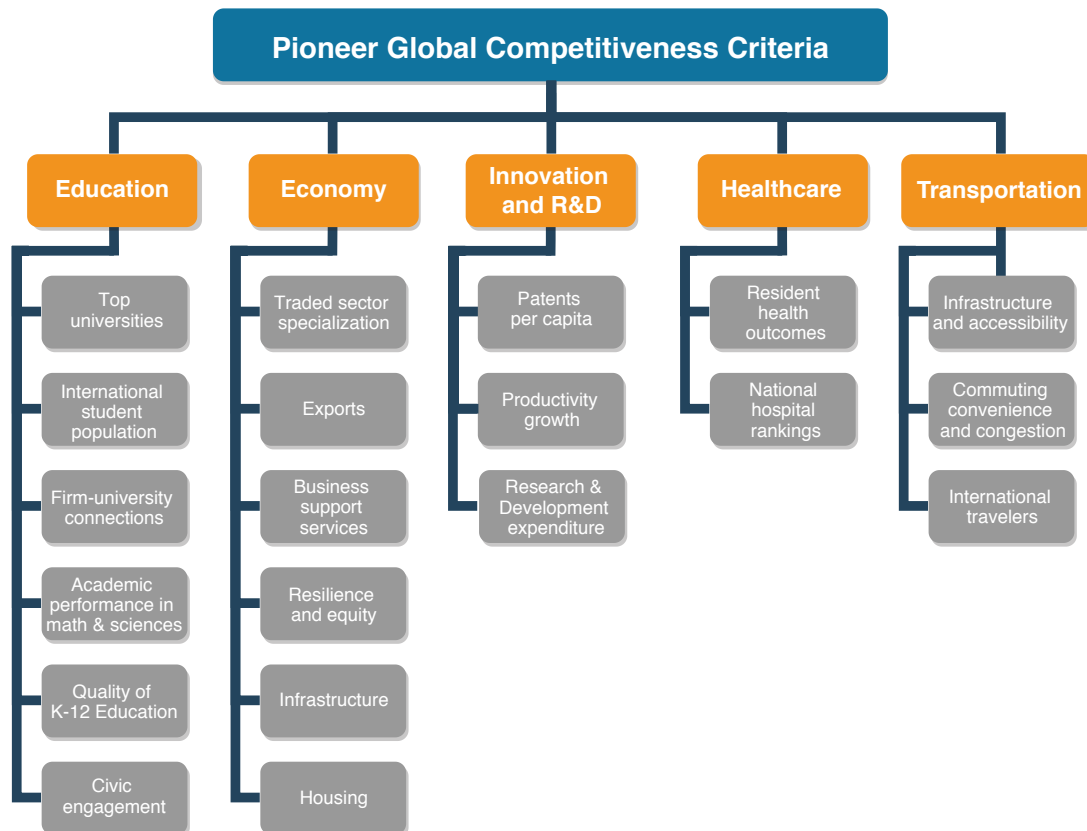
Such early investments in human capital have allowed Boston’s economy to remain flexible in times of change.

and second best universities in the world, respectively, in the Center for World University Rankings in 2019–2020.³⁹

However, some of the region’s smaller colleges and universities, especially community colleges, have recently suffered from declining enrollment.⁴⁰ A more aggressive approach to recruiting students who have historically gone to college in fewer numbers — such as minorities and lower income people — may improve admissions. The development of specific programs to facilitate a pipeline from colleges to local jobs may also help. Pursuing the admission of international students at full price would not only subsidize others’ education, but may also allow for substantial and potentially ongoing contributions to Boston’s economy.

The retention of foreign students after graduation is one of many ways in which education fuels economic power. This economic strength, as seen through Glaeser’s discussion of “education-oriented industries,” is crucial to Boston’s prospects as a global city, and may already be paying off. Kearney cited the increase in foreign students as a major reason why Boston jumped three spots on its global cities ranking between 2018 and 2019.⁴¹

Figure 2: Core Parameters for Analyzing Global Competitiveness



1(B). Skill development and firm-university connections

The economic goals that inspire human capital investments invoke a positive feedback loop between skills development and specialization on the regional level. Employers are drawn to regions with a skilled workforce, just as skilled workers are drawn to economically successful places. Thus, we view education in Boston not only as a crucial tool for increasing regional economic prosperity, but also an economic exchange in and of itself. By interacting with each other in the same place, firms and students make each other better off.

