

# **Learning from Boston: Implications for Baltimore from Comparing the Entrepreneurial Ecosystems of Baltimore and Boston**

---

*A report for The Abell Foundation prepared by Sean Pool and Matt Van Itallie, Canterbury Road Partners*

## Table of Contents

Executive Summary .....	4
Preface .....	6
Methodology and Structure of the Report .....	7
Limitations of this Report, and Statement of Potential Conflict of Interest.....	8
Terminology .....	9
Framework: Logic Model of an Entrepreneurial Ecosystem.....	10
Actors .....	11
Resources .....	12
Outputs .....	12
Environmental Factors .....	13
Evaluation Criteria.....	13
Outputs of the Entrepreneurial Ecosystem .....	14
Actors in the Entrepreneurial Ecosystem .....	16
1. Active and Potential Entrepreneurs.....	16
Definition and context .....	16
Data review .....	16
Detail on selected Boston programs and institutions:.....	20
2. Experienced Mentors.....	22
Definition and context .....	22
Data review .....	23
Detail on selected Boston programs and institutions:.....	24
3. Investors.....	25
Definition and context .....	25
Data review .....	26
4. Universities.....	31
Definition and context .....	31
Data review .....	32
Detail on selected Boston programs and institutions:.....	38
5. Established Technology Companies.....	39
Definition and context .....	39
Data review .....	39
6. Support Platforms.....	42
Definition and context .....	42
Data review and detail on selected Boston programs:.....	44
7. Cheerleaders .....	46
Definition and context .....	46
Data review .....	47
Detail on selected Boston programs and institutions:.....	48
Environmental Factors of the Entrepreneurial Ecosystem .....	49
1. Policy incentives .....	49
2. Density and transportation .....	51
Definition and context .....	51
Data review .....	52
3. Culture and Creativity .....	54
Definition and context .....	54

Data review and summary .....	54
Comparisons of the Entrepreneurial Ecosystems .....	54
Boston’s entrepreneurial ecosystem is “Established.” .....	54
Baltimore’s entrepreneurial ecosystem is “Emerging,” and has the potential to become “Established.” .....	56
Specific comparisons .....	58
Guiding Principles for Recommendations .....	58
1. Invest in core activities.....	59
2. Go short and go long.....	59
3. Make the most of existing assets. ....	59
4. Think holistically. ....	59
5. Look at the bang for the buck. ....	59
Recommendations .....	60
1. Create, find or hire more entrepreneurs. ....	61
2. Expand early stage investment.....	62
3. Identify and codify existing entrepreneurship ecosystem-related programs and projects.....	63
4. Create an Innovation District. ....	63
5. Leverage existing pools of technology.....	64
6. Consider regulatory and tax reforms.....	64
7. Pursue short-term investments in supporting public transit. ....	65
8. Invest in measurement of Baltimore’s entrepreneurial ecosystem.....	65
9. Consider an “Entrepreneurial Moon Shot”—a dramatic, comprehensive investment in Baltimore’s entrepreneurial ecosystem.....	66
Attachment A: List of Baltimore startups. ....	67
Attachment B: Interviewees .....	70
Attachment C: Potential Areas of Additional Study .....	71
Attachment D: List of Organizations Identified in Baltimore and Boston Entrepreneurial Ecosystems (Excluding Startup Companies) .....	72
Attachment E: Selected Bibliography .....	78
Endnotes .....	83

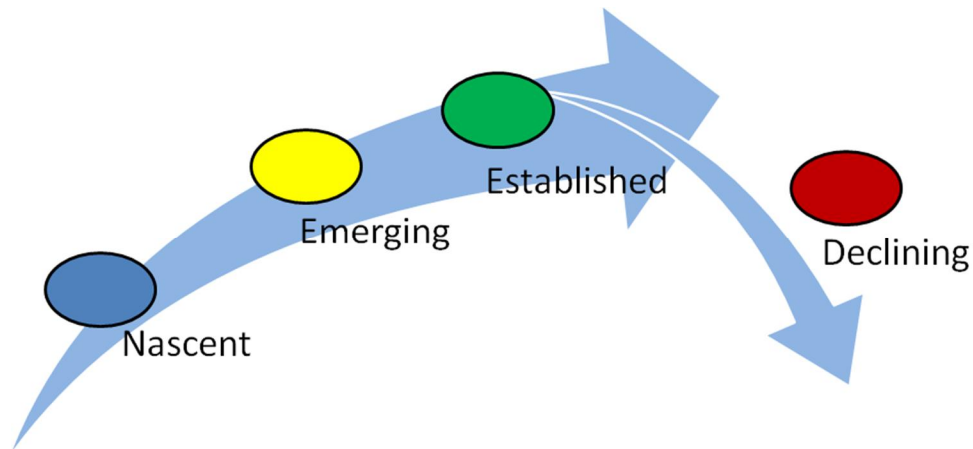
## Executive Summary

This Abell Foundation report analyzes the *entrepreneurial ecosystems* of Baltimore and Boston. “Entrepreneurial ecosystems” refer to the individuals and organizations that create new businesses, products and services.

This report answers three main questions:

- What are the major characteristics of Baltimore and Boston’s current entrepreneurial ecosystems?
- What are the specific details of some of the institutions in Boston’s entrepreneurial ecosystem?
- What are the implications from Boston’s experience and from a broader literature review for Baltimore as it considers investments in its entrepreneurial ecosystem?

Entrepreneurial ecosystems can be classified into one of four stages of a “life cycle”: Nascent, Emerging, Established, or Declining.



Baltimore and Boston data was collected on seven types of actors involved in entrepreneurial ecosystems: active and potential entrepreneurs, mentors, investors, universities, large companies, support platforms, and cheerleaders.

The report includes brief explanations of several Boston institutions involved in the entrepreneurial ecosystem: ONEin3 Boston, Stay in MA, The Boston Innovation District, MIT Venture Mentoring Service, Venture Well/Village Capital, TechStars Boston, BU Kindle, Venture Development Center at the University of Massachusetts Boston, the Massachusetts Technology Transfer Center (MTTC), MassChallenge, the Cambridge Innovation Center (CIC), and Greenhorn Connect.

This report finds that:

- Boston’s entrepreneurial ecosystem is “Established.” Boston has the actors needed for success in abundance and those actors are well connected by information-sharing platforms, frequently collaborating to share technology, talent, and capital to create new startups.
- Baltimore’s entrepreneurial ecosystem is “Emerging,” and has the potential to become “Established.”

Specific comparisons between the two cities include:

- Boston has more startups: 1,647 startups were identified in Boston compared to an estimate of 345 organizations in Baltimore.
- Baltimore has fewer potential entrepreneurs than Boston. For example, in Boston, more than one in three residents is between 20 and 35 years old, an age range particularly likely to engage in entrepreneurship. In Baltimore, the figure is closer to one in four.
- There is more investment in Boston in entrepreneurial ventures than in Baltimore.
- There are fewer established high-growth firms in Baltimore.
- Flows of resources from university into the entrepreneurial ecosystem are stronger in Boston than they are in Baltimore.
- Boston has greater effective population density, due in part to its transit system.
- Both cities have strong support platforms for entrepreneurship and strong cheerleaders of entrepreneurial activities. More than 200 organizations active in the two cities’ entrepreneurial ecosystems were identified.
- Both cities have strong arts and cultural resources that help support an entrepreneurial ecosystem.

The report concludes that Baltimore should consider nine interventions to accelerate the City’s entrepreneurial ecosystem over the next six to 18 months.

Name	Size of impact	Ease of implementation
1. Create, find or hire more entrepreneurs.	High	Medium
2. Expand early stage investment.	High	Medium
3. Identify and codify existing entrepreneurship ecosystem-related programs and projects.	Low	High
4. Create an Innovation District.	Medium	High for initial stages/ Low for follow-on stages
5. Leverage existing pools of technology.	Medium	Medium
6. Consider regulatory and tax reforms.	Medium	Medium
7. Pursue short-term investments in supporting public transit.	High	Medium
8. Invest in measurement of Baltimore’s entrepreneurial ecosystem.	Low	High
9. Consider an “Entrepreneurial Moon Shot”—a dramatic, comprehensive investment in Baltimore’s entrepreneurial ecosystem.	High	Low

## Preface

Startup companies are a significant source of U.S. economic growth. According to the Ewing Marion Kauffman Foundation, “net job growth occurs in the U.S. economy only through startup firms.”<sup>1</sup>

For this reason, national, state, and civic researchers, policymakers and stakeholders have focused their attention, in recent years, on understanding what startups are, how they work, and how they can be attracted and cultivated. Startup America, for example, has examined startup firms and entrepreneurship exclusively through the lenses of economic and jobs growth.<sup>2</sup> The Brookings Institution<sup>3</sup> and the Center for American Progress<sup>4</sup> have looked at startup formation trends from the perspective of their role in driving technology innovation. Compelling books from leading thinkers, including Rob Atkinson of ITIF,<sup>5</sup> Brad Feld of the Foundry Group,<sup>6</sup> and Richard Florida of the Martin Prosperity Institute,<sup>7</sup> have also laid out analyses and prescriptions.

One thing that nearly all analyses agree on is that startup companies have a tendency to “cluster” within “startup communities” or “entrepreneurial ecosystems.”<sup>8</sup> This creates a virtuous cycle: Entrepreneurship leads to more entrepreneurship, and the entrepreneurial ecosystem can deliver substantial economic development, as well as wealth and job creation.

For many policymakers, then, the question is raised: “How can *my* community enter this prosperous cycle by building our entrepreneurial ecosystem?” In particular, communities with assets relevant to an entrepreneurial ecosystem—for example, innovations and innovators at large research institutions—may wonder whether those assets could be brought to bear on economic development.

These national questions have also been asked in the Baltimore region, due in part to a broad and committed set of stakeholders, who have set out ambitious goals, undertaken substantial projects and programs, and achieved success in strengthening Baltimore’s—and Maryland’s—entrepreneurial ecosystems. An incomplete list of these goals, efforts and results would include: the rise of EdTech and cybersecurity communities in the City; the University of Maryland’s bold entrepreneurship goals; Governor O’Malley’s statewide policy leadership on innovation, including the Maryland Venture Fund and the Maryland Innovation Initiative; Mayor Rawlings-Blake’s expansion of AccelerateBaltimore; the launch and expansion of organizations such as Betamore, Bio Health Innovation, the Foundry and TechBreakfast; TEDCO’s regional leadership on commercialization; and the substantial successes of the Johns Hopkins University and the Applied Physics Lab in accelerating technology commercialization.

Baltimore’s interest in innovating, and supporting innovation, is almost palpable—from the energy associated with TedxBaltimore and Ignite Baltimore, to the wealth of organizations and individuals tackling new solutions to community challenges.

In response to this interest and these questions, The Abell Foundation has commissioned a series of reports analyzing the local entrepreneurial ecosystem. Earlier this year, the Foundation released a two-part report created by the Innovation Alliance that assessed regional participants’ perspectives on entrepreneurship and innovation, and made recommendations to address related facility needs.<sup>9</sup> Another report examined employment trends for cybersecurity.<sup>10</sup>

This report compares the state of Baltimore’s entrepreneurial ecosystem to Boston’s, a relevant comparison based on demographics, assets, and desired end state.

It also illustrates some of the important similarities and differences between the two regions, with respect to their innovation ecosystems, and suggests potential recommendations for “the City of Baltimore,” or simply, the “City”—which, throughout this report, refers to private, public and nonprofit organizations and individuals in the greater Baltimore region—to consider.

This report concludes that Baltimore is an “Emerging” Ecosystem—further along than “Nascent,” but not yet “Established.” However, the City has the necessary building blocks to cultivate an “Established” entrepreneurship ecosystem.

## Methodology and Structure of the Report

This report tested the hypothesis that Boston has a larger number of startups, entrepreneurs, and entrepreneurial veteran mentors than Baltimore. The research supported this hypothesis. Given this finding, the follow-up question became how can Baltimore catch up quickly.

Specifically, this report answers three main questions:

- What are the major characteristics of Baltimore and Boston’s current entrepreneurial ecosystems?
- What are the specific details of some of the institutions in Boston’s entrepreneurial ecosystem?
- What are the implications from Boston’s experience and from a broader literature review for Baltimore as it considers investments in its entrepreneurial ecosystem?

Five methods were used to research and create this report:

- First, **quantitative demographic, financial, socioeconomic, and innovation-related information** was analyzed to determine the macroeconomic context, and to assess the limitations and opportunities of comparing these regions. Data was collected from a range of sources, including the U.S. Census Bureau, the Bureau of Economic Analysis, the Association of University Technology Managers, the Harvard Cluster Mapping Project, and the National Venture Capital Association.<sup>11</sup>
- Second, a **literature review** was conducted. This included theory and evidence about innovation, entrepreneurial ecosystems, clusters, and entrepreneurship, as well as interventions underway—primarily in Boston, but also in other communities around the U.S. and the globe.
- Third, the research team conducted interviews with 12 members of the **entrepreneurial ecosystems in Boston and Baltimore**, to understand the current situation and the state of current and potential interventions. See Attachment B.
- Fourth, **more than 200 specific organizations** active in the two cities’ entrepreneurial ecosystems were identified and catalogued.
- Fifth, an estimate of the **number of startups in Baltimore** was created based on consolidating nine lists from Baltimore stakeholders.