Moreover, proximity aids matching between educational institutions and employers, allowing for local connections to drive growth. Specifically, the Brookings Institute writes that “by ‘growing from within,’ rather than solely chasing firms from the outside, metro areas can make strategic investments and forge collaborations in applied research, innovation, skills development, and modern infrastructure that together create the inputs for long-term success.”⁴²

Facilitating connections between firms and universities is a momentous opportunity to achieve this level of skill development. Boston’s education institutions are already crucial contributors to cutting-edge research in innovative industries, and the city can act to facilitate a long-term economic “ecosystem” that builds on these strengths. Land use laws, tax incentives, and business support services can all be applied to encourage start-ups to locate near and employ students. Economic development agencies may even amend their agendas to further guide and assess the impact of these reforms.⁴³ The ultimate goal should be to ensure that schools like MIT, Tufts, and Northeastern continue to have a positive impact on Boston’s economic outlook.

1(C). Resident academic performance, especially in math and sciences

Despite Massachusetts’s international reputation for tertiary education, there is ongoing inequality in the state’s public education system. Inner city schools suffer from underperformance on standardized testing and lower graduation rates relative to elsewhere in the state.⁴⁴ Education reform has the potential not only to enhance Boston’s regional economy but also to address equity concerns and facilitate upward mobility among Boston’s disadvantaged children.⁴⁵

This reform should involve a variety of tactics that invest in several aspects of education, simultaneously increasing choice and competition in schooling while using performance bonuses to draw and keep talented teachers in disadvantaged communities.⁴⁶ Curricula in underperforming districts may be supplemented by considering the evolving labor market, likely involving an increased emphasis

on everything from numeracy and vocational training to social intelligence and business ethics.⁴⁷ Studies have shown that investments in STEM field education are particularly good at improving outcomes for disadvantaged students.⁴⁸ Also, children with learning disabilities may benefit from increased investment in classroom technology that allows learning to be more personalized.⁴⁹ More than anything else, Massachusetts needs to assemble a broad base of constituents that are able to work together on these issues towards a common goal.

1(D). Social studies and civic engagement

While STEM education is an obvious priority in advancing the region’s economic competitiveness, the fundamentals of democratic governance and citizenship are still essential to political stability. The ability to articulate one’s opinions, as well as a grounding in political and social history, is crucial to maintaining the rule of law. Moreover, jurisdictions without political stability and social elements of trust tend to deter investment.⁵⁰

While difficult to measure, political and civic engagement, as well as the rule of law, have a notable presence on many global cities rankings. Preparing students to think critically about governance and civic issues will help solidify the democratic principles for which Boston has been renowned since the colonial era. At a time when civic engagement in America is on the decline — especially among young people — it is paramount that the public education system reflects the need for all citizens to have a sophisticated understanding of current events, politics, and history.⁵¹ Much like the economic future of Boston, the civic future of Boston depends largely on the public education of youth.

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2. Economic parameters

Economic variables are so fundamental to the designation of “global city” that the entire competitive element of the rankings is often framed in terms of economic power.⁵² While Boston topped Kearney’s 2019 global cities index in GDP per capita, global competition also requires a dense web of support for small businesses, a strong export sector, and financial services industry specialization.⁵³ However, worldly economies must not only be powerful, competitive, and dynamic, but also resilient, diverse, and equitable. Below, we examine the parameters and policies that will keep Boston’s economy oriented outward toward the rest of the globe.

2(A). Traded sector specialization

In Sassen’s groundbreaking work on global cities, she came to classify urban regions based on the presence of

“specialized producer and financial services.”⁵⁴ Such traded sector goods and services often rely more on innovation, global integration, and resilience than local services (like restaurants and barber shops).⁵⁵

Within this category of traded services, Boston has a high concentration of education, financial services, IT, insurance, and even marketing jobs, according to a Harvard Business School analysis.⁵⁶ Many of these same industries also produce high job growth in Boston. Between 1998 and 2016, education, business services, marketing, tourism, and biopharmaceuticals provided the largest private sector job gains in the Boston area.⁵⁷ Economic specialization in Boston is most prevalent in education, marketing, and biopharmaceuticals, as indicated by both a large share of national employment and ongoing strong job growth in those industries.⁵⁸

In fact, growth in the innovation economy is attributable to a renewed focus on specialization in recent decades. As The Brookings Institute puts it, “cities and metro areas have learned the importance of prioritizing a few globally competitive specializations, focusing on middle-market firms that are sophisticated enough to enter global markets and can be bolstered by regional economic development efforts, and ultimately, identifying new metrics for regional economic competitiveness than simply job creation.”⁵⁹ In Boston, these specializations include business services, information technology, education, and others.