An overarching framework, or logic model, was developed, based on a synthesis of the literature, to explain and diagnose entrepreneurial ecosystems. That framework was then used to structure the findings and recommendations.

The remainder of this report is organized as follows:

- First, a *terminology* section identifies important terms such as “innovation” and “startups.”
- Then, a *logic model* of entrepreneurial ecosystems is presented, developed for this report.
- The following sections provide detail on *Outputs*, *Actors*, and *Environmental Factors*. Resources, another element of the logic model, are included in discussion of other sections, for clarity’s sake. The focus, and bulk of the report, explores and assesses Actors. Short case studies are presented of Boston-based organizations.
- The report then summarizes the *comparisons* across these categories.
- *Guiding principles* are provided for developing and assessing interventions to strengthen entrepreneurial ecosystems.
- Finally, specific *recommendations* are presented for consideration to strengthen Baltimore’s entrepreneurship ecosystem, prioritized by size and ease of impact.

Attachments then provide a list of Baltimore startups (Attachment A), report interviewees (B), potential areas of additional study (C), a list of organizations identified in Baltimore and Boston entrepreneurial ecosystems (D), and a bibliography (E).

Attachments include the list of Baltimore startups, interviewees, a bibliography, potential areas of future study, and a full list of Boston venture capital firms.

## Limitations of this Report, and Statement of Potential Conflict of Interest

Limitations of this report include:

- This is a static report, intended to provide accurate information as of May-June 2013, or the most recently available relevant dataset.
- This study focused on the current state of entrepreneurial ecosystems, rather than a historical view. Understanding changes over time of the cities’ entrepreneurial ecosystems is a relevant and important question—and is suggested in Attachment C as a potential area of additional study. But most importantly for the Baltimore ecosystem, and thus the focus of this report, are the following considerations: (a) where are the entrepreneurial ecosystems today, and (b) what steps should Baltimore take today to strengthen its entrepreneurial ecosystem?
- This report should not be seen as a comprehensive collection of the viewpoints of all relevant stakeholders in either city. In Baltimore, hundreds if not thousands of people could have made a meaningful contribution to this report. Instead, this list should be considered a sampling of relevant perspectives. Possible methods to expand the dialogue are included in the Recommendations section.



Statement of Potential Conflict of Interest:

Baltimore-based Canterbury Road Partners' principal line of business is technology transfer support services. The firm is engaged in technology licensing, entrepreneur recruitment, and intellectual property analysis in Maryland and across the country.

## Terminology

Several terms that are used throughout this report are defined here.

**“Baltimore”** and **“Boston.”** The common understanding of Boston as an entrepreneurial ecosystem includes Cambridge, in large part for the vibrant economic activity surrounding MIT and Harvard. Therefore, whenever possible, data were collected and compared from the political boundaries of the City of Baltimore and the Cities of Boston and Cambridge.

As noted above, the cities' names in this report refer to private, public and nonprofit organizations and individuals in the relevant geographic regions.

The literature review found that a *regional* definition of a City can be appropriate for evaluating the state of the entrepreneurial ecosystems, and is especially appropriate for considering potential interventions. With that in mind, the common use of “Baltimore” in this report is an informal regional definition. In addition to the political limits of Baltimore City, it includes the citizens, businesses and organizations who define themselves as part of the Baltimore community. Specific, nested definitions of Baltimore and its surrounding communities used in this report include political limits only; political limits plus Towson<sup>12</sup>; political limits plus all immediately surrounding communities and institutions (e.g., Towson, Hunt Valley, UMBC); Central Maryland (e.g., including USM's College Park); and the greater Mid-Atlantic region, including central/Southern Maryland, Washington D.C. and its suburbs, and northern Virginia. Specific geographical boundaries for data used are noted.

The geographic scope of entrepreneurial ecosystems has also varied in other analyses—from a national or even multi-national level<sup>13</sup> to focusing on a single research institution.<sup>14</sup>

**“Innovation”** and **“entrepreneurship.”** These terms are used interchangeably in this report. They refer to the creation of new private-sector economic activity, specifically through the revenue from, and financial investment in, the creation of new products, services, and approaches.

This is a particular definition of these two terms, of course. It is based on the definition from economist Joseph Schumpeter that innovation is the creation of something new of private-sector value.<sup>15</sup> One implication of this definition is that public-sector creativity and nonprofit creativity are excluded. While they can be contributors to private-sector creative activity, and are undeniably important for the health of a region, they are not the “thing itself” when it comes to innovation for this report.

A second implication is this definition includes all forms of private-sector investment and revenue generation, regardless of whether or not it is based on a new technology such as a patent or laboratory discovery. From the perspective of strengthening a city, all forms of private-sector investment and revenue generation can be considered to contribute. To make this specific, it does not matter for the

purposes of this report that Under Armour has achieved success through advances in intellectual property, sales and marketing efforts, or thoughtful leadership, or (as is indeed the case) a combination of all three—what matters is that Under Armour has generated tremendous economic impact.<sup>16</sup>

**“Entrepreneurial ecosystems,” “innovation ecosystems” and “startup communities.”** These terms are used widely in various bodies of academic and policy literature, and there is no single definitive definition.<sup>17</sup> In Brad Feld’s recent book *Startup Communities*, for example, the ecosystem interventions he envisions are focused strongly on how to optimize entrepreneurial ecosystems for the benefit of the entrepreneurs’ own pursuit of creativity. Broader economic outcomes in his model are not the focus, and as such he divides the involved actors into only two broad categories: leaders and feeders. Richard Florida, scholar and Executive Director of the Martin Prosperity Institute, similarly places more emphasis on creativity and culture.

For this report, these terms are used interchangeably to refer to *a collection of actors engaging in activities that lead to new investment and revenue generation through the creation of new private-sector products, services, or business models.*

**“Startups.”** Even a term seemingly as straightforward as “startups” can be challenging to define. Does a small-scale microbrewery count? A bagel shop? A sole-proprietorship Web design firm? Does it need to involve technology, or can it sell a simple product? What about a service?

Paul Graham, founder of Y-Combinator, a nationally leading startup incubator, defines a startup company as:

“A startup is a company designed to grow fast. Being newly founded does not in itself make a company a startup. Nor is it necessary for a startup to work on technology, or take venture funding, or have some sort of ‘exit.’ The only essential thing is growth. Everything else follows from growth.”<sup>18</sup>

This report generally defines “startups” as the companies that are created with the intention of achieving fast growth. This includes (a) companies that self-identify as startups, for example, by signing up through a website or other organization, and (b) companies that have grown substantially large and are included in larger data, e.g., the Inc. 5000. Fast growth typically requires products and services to be aimed at national or global markets, not exclusively local ones, so restaurants and bagel shops, for example, would not generally be considered startup companies under the definition used in this report. It is important to note that some of the findings in this report do also apply to these businesses as well. Recommendations that aim at “high-growth” entrepreneurs will also benefit local small businesses owners. However, the logic framework and analysis focus on high-growth startups.

## **Framework: Logic Model of an Entrepreneurial Ecosystem**

A “logic model” is a theoretical tool to understand the relationship between inputs and outputs.<sup>19</sup>

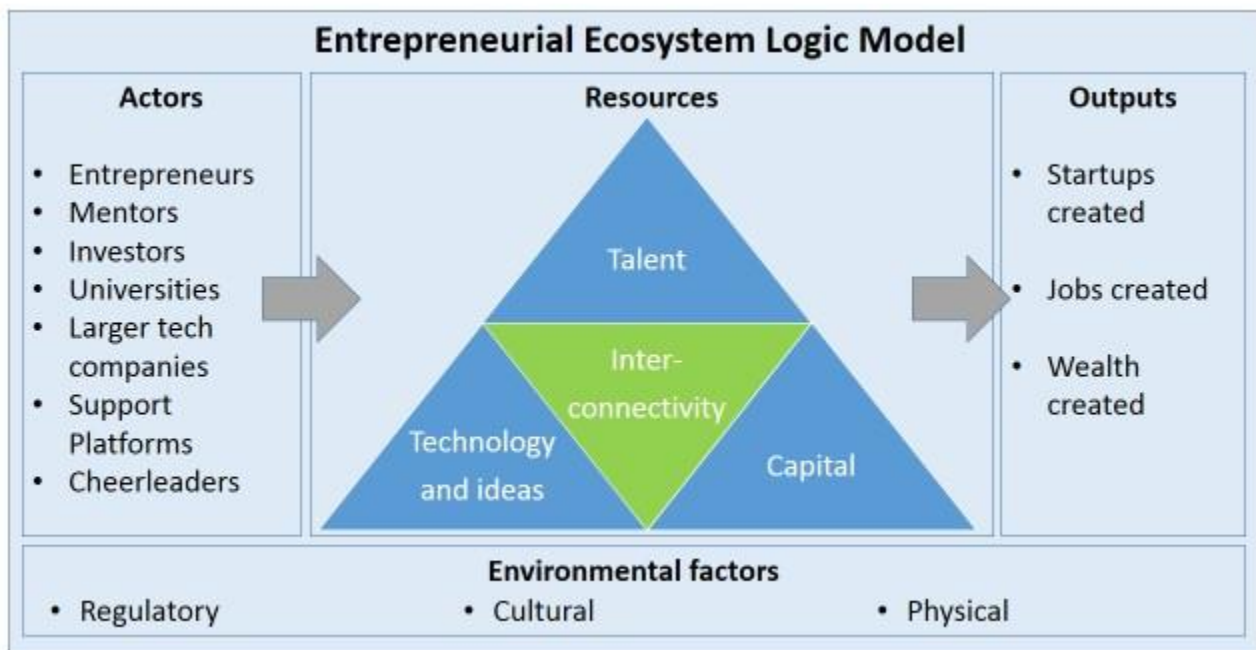
This report’s logic model for entrepreneurship ecosystems, based on a literature review and synthesis, structures the connection between four “ingredients”:

- **Actors:** individuals or institutions, such as investors, and mentors, who participate directly or indirectly in entrepreneurship and innovation. Seven categories of actors are identified.
- **Resources:** the four elements that actors in the ecosystem use to transform ideas into value.
- **Outputs:** the most important measurements of the effectiveness of an entrepreneurial ecosystem.
- **Environmental Factors:** background conditions of the ecosystem, such as culture and policy environment that substantially affect actors, resources, and outputs.

This entrepreneurial ecosystem logic model assumes that *actors* create, use, and exchange *resources*, within an *environment*, to create desired *outputs*. By better understanding *who* the actors are; *how* they create, use, and exchange *resources*; and how these activities are influenced by their *environment*, the model seeks to create insight for where targeted interventions can be made to increase the desired output.

The model can be illustrated as follows:

Figure 1



### Actors

This report groups actors—people and institutions—involved with entrepreneurial ecosystems into seven broad categories. It also intentionally does not distinguish between individuals and institutions, but rather focuses on how they interact with one another.

1. **Active and potential entrepreneurs** are presently engaged in building a startup (active), or are considering becoming involved in a startup (potential).
2. **Mentors** have built, led or advised successful businesses and organizations in the past, and can provide guidance and advice for first-timers.

3. **Investors** are actively invested in, or seeking to invest in, startup companies.
4. **Universities** refer to faculty and researchers, students, technology, and programming. National laboratories are included in this definition.
5. **Large companies** often serve as sponsors of entrepreneurship, whether through upfront investment, or eventual exit. Large tech companies also serve as anchors for a talent pool that can be leveraged by the startup community, as skilled Web developers, engineers, and other professionals ‘spin out’ or ‘spin in’ back and forth with large companies.
6. **Support platforms** are organizations and institutions—whether government, for-profit, or nonprofit—that help facilitate the flows of technology, talent, and capital among and between stakeholders. Examples include startup accelerators, incubators, co-working spaces, and networking event organizers.
7. **Cheerleaders** connect the exchange of knowledge, ideas, and deals among ecosystem participants. Cheerleaders are important contributors to network connectivity.

## Resources

The four most important resources of an entrepreneurial ecosystem are talent, capital, ideas and technology, and the interconnectivity between actors.

1. **Talent** and “human capital” are used interchangeably.<sup>20</sup> This category includes the entrepreneurial and business skills of stakeholders, as well as technical skills such as research, software engineering, and design.
2. **Capital** is funding for innovative ventures, such as grants, equity, and debt. Capital can come from both public, nonprofit and private sources.
3. **Ideas and technology** are the kernels of new businesses. They can be as simple as a new solution to a customer need, or as sophisticated as a cluster of biotechnology patents.
4. **Interconnectivity** is the sharing and exchange of these other three resources between actors. It is so fundamental to a functioning entrepreneurial ecosystem that it is noted as a resource in and of itself. An entrepreneurial ecosystem in which each of the actors had zero awareness or relationship with each other actor would not function. Hypothetically, an ecosystem in which every actor had 100 percent awareness of all other actors and opportunities would function perfectly.