In particular, Boston has a reputation for its extensive financial services industry. The second largest cluster in the region after education, financial services employ some 67,000 area residents.⁶⁰ The industry requires a high concentration of human capital, which makes it uniquely fit for Boston, while labor and land costs are not as high as in other well-educated financial hubs such as New York.⁶¹ Still, competition from emerging banking centers such as Charlotte will challenge Boston’s financial services industry in the coming decades. Certain subcategories — including stock exchanges and financial investment activities — collectively lost some 20,000 jobs in Boston from 1998 to 2016.⁶² As property values and payroll costs continue to climb, the further expansion of Boston’s financial industry may be severely hampered.

Another large area of traded sector specialization in Boston is in information technology and software development. With 62,000 jobs and a large Location Quotient (a measure of industry concentration) of 2.61, computer-related industries have a significant footing in Boston with historical roots.⁶³ Software publishers have driven job growth in the last couple of decades, and the sector has also benefited from connections to the region’s market for medical

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devices.⁶⁴ Profit margins in the industry tend to be lower in other large northeastern states like New York and New Jersey, but Massachusetts struggles to retain economic activity in some of the more manufacturing-heavy elements of IT, such as semiconductors, laboratory instruments, and electronic components.⁶⁵

Overall, the kinds of industries that are prevalent in Boston aid the perception that Boston’s economy is innovative, forward-thinking, and resilient. All of the above statistics make it clear that Boston has a high concentration of innovative industries in which it has a distinct comparative advantage. However, the number of jobs in the traded sector has failed to surpass its 2001 high.⁶⁶ Also, job growth in some crucial industries, including financial services, transportation, and others, has not kept pace with national growth.⁶⁷ Incentives for export growth and international business connections are further needed to capture as much value as possible from the traded sector.

2(B). - Exports

Currently, medical equipment and electronic devices constitute some of the most valuable exports originating in Massachusetts.⁶⁸ Medical needles and catheters, surgical and dental instruments, integrated circuits, and semiconductor devices have all made up at least 2 percent of the value of Massachusetts exports in recent years. Still, imports for medicinal uses are often of even greater value.⁶⁹ This medical paraphernalia may include products like medication, artificial joints, and even unwrought gold. Compared to other northeastern metropolises, Boston has a relatively strong export sector. The value of Boston’s exports has recently been on par with that of Philadelphia, which has a significantly larger metropolitan area than Boston does.⁷⁰

Still, there is further opportunity in Massachusetts to use innovation in the healthcare and research industries to add more value to our exports. A Brookings Institute paper even advocates for “train[ing] economic development professionals to engage firms around exports and foreign direct investment opportunities” rather than focusing inwardly on attracting businesses from other New England cities.⁷¹ Governments can expedite this move towards global competition by providing resources and consultants to firms for complying with foreign regulations and interacting with foreign lawyers, languages, and banks. Still, the significance of the export sector goes beyond economic gains.

2(C). - Business support services and global competition

Business connections with international consumers, firms, and governments are vital to Massachusetts’s economy. In

addition to facilitating competition on a broader scale, joining foreign markets reaffirms Boston's reliance on innovation and productivity for growth, as opposed to protectionism, tax incentives, and other problematic arrangements.⁷² Boston should not be reliant on "corporate giveaways" to attract new firms; rather, it should continue to invest in the workers that ultimately decide whether a company can thrive in the city.⁷³ The expansion of Boston's firms to international markets also reasserts the region's specialization, building up Boston's reputation as a leading city for health-care services, education, and other industries.

Focusing economic development efforts outward instead of inward requires enormous investment, yet this investment has the potential to be transformative for the firms that are most deeply rooted in Boston. A Brookings Institute analysis suggests "conducting trade missions abroad, hosting foreign delegations, launching export grant competitions, facilitating supply chain mentorships, establishing "soft landing" accelerators to minimize investment risk, providing global fluency training, and forming long-term economic partnerships with international counterparts."⁷⁴ While many of these suggestions require years of planning, Boston will continue to build up a business environment that is able to stimulate economic activity with frequent international interactions.

Meanwhile, the factors that allow for this global competitiveness are rooted in microeconomic capability.⁷⁵ Starting a business should be as easy as possible, and institutional support for new businesses is a necessity.

Support networks for small businesses in Massachusetts are already strong, as exemplified by the state's top three ranking on the Kauffman Index of Main Street Entrepreneurship, which chiefly examines the longevity, prevalence, and density of small businesses.⁷⁶ However, the Kauffman Foundation has also cited Massachusetts as having both a relatively low concentration of new businesses and a substandard amount of experience among owners of new businesses.⁷⁷ These figures are partially offset by the disproportionate success of Massachusetts startups, which tend to both employ more people and generate more revenue than similar startups in other states.⁷⁸

2(D). - Resilience and equity

In periods of economic expansion, it is imperative to create a business environment that will recover easily from negative shocks. In the coming decades, part of this resilience will involve helping workers adapt to increasing automation.⁷⁹ Low-skilled workers tend to be most affected by labor market shifts, creating equity concerns even if automation helps

improve efficiency. Eventually, regional retraining programs for former local service workers may be appealing.

Other equity issues are readily apparent in Boston's labor market today. Boston has a large concentration of jobs for high-skill workers, but not many promising career paths for workers without a Bachelor's degree.⁸⁰ While this may be understood as a sign of the state's deep commitment to education, it will also make it harder to attract the construction, maintenance, and service workers needed to add resilience to the region's economy. A global economy will have infrastructure needs — from airport runways to a flexible housing stock — that require a substantial number of these blue-collar workers.

2(E). Infrastructure

Infrastructure investment is one of the most important roles that the government plays in guiding economic growth. In addition to its uses in transportation and housing, infrastructure facilitates the provision of utilities and drinking water, management of hazardous waste sites (of which Massachusetts has 32), and the safety and health of everyone who works or attends school in a public building.⁸¹

Unfortunately, the United States is seriously behind much of the developed world in terms of the quality of its infrastructure, and Massachusetts is no exception.⁸² In 2017, the American Society of Civil Engineers found that Massachusetts had 483 structurally deficient bridges, 292 high-hazard dams, a \$17 million funding gap in its park system, and thousands of miles worth of poor-condition roads, among other concerns.⁸³ In remedying this backlog of maintenance concerns, officials need to balance the need for targeting investment where it is most impactful with mitigating opportunities for future risk. Despite the necessary prioritization of safety, there are potentially non-safety-oriented projects that could better mitigate the estimated economic costs associated with driving on poorly maintained roads. Traffic congestion is a separate concern, with three of the country's 50 worst traffic bottlenecks occurring on Interstate 93 alone.⁸⁴

The crux of Massachusetts' infrastructure catch-22 is that the cost of deferred maintenance exhibits a compounding effect over time, requiring a politically and fiscally risky tradeoff in attempting to focus on specific issues at a given time.⁸⁵ In the long-term, infrastructure investment requires meticulous planning. Utilities, water, roads, and other resources can be provided in a more cost-effective and capital-efficient way by concentrating real estate development closer to the urban core, as opposed to I-495 corridor exurbs like Hopkinton and Boxborough, which have seen over 20 percent population growth since the 2010 census.⁸⁶

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Relatedly, the state has resources — such as the Brownfields and Site Readiness programs — designed to expedite the suitability of urban land for redevelopment and private investment.⁸⁷ Utilization of such resources, combined with fiscal responsibility in planning for the future maintenance of infrastructure, should guide improvements in Massachusetts' infrastructure in a more sustainable way.

2(F). Housing

Housing in Massachusetts grew prohibitively expensive in the last few decades of the 20th century, and has continued to appreciate by more than 5 percent per year between 2014 and 2019, far outpacing inflation.⁸⁸ Many residents in lower income communities are rightly concerned about gentrification, but expensive housing also has the more insidious effect of discouraging talented workers from moving to Boston in the first place.