These four resources, and how they are *used*, *created*, and *exchanged* among ecosystem actors, underlie the analysis throughout the rest of the report.

## Outputs

The entrepreneurial ecosystem logic model looks at three outputs:

- Number of startups created—as noted above, companies created with the intention of becoming high growth
- Number of jobs created
- Amount of wealth created

This is a short list, aimed at action. Limiting the number of outputs increases the likelihood that the Return on Investment (discussed in the conclusion) can be measured, and that stakeholders and

supporters of the entrepreneurial ecosystem can stay laser-focused on the most important interventions.

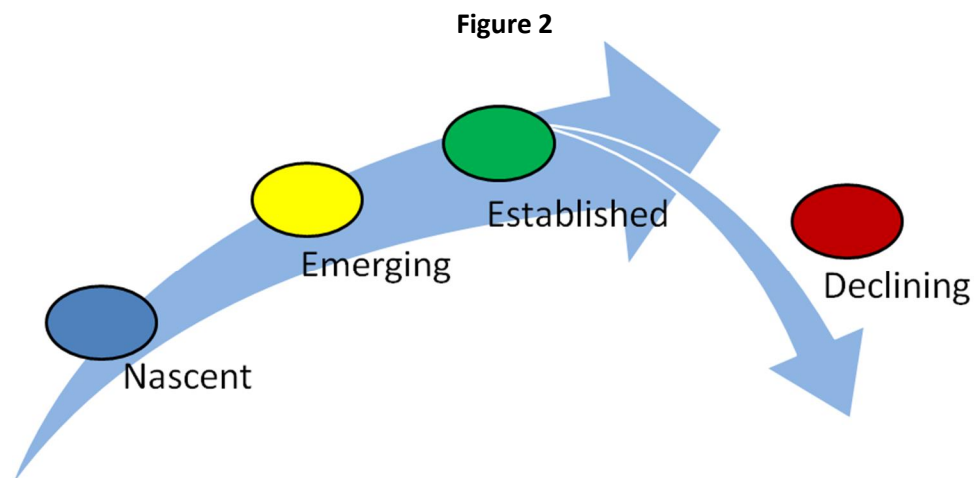
### Environmental Factors

Environmental factors are background conditions of the entrepreneurial ecosystem. They include the cultural environment (such as the presence of a high-quality arts or restaurants scene), the regulatory environment (such as tax incentives for small companies), and the physical environment (such as density and the availability of effective transportation networks).

### Evaluation Criteria

This logic model can be used to answer the questions posed in this report.

Question 1—what are the major characteristics of Baltimore and Boston’s current entrepreneurial ecosystems?—can be answered by reviewing both cities’ *actors, resources, outputs* and *environmental factors*. Entrepreneurial ecosystems, like the companies and technologies that comprise them, have a life cycle that can be envisioned in four stages: Nascent, Emerging, Established, and Declining.<sup>21</sup>



The groupings provide structure for Question 2: What are the specific details of some of the institutions in Boston’s entrepreneurial ecosystem? Question 3—what are the implications from Boston’s experience for Baltimore as it considers investments in its entrepreneurial ecosystem?—can be answered through the review of each cities’ resources and assets. Specific interventions for Baltimore come both from Boston’s experience as well as the larger literature review.

This structure also helps prioritize the recommendations. Actors in *highly connected* ecosystems with high levels of *talent, technology, and capital* produce more and better entrepreneurial outputs, so recommendations should be aimed at these areas.

## Outputs of the Entrepreneurial Ecosystem

This section presents evidence of the outputs of the entrepreneurial ecosystems, companies, jobs and wealth. The challenges encountered in collecting this information lead to one of this report's recommendations: to codify existing entrepreneurship ecosystem-related programs and projects.

**Startups.** Quantifying the number of startups is difficult due to churn (startups are created and closed) and self-selection (whether or not one intends a company to be a high-growth company).

The count of Boston-area startups is based on the Boston Area Startups website.<sup>22</sup>

The count of Baltimore-area startups—including startups at Towson, UMBC, and College Park—is based on nine sources:

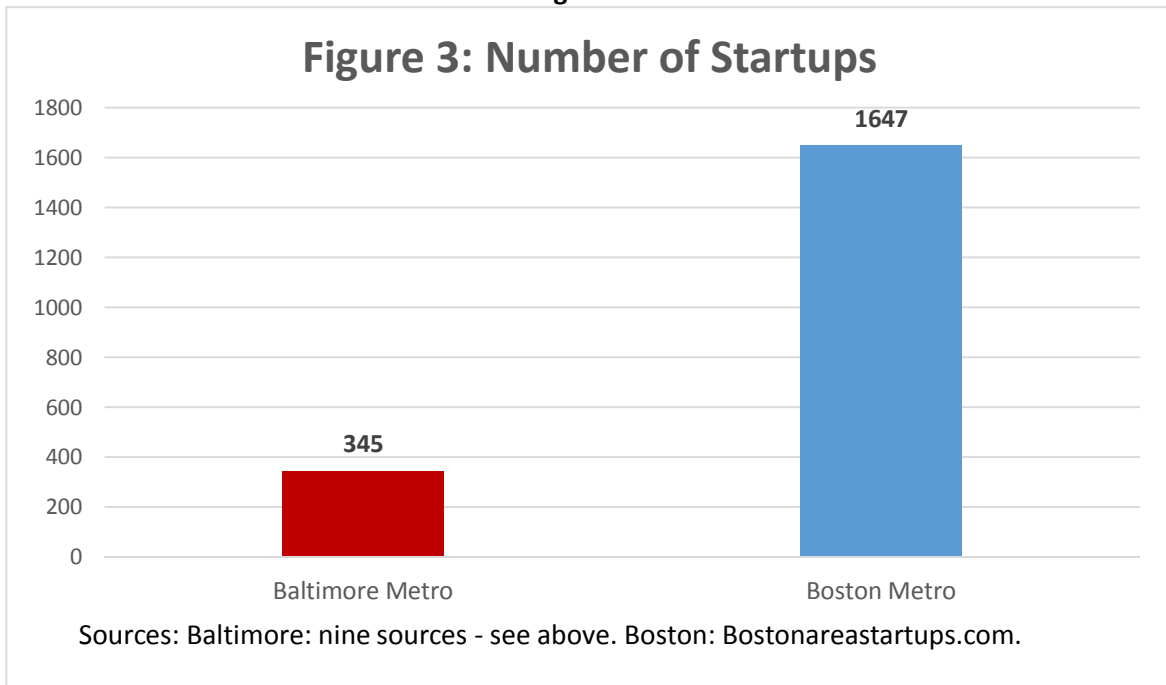
1. Listing on Baltimoretech.net
2. Tenancy at bwtech<sup>23</sup>
3. Membership/association with Emerging Technology Centers (ETC)<sup>24</sup>
4. Listing on document maintained by former *Baltimore Sun* writer Gus Sentementes<sup>25</sup>
5. Tenancy at Maryland International Incubator<sup>26</sup>
6. Tenancy at Mtech<sup>27</sup>
7. Tenancy at Towson Global<sup>28</sup>
8. Tenancy at University of Maryland BioPark<sup>29</sup> or
9. Participation in Wasabi Ventures accelerator<sup>30</sup>

Organizations that were clearly not startup companies—e.g., local, state and national government agencies; large established companies; and research centers—were excluded from the list. In general, companies were included rather than excluded. Organizations that appeared on multiple lists were only counted once.

This methodology estimates there are 345 startups in the Baltimore region. The full list is included in Attachment A. This method undercounts Baltimore startups by excluding those not affiliated with one of the above lists, and may over-count by including some organizations that can no longer be considered startups.<sup>31</sup>

Using these definitions, as the following chart illustrates, Boston has four-and-a-half times as many startups as Baltimore.

Figure 3



**Geographic scope:** Self-identified members of each metropolitan area.

The types of startups created are also of interest. Baltimore has expertise in EdTech, life sciences, cybersecurity, drug and medical devices, mobile IT, gaming, health IT, and advertising.<sup>32</sup>

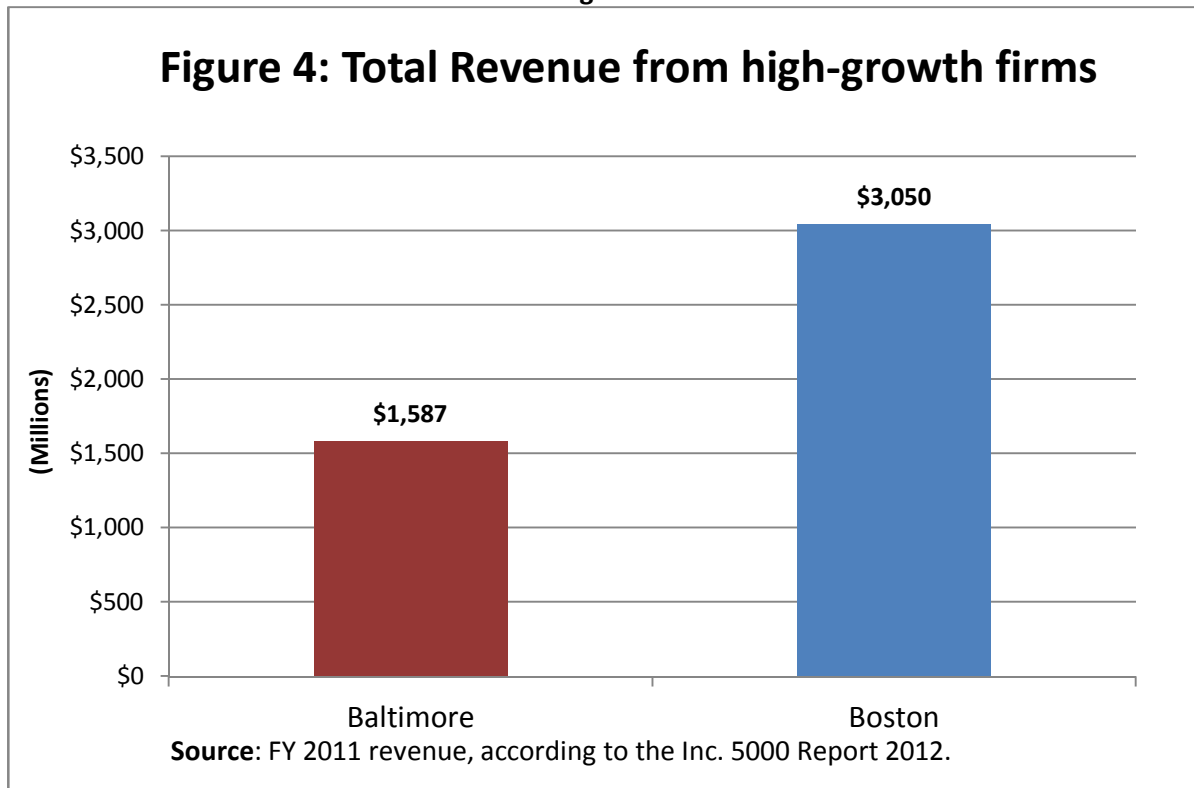
**Summary of Startups.** Boston's ecosystem is "Established" on this dimension, and Baltimore's is "Emerging." Baltimore has fewer startups than Boston.

**Jobs.** A specific count of jobs in startups was not identified. A proposal to resolve this data gap is suggested in the Recommendations.

A proxy method is to extrapolate from the number of startups, adjusting for industry type and revenue. An alternative, but still proxy, method is to look at the number and percent of high-technology jobs relative to total population. That second definition substantially over-counts employment, as it includes high tech employment in medium or large firms. In the absence of other available data, however, it may provide a very rough estimate for comparing communities or changes over time. By this proxy measure, Boston has a higher concentration, with nearly 5,000 people currently employed in "high-tech" for every 100,000 residents, compared to 3,000 per 100,000 in Baltimore.<sup>33</sup> In absolute terms, Baltimore had 31,599 high-tech jobs in 2012, one-fourth of Boston's 132,761.<sup>34</sup>

**Wealth Creation.** One proxy for wealth creation is the revenue of the companies listed in the Inc. 5000 list of high-growth companies in each city.<sup>35</sup> Firms in the Boston entrepreneurial ecosystem earn just over \$3 billion in revenue, compared to \$1.6 billion in Baltimore.<sup>36</sup>

Figure 4



**Geographic scope:** MSA.

**Summary of Jobs and Wealth.** Boston’s ecosystem is “Established” on this dimension, and Baltimore’s is “Emerging.” Baltimore has fewer jobs in startups, and less wealth is created. This is an area in particular need for greater data collection.

## Actors in the Entrepreneurial Ecosystem

The following section provides additional detail on the seven types of actors discussed above: Active and Potential Entrepreneurs, Investors, Mentors, Universities, Support Platforms, Large Companies, and Cheerleaders.

### 1. Active and Potential Entrepreneurs

#### Definition and context

In the logic model, entrepreneurs are the talent *resource* and also create startups, an *output*.

#### Data review

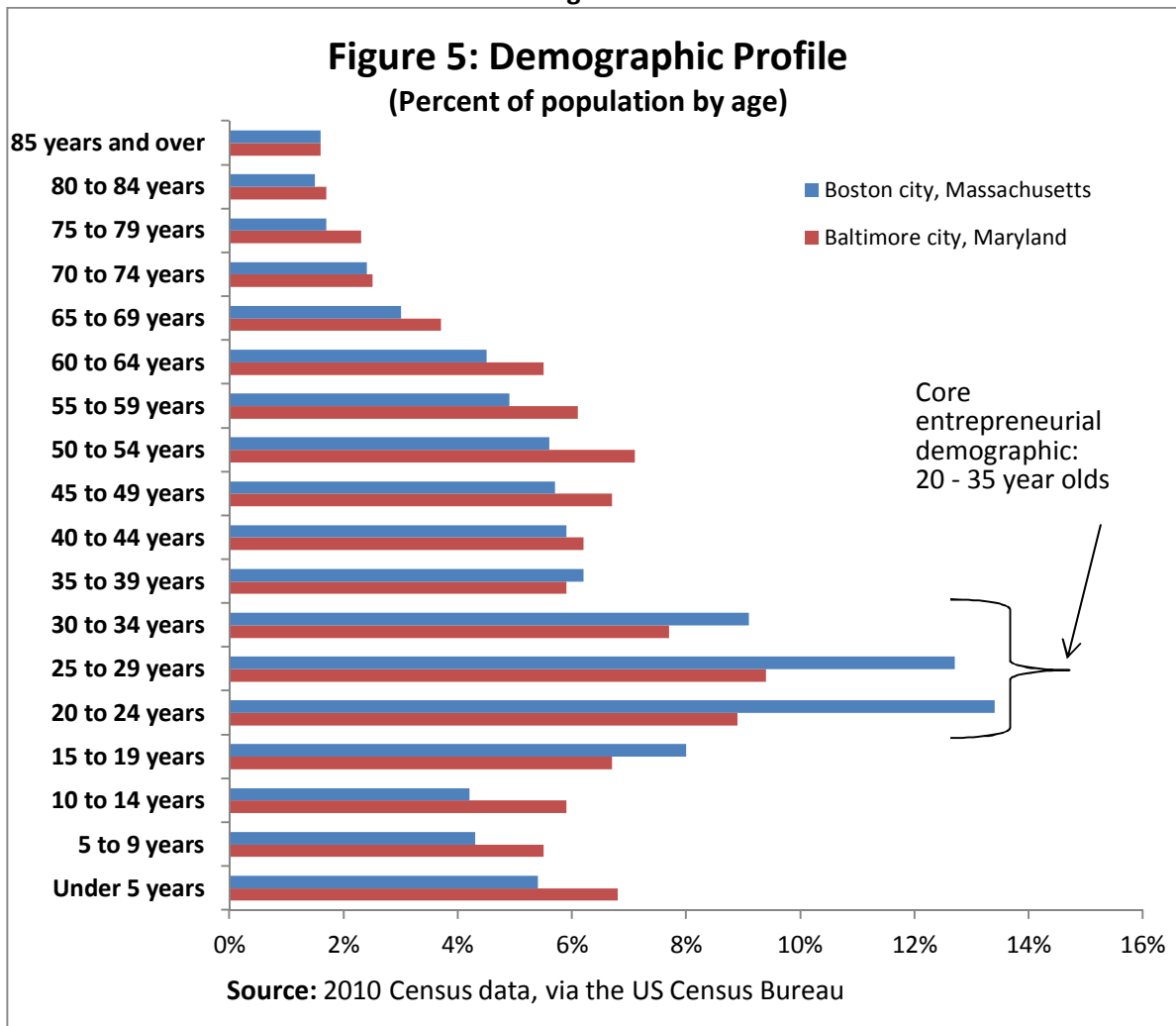
**Number of *actual* entrepreneurs.** Startup companies created can act as a proxy for entrepreneurs because startups are formed by entrepreneurs. As noted above, Baltimore is estimated to have 345 startups and Boston has 1,647.

**Number of *potential* entrepreneurs.** Boston and Baltimore differ on one important demographic aspect: the number of people between ages 20 and 34, the range when people are particularly likely to engage



in entrepreneurship.<sup>37</sup> As Figure 5 shows, a higher percentage of Boston’s population is in this demographic range.

Figure 5



**Geographic scope:** City limits.

This is a significant difference. In Boston, more than 1 in 3 residents is within this range, whereas in Baltimore, the figure is closer to 1 in 4.<sup>38</sup> In absolute terms, this translates into almost 60,000 more people, as shown below in Figures 6 and 7.

Figure 6

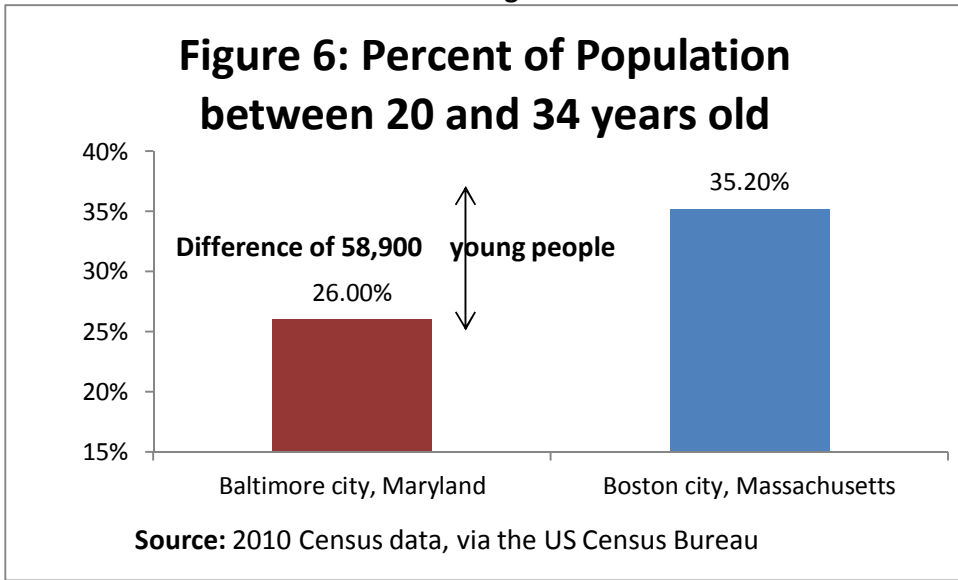
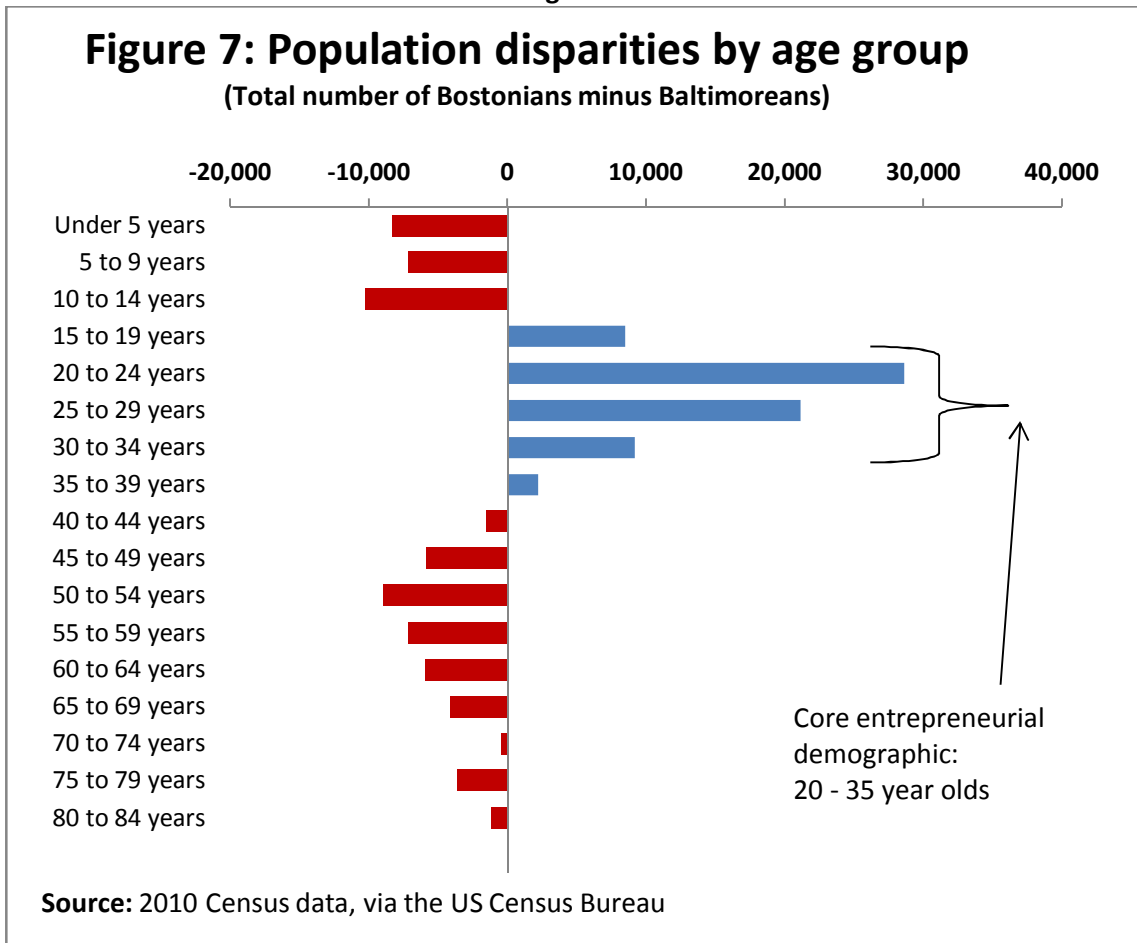
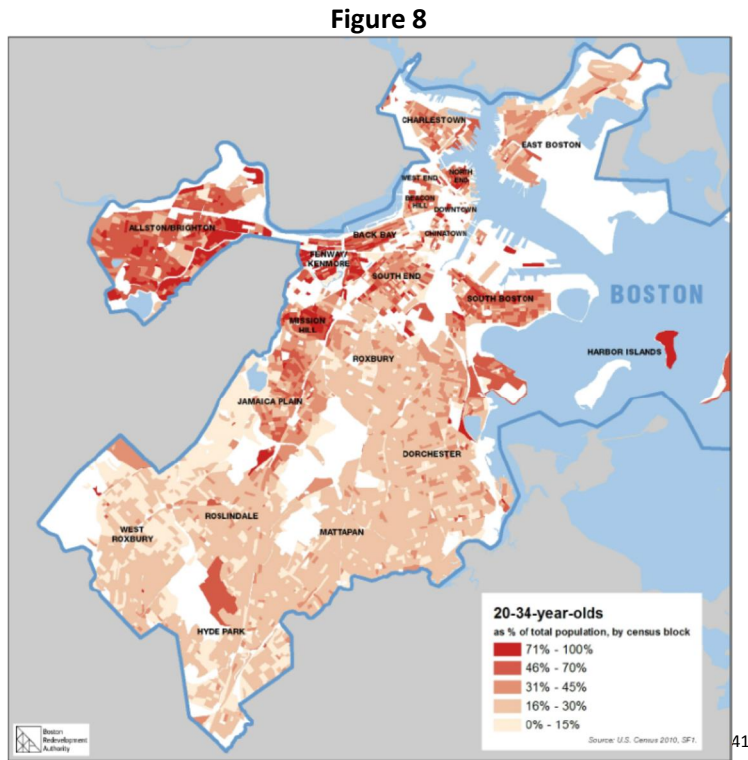


Figure 7



**Density.** It is also worth examining the *density* of potential entrepreneurs. In *Startup Communities*, Brad Feld notes “entrepreneurial density” as one of the two most important drivers of startup community success.<sup>39</sup> He defines entrepreneurial density as equal to the number of people engaged in startup companies (either as founders or employees) divided by the adult working population.<sup>40</sup> Actual density also matters, discussed in the environmental factors below.

Boston has several neighborhoods where 20-34 year olds exceed 70 percent of the population:



**Geographic scope:** Political boundaries.

Baltimore data reveal several neighborhoods with populations of at least 60 percent of 18-44 year olds. [Note: This is a broader definition relative to Figure 8, which refers to 20-34 year olds.]