Despite being in the midst of a significant housing construction boom, Boston will continue to struggle to keep pace with market housing demand as long as wealthier suburban communities impose heavy restrictions on development within their borders.⁸⁹ These zoning laws and use regulations have much broader implications for the regional economy, hampering job growth in industries like construction and destabilizing the equilibrium between talented employees and productive businesses.⁹⁰

A recent Urban Institute analysis found that 41 percent of zip codes in Boston have a severe shortage of workers within a reasonable commute relative to the number of jobs available, and that such a discrepancy is largely due to lagging housing production.⁹¹ Such an issue results in an overburdened transportation system as low- and middle-income workers are forced to move to far-flung suburbs to be able to afford housing. Equity concerns also surface as development restrictions tend to increase both class and racial segregation.⁹²

Recently, the City of Boston has made great strides in addressing the housing shortage in the Boston area, but some voices are calling for a more balanced solution beyond luxury condos, including alleviating statewide regulatory burdens like parking requirements.⁹³

Addressing the above concerns will contribute to Boston's economic power, not only giving Boston a stronger real estate market but also allowing more workers to live here, and thus contribute to innovations and increased productivity in industries like technology, healthcare, and biopharmaceuticals.

41 percent of zip codes in Boston have a severe shortage of workers within a reasonable commute relative to the number of jobs available

3. Innovation and R&D

The above discussion has referenced the innovative nature of Boston's economy several times. In this section, we'll make more explicit the economic factors, industries, and institutions that help develop and strengthen an innovation-driven economy.

3(A). Patents and productivity growth

In an oft-cited report on industry clustering, Harvard Business School measures innovation on an industry level by the national share of (and growth in) patents awarded. In Boston, this metric demonstrates strong evidence for innovation in biopharmaceuticals, medical devices, and chemical products.⁹⁴ MIT and Harvard were each awarded over 650 patents in these fields between 2012 and 2017.⁹⁵

Patents are a reliable indicator of innovation not only because they represent the creation of new commodities but because they represent the creation of new methods of production.⁹⁶ Ultimately, productivity growth, not just the expansion of the array of goods available to the market, is one of the most consistent and impactful ways to generate long-term economic gains in developed countries. Patents capture both of these benefits of novel economic activity, and Massachusetts had the second most patents per capita among the states in 2018 after Delaware, and the fourth most overall.⁹⁷

Massachusetts is also notable for the resources it provides to inventors in small businesses. The Arts & Business Council of Boston runs a patent pro bono program that helps provide financial assistance for "independent inventors and small businesses" who are unable to turn their ideas into reality by themselves.⁹⁸ Similarly, the Inventors Association of New England meets regularly in Cambridge to guide entrepreneurs through the process of navigating "licensing, intellectual property, prototyping, product development and marketing" endeavors.⁹⁹ There is a Patent and Trademark Resource Center at the Boston Public Library and at UMass Amherst, as well as other inventors' organizations throughout the region.¹⁰⁰

In terms of industry, Massachusetts' patents tend to innovate in chemical products, pharmaceuticals, electronics, and medical equipment.¹⁰¹ Massachusetts' research universities have a major role in facilitating knowledge creation in these fields, and in recent years Massachusetts has had five institutions (MIT, Harvard, UMass, Tufts, and Northeastern) in the global top 100 list of universities by number of U.S. patents granted.¹⁰² The Commonwealth is also making great strides in encouraging knowledge sharing via public funding.

3(B). *Research & Development expenditure*

Government spending for innovative research initiatives is another reliable indicator of a jurisdiction's commitment to novel ideas, methods, and processes. Massachusetts ranked second in R&D expenditure among the states in 2015, and a higher than average portion of this spending comes from private businesses, rather than the state or federal government.¹⁰³ Meanwhile, a fairly typical portion of this expenditure originates in university systems relative to other states, despite the overall higher availability of R&D funding in Massachusetts.¹⁰⁴

Surprisingly, only 21 percent of Massachusetts' R&D expenditure is in the health industry, far behind the national average of 43 percent.¹⁰⁵ However, this may speak to the economic diversity of the state's innovation economy, which includes a relatively larger role for technology and engineering. The media has given significant attention to R&D spending in the life sciences in the Boston area recently, given that many such companies prioritize the accumulation of knowledge over manufacturing.¹⁰⁶

Biotechnology and software development are also strong areas for new research.¹⁰⁷

Still, the Massachusetts Technology Collaborative has sounded the alarm on innovation economy job growth and venture capital investment growth in the state. Since many of the R&D-intensive firms in the Commonwealth are start-ups and small businesses, having the network to support them — especially in cutting-edge fields — requires a constantly evolving array of institutional resources. Post-secondary educational opportunities help provide this support network, and industry clustering and proximity can help increase the propensity for knowledge exchange within industries. Encouraging more highly localized specialization, such as that demonstrated by Cambridge's start-up culture and Waltham's Route 128 corridor, would help strengthen the R&D sector in the entire Boston area.