Neighborhood	% of 18-24 year olds	% of 25-44 year olds	% of 18-44 year olds
Charles Village/Barclay	33.9	30.7	64.6
Canton	10.5	53	63.5
Fells Point	11.3	51.7	63
Midtown	22.2	39	61.2
Inner Harbor/ Federal Hill	13.3	47.2	60.5

Source: Baltimore City Health Department.<sup>42</sup>

**Educational attainment.** Another element to consider relative to entrepreneurs is education levels. Studies have shown positive correlation between education levels and entrepreneurial success of individual business owners.<sup>43</sup>

A higher percentage of Bostonians have earned higher education degrees—34.3 percent of Baltimoreans have a bachelor’s or higher, while 42.7 percent of Bostonians do.<sup>44</sup> Both cities rank high relative to others in the U.S.: The Boston metro region is number one in the nation in terms of educational attainment, while Baltimore ranks seventh.<sup>45</sup>

In summary, then, Boston has a larger pool in both relative and absolute terms of several groups of potential entrepreneurs: high-tech employees, people with higher education degrees, and people in the 20-34 age bracket.

**Note on interconnectivity: pathways into entrepreneurship for recent university graduates.** One of the themes that emerged anecdotally from interviews is a weaker connection between recent college/university graduates and early stage companies in Baltimore. Students are not sure how to participate in Baltimore’s entrepreneurial ecosystem.

**Detail on selected Boston programs and institutions:**

Boston has also taken a number of steps to *attract, retain, develop, and concentrate* entrepreneurs. Three are highlighted here: ONEin3 Boston, Stay in MA, and The Boston Innovation District.

**ONEin3 Boston.** Boston’s ONEin3 program is designed to *retain* potential entrepreneurs. ONEin3 Boston is an initiative of the City of Boston’s economic development office, and operates a number of programs explicitly designed “to increase the ‘stickiness’ of Boston for potential entrepreneurs.”

ONEin3 Boston manages the ONEin3 Council, which provides a platform for 2-way communication between this important constituency and the mayor’s policymaking office at a neighborhood and citywide level. ONEin3 neighborhood councils meet to discuss civic, social, professional, financial issues endemic to their locality, and pass policy recommendations to the mayor’s office to make the city more attractive.

ONEin3 also operates a number of outreach programs designed to “connect Boston’s young adults with civic, social and professional resources, as well as with each other.”<sup>46</sup> Additionally, ONEin3 coordinates the Boston Young Entrepreneurs Program, which supports startups and potential entrepreneurs, and ONEin3 Money, “which supports the financial health and wellness of ONEin3ers.”<sup>47</sup>

Stakeholder	Description	Function within model
<b>ONEin3 Boston</b>	Guides civic policymaking to better suit needs of key entrepreneurial demographic. Does outreach and provides resources to same demographic.	* Attract, retain, entrepreneurial <i>talent</i> over a medium-to-long time horizon.

**Stay in MA.** Stay in MA is a targeted model program for retaining and developing entrepreneurial talent. Recognizing the entrepreneurial resource of the large student population, Stay in MA is a privately funded, civic-minded program designed to increase *network connectivity* between Boston’s college

campuses and the broader entrepreneurial ecosystem. The program was created in response to feedback from local entrepreneurs that they “never see students” at local industry events.

With a budget of about \$15,000 each year, the program gives out small grants to fund students to participate in local industry events and conferences, some of which can carry hefty participation fees. The program has funded approximately 300 such fellowships.<sup>48</sup>

Stakeholder	Description	Function within model
<b>Stay in MA (private service provider)</b>	Provides funding for local students to participate in local entrepreneurship industry events and conferences.	<ul style="list-style-type: none"> <li>* Develop and retain entrepreneurial <i>talent</i> — long time horizon.</li> <li>* Increase <i>interconnectivity</i> between potential entrepreneurs and existing entrepreneurs and mentors.</li> </ul>

**The Boston Innovation District.** This is an effort to *attract* and *concentrate* entrepreneurs.

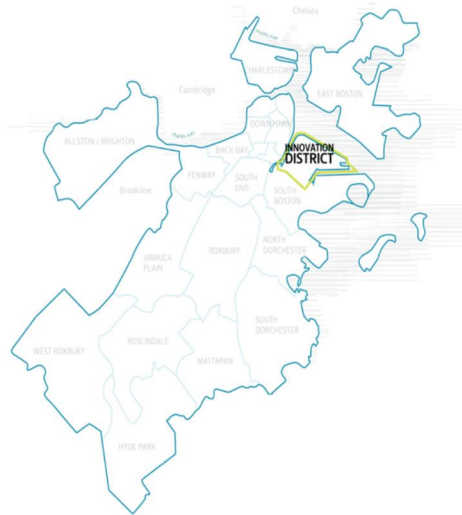
The Innovation District was driven by Mayor Menino in his 2010 policy agenda, in response to the neighborhood’s underutilized condition and the potential economic development impact.<sup>49</sup>

The District follows the logic of neighborhood-level initiatives designed to brand certain parts of cities to appeal to certain commercial and residential demographics, and apply it to entrepreneurs. The Innovation District’s focus is high-tech industries, a subset of all innovative companies, though the district has also attracted non high-tech firms.

The initiative includes several components. First, there is a substantial marketing campaign by the City.<sup>50</sup> Second, City leadership specifically encourages entrepreneurial ecosystem stakeholders such as MassChallenge (discussed below) to locate in the District. Third, there is substantial real-estate development—including a 12,000-square-foot facility for community events called District Hall (built at a cost of \$7 million), part of a larger 23-acre development. Fourth, the City of Boston Redevelopment Authority (BRA) works with developers to ensure that new building construction projects in the district satisfy a requirement to contain “innovation housing” space mixed with office and commercial space. Innovation housing is small, highly affordable efficiency apartment housing with common spaces designed to cater to budding entrepreneurs on a budget (see ‘Microapartments’ on page 52).<sup>51</sup>

The Innovation District is located in close geographic proximity to many of the neighborhoods with the high density of 20-34 year olds, and is home to many of Boston’s prominent innovation ecosystem stakeholders and network platforms, including MassChallenge, half a dozen co-working spaces, larger and fast-growing startup companies, and the soon-to-come Boston Innovation Center.<sup>52</sup>

**Figure 9**



**Geographic Scope:** Political boundaries. <sup>53</sup>

The District is reported to have attracted more than 200 companies and 4,000 new jobs since the District started.<sup>54</sup> Rising commercial rents in the district are an indirect indicator that the initiative is working.

A potential concern has emerged that access to low-cost and public co-working spaces will be limited as the District grows, which may prevent earlier-stage entrepreneurial ventures from participating.<sup>55</sup>

Stakeholder (type)	Description	Function within model
<b>Innovation District (government initiative)</b>	<ul style="list-style-type: none"> <li>Marketing campaign, recruitment, and real estate development.</li> <li>Goal is to attract and concentrate startup companies, entrepreneurs, and the creative class in one neighborhood; additional goal of local economic development for that neighborhood.</li> </ul>	<ul style="list-style-type: none"> <li>Increase <i>interconnectivity</i> among existing entrepreneurs, mentors, and other stakeholders.</li> </ul>

**Summary of Active and Potential Entrepreneurs.** Boston’s ecosystem is “Established” on this dimension, and Baltimore’s is Emerging. Baltimore has fewer entrepreneurs and a smaller pool of potential entrepreneurs.

## 2. Experienced Mentors

### Definition and context

Experienced mentors include startup alumni, serial entrepreneurs, and experienced angel and venture capitalists. Their knowledge of business and product development, fundraising, and organizational growth can be translated to new entrepreneurs to accelerate startup growth and increase startup success. Mentors can also inspire potential entrepreneurs to become active entrepreneurs.

Using the logic model terminology, mentoring increases the *interconnectivity* of an entrepreneurial ecosystem, supporting *current or potential entrepreneurs* and thus developing *talent*, and helping entrepreneurs develop their *ideas* and raise *capital*.

Mentorship can happen organically, e.g., through the networks and efforts of individuals and organizations, or formally through established programs.

### Data review

Experienced mentors are seen as an important element of Boston’s entrepreneurial ecosystem. When asked what was the “single most important asset within Boston’s entrepreneurship ecosystem,” Renuka Babu Brown, the Director of Business Development and New Ventures at Boston University’s Kindle Program (described in more detail below), Brown answered succinctly: “experienced mentors, hands down.”

Kate Castle, Vice President of Marketing at Flybridge Capital Partners, a Boston-based VC firm, observed: “We are seeing lots more mentoring now in Boston, which is drawing more young people into entrepreneurship. We are hitting an inflection point, where past successful entrepreneurs are turning 180° to provide an infusion of mentorship and angel capital into the system.”

One proxy for mentorship is the number of alumni of startup companies and investors, as people with both backgrounds can provide useful guidance and support. Using current startup count as a rough estimate of historical measures, Baltimore is likely to have fewer startup alumni than Boston. Baltimore also has fewer investors, as discussed in the following section.

Another proxy for the level of mentorship in Boston and Baltimore is the count of *mentorship and connection programs and institutions*. This includes guidance, counseling, or informal networking where successful entrepreneurs or startup alumni are encouraged to interact with new entrepreneurs. As the following chart suggests, there are more structured programs in Boston.

Mentorship and connection programs and institutions	
Baltimore	Boston
Activate UMBC (women entrepreneurs)	Betaspring
Baltimore Students for Startups	Boston Entrepreneurship
Betamore	BostonBeta
CoFoundersLab	Center for Women and Enterprise
Emerging Technologies Center	First Growth Ventures
gb.tc	Indus Entrepreneur (Indian Entrepreneurs)
TEDCO’s Maryland Entrepreneur Resource List (MERL)	MassChallenge
University of Baltimore Center for Entrepreneurship	Mass Technology Leadership Council
	Massachusetts Innovation and Technology Exchange (MITX)

Mentorship and connection programs and institutions	
Baltimore	Boston
	MIT Venture Mentoring Service
	NCIIA Venture Well / Village Capital
	The Venture Café
	Ultra Light Startups
	UMass Venture Development Center

**Detail on selected Boston programs and institutions:**

Three of Boston’s mentorship/connection programs are explained in addition detail: MIT Venture Mentoring Service, Venture Well/Village Capital, TechStars Boston and BU Kindle.

**MIT Venture Mentoring Service.** The MIT Venture Mentoring Service pairs MIT student entrepreneurs with technology and engineering innovations to experienced mentors in a related field of business. In so doing, the program helps transfer *technology* from university to market, while developing entrepreneurial *talent*.

The service is free of charge and the program does not take an equity share of spinout companies. It exists solely to match young student entrepreneurs to mentors. The mentors involved provide their time and energy pro bono. At least 24 active tech companies—many in Boston—owe their existence to the VMS.

Stakeholder	Description	Function within model
<b>MIT Venture Mentoring Service</b>	<ul style="list-style-type: none"> <li>Connects student entrepreneurs to relevant mentors through structured guidance programs.</li> </ul>	<ul style="list-style-type: none"> <li>Develop and retain entrepreneurial <i>talent</i> — long time horizon.</li> <li>Increase <i>interconnectivity</i> between potential entrepreneurs and existing entrepreneurs and mentors.</li> </ul>

**Venture Well/Village Capital.** Active in Boston and Louisville, KY, the National Collegiate Inventors and Innovators Alliances’ Venture Well and Village Capital provides a structured mentorship-acceleration program. It also provides \$50,000 in startup capital to the two most promising university spinout ventures each year. In so doing, it helps drive the flow of *technology* from university labs to market, provides a source of *capital* to technology startups, and helps cultivate *talent* in the ecosystem.

Stakeholder	Description	Function within model
<b>Venture Well / Village Capital</b>	<ul style="list-style-type: none"> <li>An accelerator program that provides mentorship, investment, and work space for early-stage startups in Boston.</li> </ul>	<ul style="list-style-type: none"> <li>Develop and retain entrepreneurial <i>talent</i> — long time horizon.</li> <li>Increase <i>interconnectivity</i> between potential entrepreneurs and existing entrepreneurs and mentors.</li> </ul>



- Provide startup *capital* to entrepreneurs.

**TechStars Boston.** Located just across the bridge from Boston’s “Innovation District” (see above), TechStars Boston is a startup accelerator. The organization provides startup companies with mentorship, free office space, \$18,000 in seed funding, and a \$100,000 convertible note in exchange for a 6 percent equity stake. Tech Stars admits less than 1 percent of the companies that apply each year. TechStars counts 103 mentors and 57 alumni companies among its ranks since its founding in 2006.

Stakeholder	Description	Function within model
<b>Tech Stars Boston</b>	<ul style="list-style-type: none"> <li>• Structured, for-profit mentorship, incubation, and investment program.</li> </ul>	<ul style="list-style-type: none"> <li>• Develop and retain entrepreneurial <i>talent</i> — long time horizon.</li> <li>• Increase <i>interconnectivity</i> between potential entrepreneurs and existing entrepreneurs and mentors.</li> <li>• Attract media and investor attention to region.</li> <li>• *Provide startup <i>capital</i> to entrepreneurs.</li> </ul>

**BU Kindle.** Boston University’s Kindle Program matches aspiring entrepreneurs within the BU community with seasoned entrepreneur volunteer mentors to guide them in the early stages of startup formation. The same office also provides a business incubation program and seed grant funding for the most promising ideas.

Stakeholder	Description	Function within model
<b>BU Kindle</b>	<ul style="list-style-type: none"> <li>• Part of BU’s Office of Technology Development, the Kindle program pairs seasoned entrepreneurs and business executives with student and faculty entrepreneurs working to commercialize university invention or their own ideas.</li> </ul>	<ul style="list-style-type: none"> <li>• Develop and retain entrepreneurial <i>talent</i> — long time horizon.</li> <li>• Increase <i>interconnectivity</i> between potential entrepreneurs and existing entrepreneurs and mentors.</li> <li>• Attract media and investor attention to region.</li> <li>• Provide startup <i>capital</i> to entrepreneurs.</li> </ul>

**Summary of Experienced Mentors.** Boston’s ecosystem is “Established” on this dimension, and Baltimore’s is “Emerging.” Baltimore has fewer mentors. Both cities have several programs that facilitate mentorship.

### 3. Investors

#### Definition and context

The third group of actors in entrepreneurial ecosystems is private-sector investors. Using the terminology of the logic model, investors are *actors* who can provide a critical resource, *capital*. Investors represent one, but not the only, *source of capital* within entrepreneurial ecosystems. In this

report, “investors” refer to angel and venture capital investors who fund, and support, entrepreneurs and early-stage technology ventures in exchange for debt and equity stakes. Organizations that may provide capital while also providing other support, such as public/nonprofit seed funds and accelerator funds, are discussed in a separate section, Support Platforms.

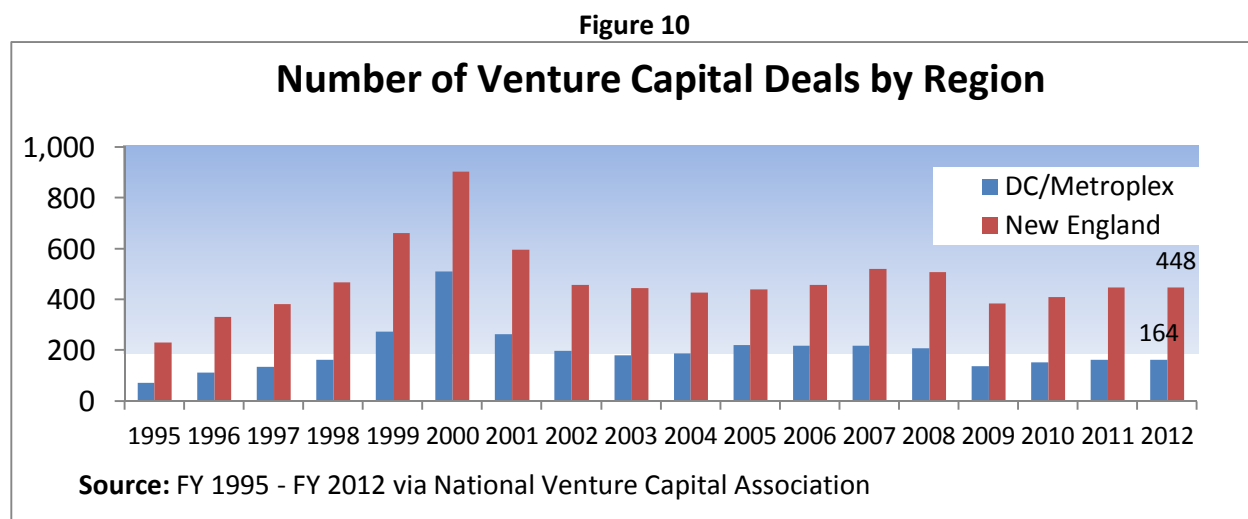
Investors also typically provide mentorship, guidance, and counseling alongside early stage equity investments.

Brad Feld defined the “availability of seed and venture capital” as the second of the top two most important indicators of a successful startup community.<sup>56</sup> As such the presence of many *investors* in an entrepreneurial ecosystem (in addition to investment itself) is an indicator of ecosystem health.

### Data review

This section estimates investor and investment levels in several ways: number and size of Venture Capital deals, number and size of Angel investment deals, presence of investing organizations including Venture Capital groups and Angel groups, analysis of statewide organizations, presence of matching programs, and qualitative assessments of investment culture.

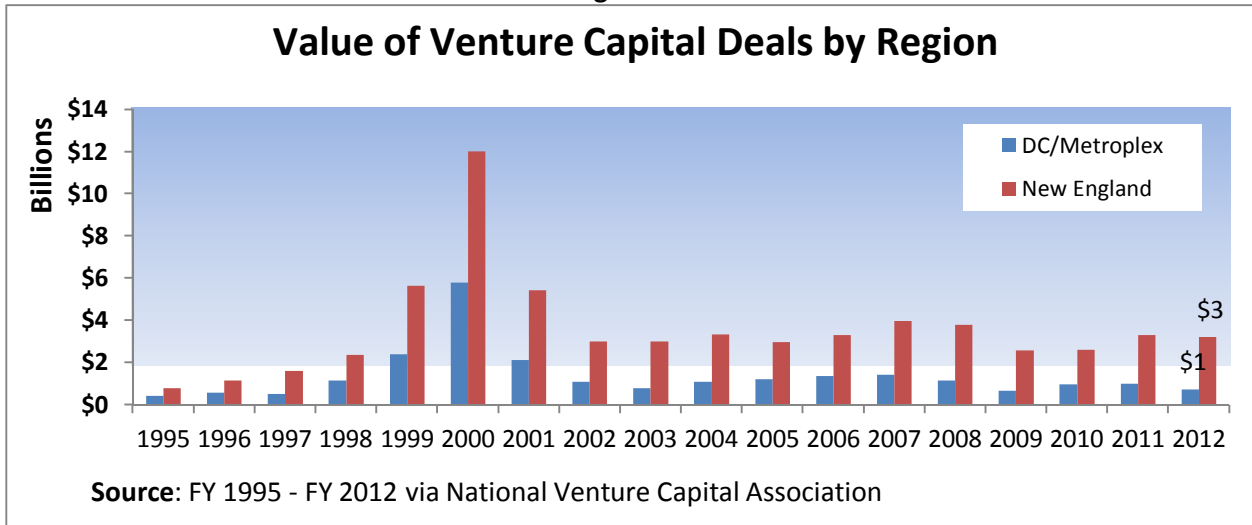
**Venture capital deals and deal size:** Figure 10 shows regional Venture Capital deal flow at the greater regional level (all of New England compared to D.C./Baltimore numbers). As the data show, New England has consistently had more than double the number of deals than the D.C./Baltimore region.<sup>57</sup>



**Geographic scope:** New England region includes: Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, and parts of Connecticut (excluding Fairfield County). D.C./Metroplex region includes: Washington, D.C.; Virginia; West Virginia; and Maryland.

The gap between the *value* of these deals by region is greater, as Figure 11 illustrates:

Figure 11



**Geographic scope:** New England region includes: Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, and parts of Connecticut (excluding Fairfield County). D.C./Metroplex region includes: Washington, D.C.; Virginia; West Virginia; and Maryland.

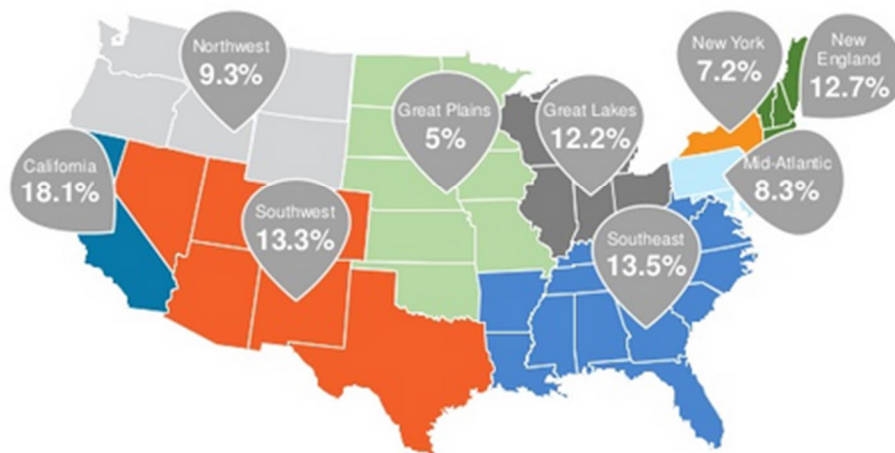
As Figures 10 and 11 indicate, New England has more venture capital deals and larger total VC investment than the Mid-Atlantic.

**Angel investment deals and deal size.** Boston is also part of a region with more angel investing activity, measured by deals with very similar total levels of investment.

As Figure 12 shows, the New England region had 50 percent more angel deals in 2012 than the Mid-Atlantic. Note that the specific Boston-Baltimore gap is likely higher, however, as New England’s primary center is Boston, while Baltimore is included in a region with Philadelphia and the PA-NJ pharmaceutical corridor.

Figure 12

**Angel Investment Deals Distributed Nationally**  
Share of Angel Group Deals by Region 2012



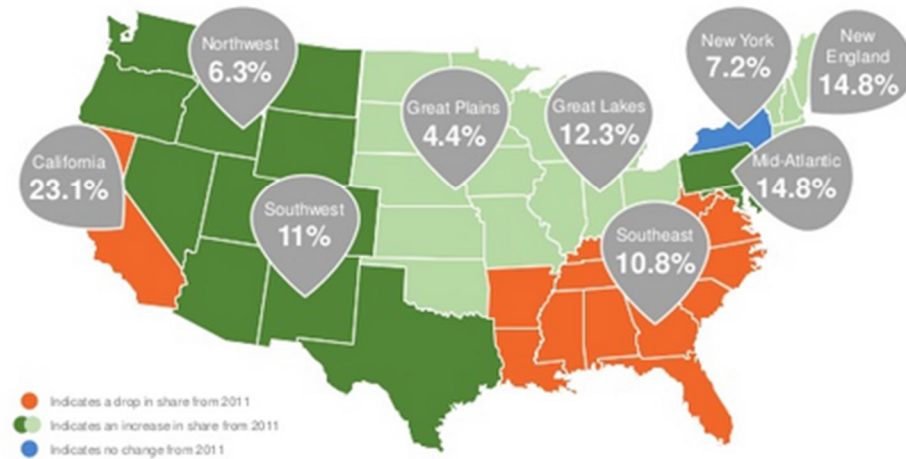
**Source and timeframe:** Angel Resource Institute, 2012 data.<sup>58</sup>

**Geographic scope:** Mid-Atlantic includes: Pennsylvania, Maryland, Delaware, and New Jersey. New England includes Connecticut, Rhode Island, Massachusetts, Vermont, New Hampshire, and Maine.

As Figures 12 and 13 show, despite many more deals in New England than in the Mid-Atlantic, the share of spending is similar. This could be explained by fewer larger deals in the Mid-Atlantic, such as bio/pharmaceutical investments, relative to a greater number of smaller Internet-based investment deals in New England.

Figure 13

**Investment Dollars Spreading Further Outside of California**  
Share of Angel Group Dollars by Region 2012



**Source and timeframe:** Angel Resource Institute, 2012 data.<sup>59</sup>

**Geographic scope:** Mid-Atlantic includes: Pennsylvania, Maryland, Delaware and New Jersey. New England includes Connecticut, Rhode Island, Massachusetts, Vermont, New Hampshire, and Maine.

**Investment organizations: Venture Capital firms and angel associations.** There are significantly more early stage funders—including Venture Capital firms and angel associations—in Boston than in Baltimore.

Capital will flow to wherever good deals may be. But when investment firms actually decide to *locate* in an ecosystem, it signals confidence in the ecosystems' long-term trajectory and also represents the presence of a long-term capital resource that can feed the ecosystem for years and decades to come. VC firms want to locate close to where the "action" is, and once they are rooted, the capital they bring with them tends to be geographically focused on the community where they are.

There appear to be substantially more investment organizations in Boston than Baltimore. Of *Entrepreneur Magazine's* international list of ~1200 funding organizations<sup>60</sup>, including seed and growth capital, eight have offices within 15 miles of Baltimore's City Hall:

1. ABS Capital Partners
2. Chesapeake Emerging Opportunities Club
3. Greenspring Associates
4. JMI Equity
5. New Enterprise Associates
6. NewSpring Capital
7. QuestMark Partners
8. TEDCO

By contrast, there are 91 such organizations within 15 miles of Boston’s City Hall.