Compounding job growth concerns is an ongoing struggle to attract and retain skilled workers in Massachusetts.¹⁰⁸ Strong immigration rates have helped offset eight straight years of negative net domestic migration between 2011 and 2018, affirming the role that immigration plays in fostering international connections.¹⁰⁹ Immigration also allows Boston firms to draw from a larger talent pool for workers and students in innovative industries, and Boston's IT industry in particular is greatly dependent on the availability of H1-B visas for its continued growth.¹¹⁰ In turn, innovative industries increase Boston's global competitiveness.

Innovative industries also have the potential to support the resilience of Boston's economy through improvements

in the health of individual workers. Below, we examine the broader role that healthcare plays not only in Boston's economy but also in the personal wellbeing of residents.

4. Healthcare parameters

Openness and accessibility to healthcare for low-income and disabled people are both significant markers of a global city, and Boston's healthcare industry has made the city an appealing place to live for people with special needs. In fact, healthcare is one of the only major household expenses that is below the national average in Boston.¹¹¹ That said, healthcare costs continue to rise faster than incomes in Massachusetts, which particularly impacts the working and middle classes.¹¹² With the rapid population aging expected in the coming decades as baby boomers retire and become more dependent on government resources, the nature and extent of healthcare reform remains an open question.¹¹³

4(A). *Resident health outcomes*

Overall, the accessibility, affordability, and quality of healthcare are all paramount to Boston's vitality as a global city. In recent years, large healthcare insurers have made improvements in price transparency, which allows consumers to compare plans for value and thus facilitate competition among companies.¹¹⁴ Ultimately, an increase in price transparency should help keep prices at market value, preventing abuses of market power. Coupled with stronger antitrust action and the encouragement of market entrants, holding insurers accountable by providing consumers with required information will add competition, diversity, and efficiency to the industry.¹¹⁵

Not only should healthcare insurers have a more transparent relationship with consumers, but they should also communicate across institutions. Retail clinics have proven to be an accessible, low-cost alternative to expensive hospital and primary care provider treatment options, and record-sharing among these providers will improve the quality of care.¹¹⁶ This information exchange will also benefit providers by catalyzing the referral process and creating opportunities for "sister" institutions, as many hospitals now have associated "minute clinics."

Overall, Boston is poised to continue its generations-long commitment to high accessibility, affordability, and quality of healthcare despite rising costs and increased demand.

4(B). *National hospital rankings*

While the above reforms are focused mainly "inward" on present Massachusetts residents, Boston is also commendable for its specialization in building both a national and international reputation for its healthcare resources. In tandem with its focus on innovation, Boston "exports its skills" by drawing non-Bostonians to its hospitals for treatment, just as non-Bostonians flock to the region's universities.

Only 21 percent of Massachusetts' R&D expenditure is in the health industry, far behind the national average of 43 percent.¹⁰

Boston also exports its biomedical expertise more directly, by creating and selling new health technologies.”¹¹⁷ To many foreign citizens, Boston is seen as a destination for innovative treatments of rare conditions. The Boston Children’s Hospital’s international services program is a leading example of this touching connection Boston has with the world.¹¹⁸ In addition, both Massachusetts General Hospital and Brigham and Women’s Hospital made U.S. News’s 2019–20 “Honor Roll” list of best hospitals.¹¹⁹ MGH and B&WH also cracked the top five nationally for cardiology and cancer treatment, respectively.¹²⁰

Boston’s ability to “export” healthcare has cemented its reputation as a global city. However, there is a drastic need for improvement in another household budget item in Boston: transportation.

5. Transportation parameters

Relative to most parts of the United States, Boston has a high capacity for transit. The density and connectivity of the region not only justifies non-car forms of transportation, but many communities in eastern Massachusetts were built to primarily accommodate streetcars and railroads.¹²¹ In 2019, Boston had the third best public transportation in the U.S. according to Business Insider.¹²² Only New York City, Chicago, and Los Angeles transit agencies coordinate more commuter passenger trips than the MBTA.¹²³

However, much of the mid- and late-20th century was characterized by suburban expansion that increased the transit system’s debt.¹²⁴ Today, the Massachusetts Bay Transportation Authority has a maintenance backlog of over \$10 billion.¹²⁵ Rising costs, poor financing decisions, and insufficient ridership have left the MBTA with enough debt service to severely hamper its resources for further investment.¹²⁶ By some estimates, the MBTA loses about a dollar for every trip taken on its rail network, and bus networks have not responded well to population shifts.¹²⁷ Furthermore, continuing to foster a car-based culture is clearly not a spatially, environmentally, or economically sustainable alternative. Below, we examine how transportation policy reform could help better match the needs of residents, visitors, and businesses.