Using the *Entrepreneur Magazine* data set increases the likelihood of an accurate apples-to-apples estimate of market participants. However, other Baltimore funding organizations include:

- Abell Investments
- Anthem Capital
- Baltimore Angels
- Camden Partners
- Dingman Center Angels
- New Markets Venture Partners
- OSTP Ventures
- Patriot Capital
- Red Abbey Venture Partners
- Sterling Partners
- Wasabi Ventures

**Statewide investment programs.** Other elements of the investment community in both regions are state-level investment programs. As the table indicates, Maryland has made a substantial investment in these programs in recent years.

Type of incentive	Maryland policy incentive	Description	Massachusetts policy incentive	Description
State venture funds	Maryland Venture Fund	State-funded seed and early-stage venture fund. 60 percent of investments in technology companies and 40 percent in life sciences. <sup>61</sup> Makes equity investments up to \$1,000,000.	Mass Ventures	Quasi-public investment fund for high-growth startups created in 1978. <sup>62</sup>
State venture funds	Invest Maryland	Managed in conjunction with the MD Venture Fund, invests 67% in MD-based venture capital firms, 25% directly in MD-based tech companies, and 8% to the Equity Participation Program, above. Also operates the Invest Maryland Challenge business plan competition, which awards \$300,000 each year to three top companies in life sciences, information technology, and other technologies. <sup>63</sup>	Emerging Technology Fund (ETF)	Loans of up to \$1 million for working capital for technology companies working to scale up manufacturing. <sup>64</sup> Applicable for high-growth technology companies, but not startups.
University-Industry Matching programs	Maryland Industrial Partnerships	Provides matching funds to joint R&D partnerships between USM schools and MD tech companies. Maximum of \$90,000 for startup	Cooperative Research Matching Grant Program	Provides 1:1 matching funds to joint R&D partnerships between Massachusetts schools

Type of incentive	Maryland policy incentive	Description	Massachusetts policy incentive	Description
		firms.		and MA industry, up to \$250,000 for two years.

**Matching programs for entrepreneurs and angel investors.** According to the University of New Hampshire Center for Venture Research, the state of Massachusetts has six times more entrepreneur-investor matching resources than does the state of Maryland (42 versus seven).<sup>65</sup>

**Other qualitative assessments of the Baltimore investment community.** Research identified two additional observations regarding venture investments in the broader region.

- Mid-Atlantic investment sources may not make investment decisions, which could be yes or no, as quickly as other more established regions such as Silicon Valley. This could be described as a “wait and see” approach, as final determinations about an investment decision are pushed off to see how the company unfolds. Where true, this can lead to undesirable results: investors are not able to participate in deals, if other regions’ investors decide to invest first; entrepreneurs are forced to relocate, to follow capital; and entrepreneurs may emphasize time sensitivity over fundamentals when making their pitch, decreasing the clarity of the assessment.
- More potential angel investors exist in the City (i.e., high net-worth individuals) that have not chosen to participate in local early stage investing.

**Summary of Investors.** Boston’s ecosystem is “Established” on this dimension, and Baltimore’s is “Emerging.” Baltimore entrepreneurs have less access to capital than Boston entrepreneurs.

#### 4. Universities

##### Definition and context

Universities are another important contributor to entrepreneurship ecosystems. They can provide all four resources:

- *Talent* (e.g., faculty researchers and staff, students, and recent alumni),
- *Technology and ideas* (e.g., via patents and unpatented research),
- *Capital* (e.g., via school-specific angel funds), and
- *Interconnectivity* (e.g., via matchmaking programs and events).

## Data review

**Number of institutions of higher education, and student enrollment.** As the following chart shows, Boston and Cambridge have more schools and a greater total enrollment than Baltimore City/Towson.

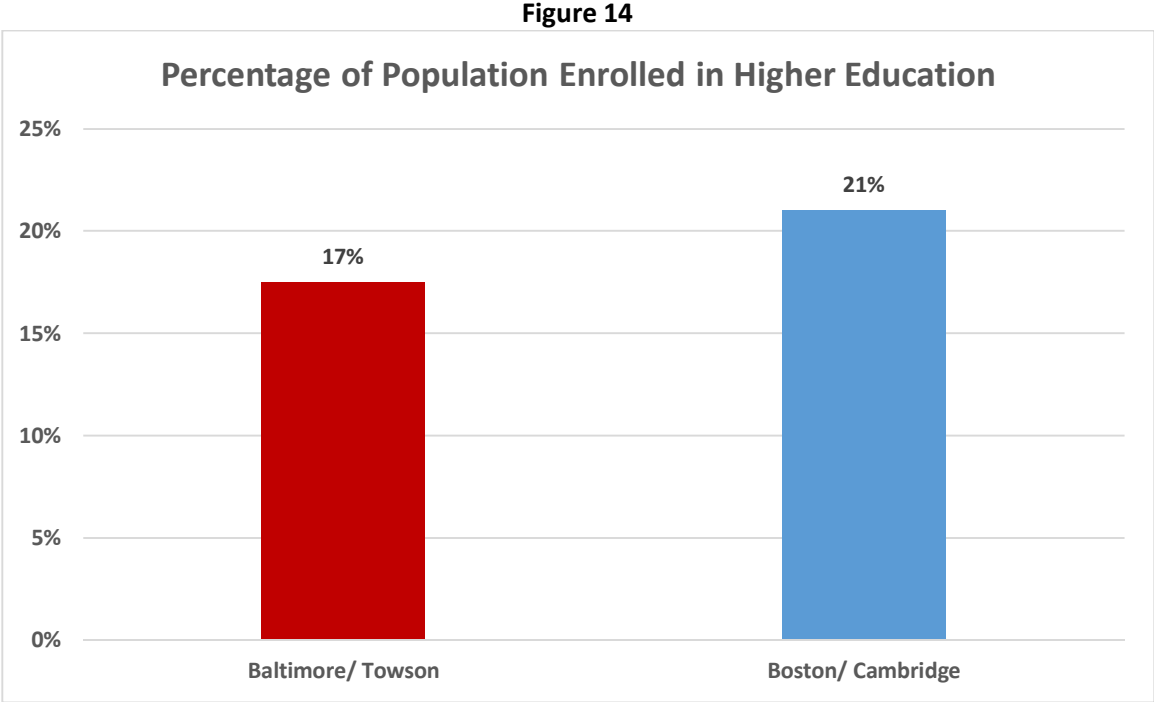
College/University enrollment, by Community			
Baltimore/ Towson		Boston/ Cambridge	
Institution Name	# of Students	Institution Name	# of Students
Towson University	19,758	Boston University	32,053
Johns Hopkins University	19,682	Harvard University	25,690
The Community College of Baltimore County	19,426	Northeastern University	24,434
University of Maryland-Baltimore County	12,041	Massachusetts Institute of Technology	10,220
Morgan State University	7,208	Suffolk University	9,103
Baltimore City Community College	6,814	Bunker Hill Community College	8,806
Loyola University Maryland	6,080	Lesley University	7,003
University of Maryland-Baltimore	5,884	Cambridge College	5,355
University of Baltimore	5,421	Simmons College	4,733
Coppin State University	3,932	Emerson College	4,380
Notre Dame of Maryland University	2,929	Berklee College of Music	4,090
Sojourner-Douglass College	1,151	Massachusetts College of Pharmacy and Health Sciences	3,626
TESST College of Technology-Baltimore	1,109	Emmanuel College	2,519
Ner Israel Rabbinical College	574	Massachusetts College of Art and Design	2,312
Stratford/ Baltimore International College	492	Boston Architectural College	1,338
St Mary's Seminary & University	225	Fisher College	1,225
Baltimore Hebrew University Inc	109	New England Law-Boston	1,103
		MGH Institute of Health Professions	864
		School of the Museum of Fine Arts-Boston	797
		Laboure College	732
		The Boston Conservatory	630
		Gibbs College-Boston	547
		Benjamin Franklin Institute of Technology	513
		New England College of Optometry	464



College/University enrollment, by Community			
Baltimore/ Towson		Boston/ Cambridge	
Institution Name	# of Students	Institution Name	# of Students
		Bay State College	354
		Massachusetts School of Professional Psychology	304
		Longy School of Music	223
		Boston Baptist College	103
		Episcopal Divinity School	85
<b>17 schools, 112,835 students</b>		<b>29 schools, 153,606 students</b>	

Source: collegestats.org, team research.

**Proportion of student enrolled in higher education.** On a per capita basis, more Boston residents are enrolled in higher education than in Baltimore, as Figure 14 illustrates.<sup>66</sup>



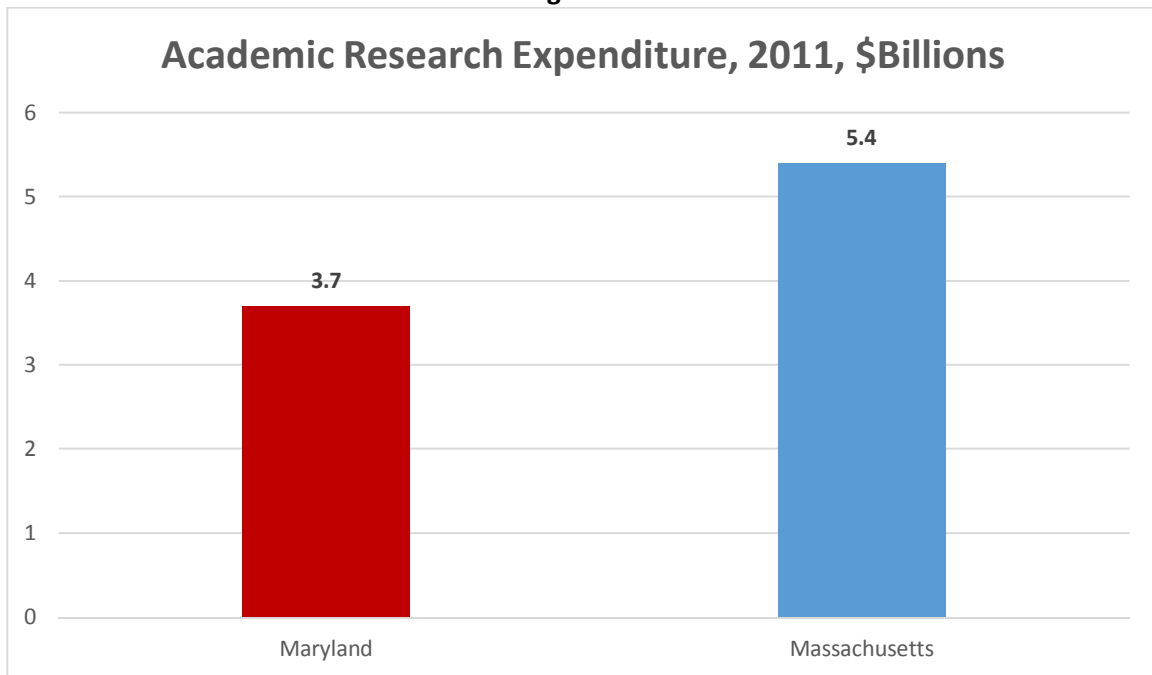
**Source and Timeframe:** Collegestats.org, 2011 enrollment data.

**Geographic scope:** Political boundaries of communities: Baltimore, Towson, Boston, and Cambridge.

**Technology.** Boston and the greater Baltimore region each have major university research centers. According to a trade association, University-connected research centers in Maryland represent a substantial source of technology, spending \$3.7 billion on research (including, for example, federal grant

funding) in 2011. Massachusetts institutions spent almost 50 percent more on research in the same period.

**Figure 15**



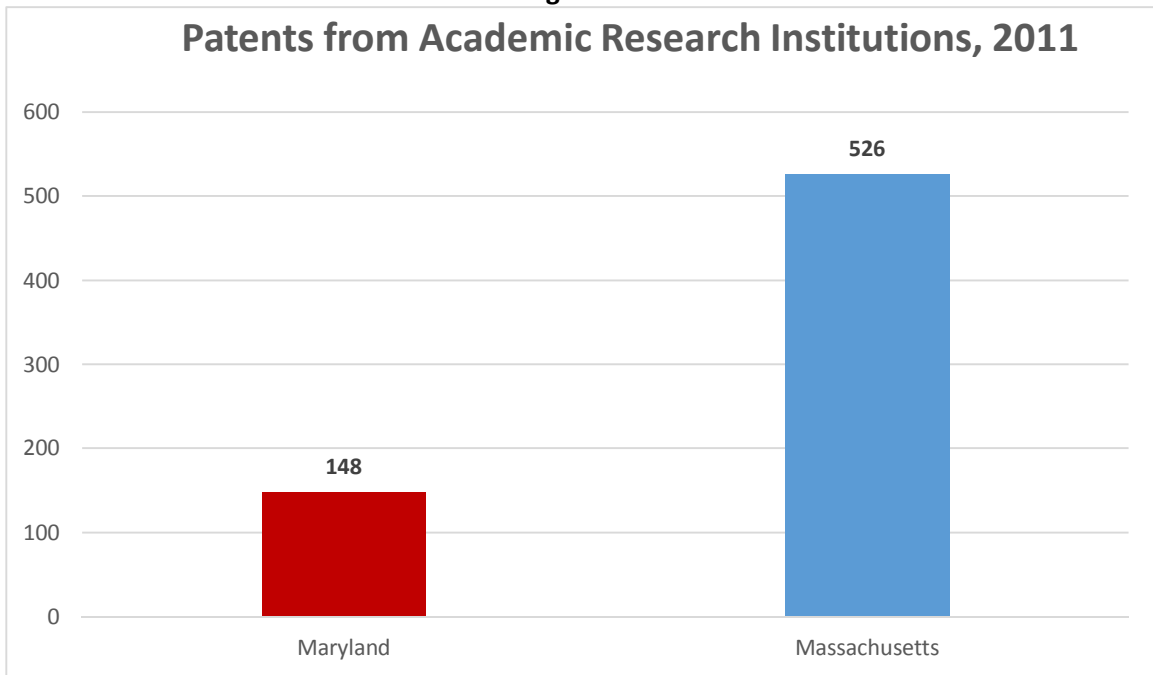
**Source and Timeframe:** Association of University Technology Managers, 2011

**Geographic scope:** State political boundaries.

Note: The Maryland list includes Johns Hopkins University, Johns Hopkins University's Applied Physics Lab, and the University System of Maryland. Most but not all of Massachusetts' institutions are in the Boston region (examples outside of the Boston region include the UMass campuses).