5(A). Infrastructure and accessibility

The MBTA has the potential to facilitate accessibility, economic activity, and social wellbeing in Boston. While ride-sharing services and rental cars are on the rise, the MBTA remains a major resource for tourists, students, and business-oriented visitors who help make Boston a global city. As Boston continues to welcome new residents, physical infrastructure improvements and increased accessibility

will not only reflect the need for expanding the capacity of transit corridors, but they will also play an active role in guiding growth in certain locations.

In other words, people may be induced to change their transportation habits if investment makes it more convenient for them to, say, take the train to work.¹²⁸ For example, the proposed construction of West Station in Allston would greatly increase that neighborhood’s accessibility to transit.¹²⁹ The MBTA can also work to improve accessibility at individual stations, especially for handicapped people. Many commuter rail stops currently lack at-grade platforms, instead requiring passengers to climb stairs to get on the train.¹³⁰

From an economic perspective, transit improvements can be seen as a way to support young and blue-collar workers who may be more likely to forego car ownership for financial reasons.¹³¹ Improving the flexibility of bus and paratransit routes, in addition to acting on demand assessments, will help fill in the gaps that large, fixed-route trains cannot provide.

5(B). Commuting convenience and congestion

Traffic delays, congestion, and parking woes are unnecessary taxes on Boston’s economy. The region has some 2.3 million daily commuters, a number that is only expected to grow in coming decades.¹³² The MBTA has had budgetary concerns for years, but many roads and bridges in Massachusetts are also in dire need of repairs.¹³³ Eventually, the Boston area will have to rely more on space-efficient forms of transportation — such as buses, bicycles, and trains — than private automobiles. However, this eventuality does not consign motorists to prohibitive traffic conditions, as safety improvements and congestion pricing on highways may help alleviate delays and facilitate efficiency.

Major highways and thoroughfares can use sensor-driven data to post “variable advisory speed limits” in response to traffic conditions.¹³⁴ Informing commuters of accidents and delays will allow traffic to adjust faster, and can also be disseminated using roadside technology.¹³⁵ Such technology may even be able to suggest alternative routes. Sensors are also useful for warning people of slippery or otherwise dangerous road conditions, which is especially relevant in New England’s wet, snowy climate. At local centers of commerce, technology and improved signage can guide people to unused parking spaces and, if necessary, verify compliance with congestion pricing systems.¹³⁶

5(C). International travelers

Despite the potential for improvements in the city’s street network, Boston’s role as a global city is more directly anchored by Logan International Airport, gateway to the

Both Massachusetts General Hospital and Brigham and Women’s Hospital made U.S. News’s 2019–20 “Honor Roll” list of best hospitals.¹¹⁹

city for most foreign businesspeople, tourists, and students. Logan fosters international connections to the city with its recent expansion of international flight offerings.¹³⁷

Eventually, the Boston area will have to rely more on space-efficient forms of transportation — such as buses, bicycles, and trains — than private automobiles.

However, inefficiency and delays are mounting concerns as Logan reaches the limit of its capacity.

Investments in strategies, personnel, and technology to expedite the security process will help facilitate an increase in capacity.¹³⁸

A simple expansion of the number of security lines is ideal, but not always possible. Automatic scanners will reduce the need for officials to manually monitor every item, while also saving time by

allowing previously contentious items — like laptops and liquids — to remain in suitcases. Facial recognition technology could also hasten the process of verifying identification.

Overall, Boston needs to take proactive steps to facilitate innovation in its transportation network in the same way it has in its major economic sectors (healthcare, technology, etc.). Transportation is an instrumental element of the resilience and efficiency found in global cities, both in the street network and between Boston and other major cities. Transportation networks not only facilitate economic activity but also leisure activities, healthcare accessibility, and educational opportunities.

Sociocultural opportunities

While sociocultural factors remain hard to measure objectively, they are nonetheless important to the international appeal of the Boston area. Within the context of the United States, Boston has a unique concentration of historical architecture

and institutions, such as the Freedom Trail and Faneuil Hall, that will continue to bolster the role of tourism in the economy.

Entertainment venues, recreational activities, and green space are also paramount to the quality of life experienced by residents and visitors. Boston may further invest in public art, pedestrian malls, studio spaces for creators, and other enhancements for recreational experiences. The Boston Harbor islands offer a great opportunity in this regard. Meanwhile, Massachusetts already designates 0.5 percent of major state-level development projects towards creating and maintaining public art, but Boston could go beyond this figure to demonstrate a commitment to placemaking.¹³⁹

Boston also benefits greatly from the national reputation of venues like the Museum of Fine Arts and Fenway Park. The restaurant scene has a prominent reputation, despite often being overshadowed by New York and even Portland, Maine, and prestigious regional shopping options such as Newbury St. help drive economic activity.¹⁴⁰ Boston also has a thriving hotel industry despite recent pressures from companies such as Airbnb.¹⁴¹

Boston falls behind in the global rankings largely because of the higher density of cultural interaction prevalent in much of Europe. Similarly ranked cities such as Amsterdam, Barcelona, and Vienna greatly overshadow Boston in this regard, and even New York can't compete with cities like London and Paris based on Kearney's measures of cultural experience.¹⁴² Still, there is a momentous market for tourism and recreation in Boston, and several other areas discussed more objectively above — transportation, education, infrastructure — can all help facilitate a more prominent role for Boston's sociocultural institutions on a global stage.

Boston falls behind in the global rankings largely because of the higher density of cultural interaction prevalent in much of Europe.

Conclusion

In a rich variety of ways, Boston already is a global city. It counts several world-class institutions among its many colleges and universities. Its commitment to research-oriented fields has transformed the region into a globally important hub of innovation with standout finance, education, healthcare, and technology sectors. The city has long been invested in efforts to develop the skills and foster the talents of its citizens, and this commitment to human capital has given Boston the workforce it needs to become a global leader among knowledge and service-based economies in the coming decades.

Many of the city's shortcomings as a global competitor concern issues of equity, accessibility, and efficiency, whether in education, transportation, or the labor

market. Infrastructure requires significant additional investment in Massachusetts to facilitate the fluidity of its dense concentration of economic activity while minimizing delays. Boston must also apply its innovative streak to improving transportation, preparing for labor market shifts, and ensuring educational opportunities for children of all backgrounds. Free-market solutions to fill gaps in healthcare and housing, combined with carefully orchestrated public funding for education reform, small business support, and sustainable transportation, have the potential to give Boston a renewed status on the global stage. The ultimate goal is not simply to rise in the Kearney rankings; it is to continue to build a city that has all of its values and ambitions embodied in its form and function.

Appendix A: Criteria for evaluating global city by section

- 1(A). Prevalence of top universities; propensity for attracting and retaining international students
- 1(B). Employment outlook among university students; proficiency of skills matching between workers and jobs
- 1(C). Comparative performance on standardized tests in primary and secondary schools
- 1(D). Levels of civic and political engagement among students and young people
- 2(A). Specialization in financial services, consulting, technology, and other tradable industries
- 2(B). Total value and diversity of the export sector
- 2(C). Concentration of business support services
- 2(D). Relatively rapid recovery from labor and financial market shocks; reductions in income and health outcome inequality
- 2(E). Minimization of health, safety, and economic costs of aging and structurally deficient public infrastructure
- 2(F). Provision of safe, high-quality, and affordable housing that satisfies market demand
- 3(A). Patents filed per capita
- 3(B). Research & Development expenditure
- 4(A). Increased life expectancy and healthcare coverage
- 4(B). Quality and extent of services in major hospitals
- 5(A). Structurally safe and multimodal transportation infrastructure; maintenance and repairs keep up with demand in a non-disruptive manner
- 5(B). Minimization of commute times and economic costs of traffic congestion
- 5(C). Increased regional capacity for international transportation connections

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About Pioneer

Pioneer Institute is an independent, non-partisan, privately funded research organization that seeks to improve the quality of life in Massachusetts through civic discourse and intellectually rigorous, data-driven public policy solutions based on free market principles, individual liberty and responsibility, and the ideal of effective, limited and accountable government.