**Academic patents issued.** The technology transfer trade association reported that Maryland universities had less than one-third as many patents issued as Massachusetts schools in 2011.<sup>67</sup>

**Figure 16**



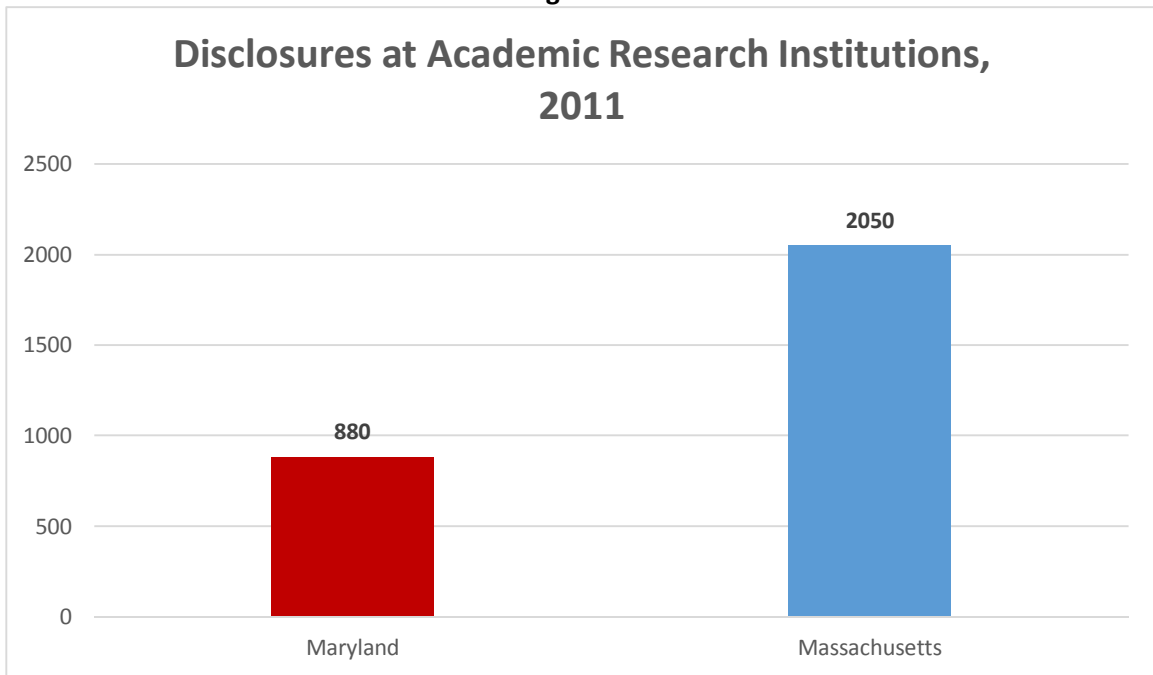
**Source and Timeframe:** Association of University Technology Managers, 2011

**Geographic scope:** State political boundaries.

These results should be interpreted with caution. Patenting activity is an extremely crude proxy for “innovativeness”—here, defined not as new, scientifically valid findings, but in the narrower definition of having commercialization applications. Too, patents may or may not lead to commercialization or startups, near the university or elsewhere. Furthermore, an institution’s available resources can drive patent filing rates. As of 2011-12, Harvard and MIT held two of the 10 largest endowments in the country, while JHU was ranked 27<sup>th</sup>, U of M 91<sup>st</sup>, and UMCP 247<sup>th</sup>.<sup>68</sup>

When “disclosures” are considered—referring to the technological innovations that are shared with a university’s technology transfer office, and can be less dependent on university resource levels—the gap between Maryland and Massachusetts is smaller.

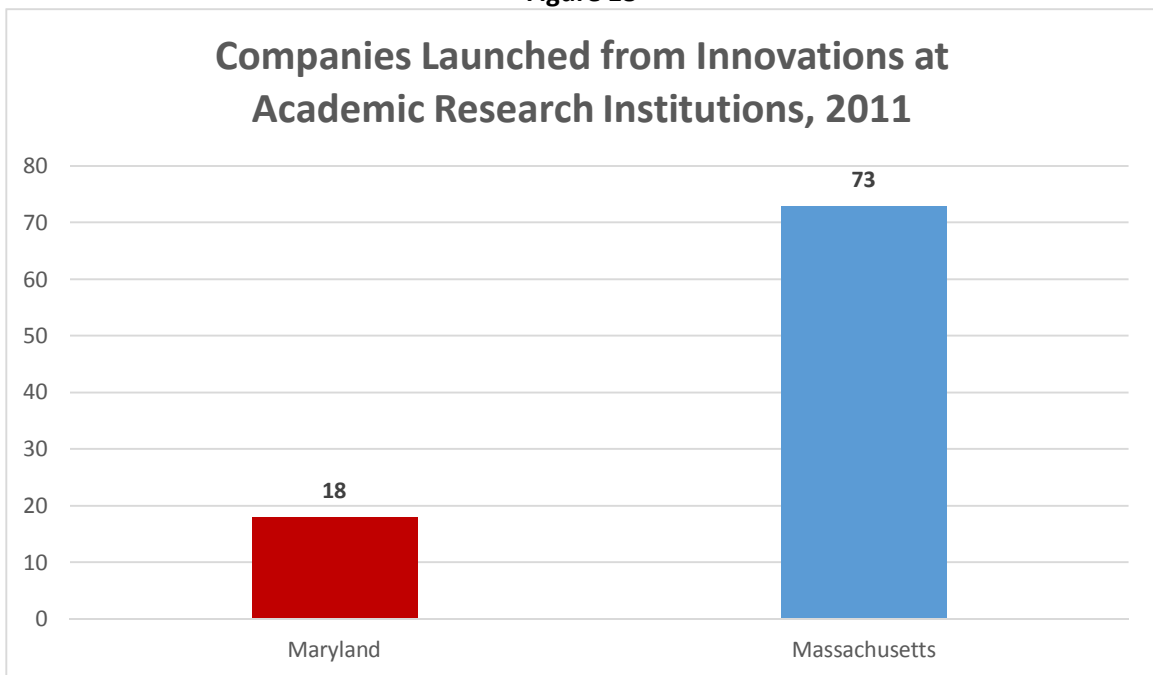
**Figure 17**



**Source and Timeframe:** Association of University Technology Managers, 2011  
**Geographic scope:** State political boundaries.

**Startup companies resulting from university research.** Maryland schools also formed fewer startup companies.

**Figure 18**



**Source and Timeframe:** Association of University Technology Managers, 2011  
**Geographic scope:** State political boundaries.

**University programs and offices.** Boston has more Technology Transfer Offices—which support the commercialization of intellectual property through creation of startup companies or outlicensing to existing manufacturers—than Baltimore does.

Technology Transfer Offices	
Baltimore	Boston
Johns Hopkins University Office of Technology Transfer	Beth Israel Deaconess Medical Center Technology Ventures Office
University of Maryland Baltimore County Office of Technology Development	Boston Biomedical Research Institute
University of Maryland Baltimore Office of Technology Transfer	Boston College Office of Technology Transfer and Licensing
University of Maryland College Park Office of Technology Commercialization	Boston University Office of Technology Development
Morgan State Office of Technology Transfer	Brandeis University Office of Technology Licensing
	Children’s Hospital Boston Technology and Innovation Development Office
	Dana Farber Cancer Institute Office of Research and Technology Ventures
	Harvard University Office of Technology Development
	Immune Disease Institute Office of Technology Development
	MIT Technology Licensing Office
	Northeastern University Office of Technology Innovation & Commercialization
	Partners HealthCare Research Ventures & Licensing
	Tufts University Office for Technology Licensing and Industry Collaboration
	University of Massachusetts Commercial Ventures and Intellectual Property
	Whitehead Institute for Biomedical Research Office for Intellectual Property
	Worcester Polytechnic Institute Technology Transfer Office

Baltimore universities appear to have a greater number of *innovation and entrepreneurship programs* geared toward harnessing the *technology* and *talent* assets of the universities for the benefit of the local entrepreneurship ecosystem.

**Campus innovation and entrepreneurship programs**

Baltimore	Boston
<b>BWITech</b>	<b>Boston University Kindle</b>
<b>Hopkins Carey School Innovate! Program</b>	<b>Boston Urban Business Accelerator (Boston University)</b>
<b>Hopkins Engineering Fast Forward</b>	<b>Center for Integration of Medicine and Innovative Technologies</b>
<b>Loyola University -Wasabi Ventures</b>	<b>Harvard iLab</b>
<b>MIPS (Maryland Industrial Partnerships)</b>	<b>It's All Here MA</b>
<b>Towson Global</b>	<b>Massachusetts Technology Transfer Center</b>
<b>UMD BioInnovation Center</b>	<b>University of Massachusetts Boston Venture Development Center</b>
<b>University of Maryland Dingman Center</b>	
<b>University of Maryland MTech</b>	

**Detail on selected Boston programs and institutions:**

**Venture Development Center at the University of Massachusetts Boston.** This provides a structured bridge for students into the local entrepreneurship scene through several programs. It matches UMass student interns with startup tech company internships. The center also provides entrepreneurship curriculum and business mentoring, and retains entrepreneurs in residence (EIRs) to provide mentorship and consult with startup companies. It also provides lab, computing, coffee, equipment and other services to startup companies to actually locate on campus. This increases connectivity between students and startups, by bringing the ecosystem to the students.

Stakeholder	Description	Function within model
<b>Venture Development Center at the University of Massachusetts Boston</b>	<ul style="list-style-type: none"> <li>• Curriculum.</li> <li>• Internship placement.</li> <li>• Network management.</li> <li>• Hosting startup companies within a campus-based incubation space.</li> </ul>	<ul style="list-style-type: none"> <li>• Develop entrepreneurial <i>talent</i> through curriculum development.</li> <li>• Retain talent in Boston through internship placements and networking with local startups.</li> <li>• Increase <i>interconnectivity</i> between potential entrepreneurs, skilled workers, and existing startups.</li> </ul>

**Massachusetts Technology Transfer Center (MTTC).** The Massachusetts Technology Transfer Center’s mission is to help increase flows of *technology* into the local Boston tech ecosystem. It offers an online database or “one-stop-shop” for intellectual property held by Massachusetts schools.

Through partnerships with other organizations, including the National Collegiate Inventors and Innovators Alliance (NCIIA), the MTTC also provides intensive bootcamps and networking opportunities to bring together student and faculty inventors, businesspeople, investors, and larger tech companies.

MTTC therefore acts as a hub to drive *interconnectivity* between several important stakeholders: universities, investors, large tech companies and local industry, as well as to promote flows of *technology* between these stakeholders.

Stakeholder	Description	Function within model
Massachusetts Tech Transfer Center	• b	<ul style="list-style-type: none"> <li>• Increase flows of <i>technology</i> by making university inventions more accessible to entrepreneurs and partners.</li> <li>• Increase <i>network connectivity</i> between campuses and entrepreneurial ecosystem through events and programs.</li> </ul>

**Summary of Universities.** Boston’s ecosystem is “Established,” and Baltimore’s is “Emerging.” Boston has more university resources available than Baltimore does. The data also suggest that Boston as an ecosystem has been able to leverage university assets for their entrepreneurship ecosystem more fully than has been the case to date in Baltimore.

## 5. Established Technology Companies

### Definition and context

Large technology companies are an important actor in entrepreneurial ecosystems for several reasons.

First, they can provide *talent* to help feed the local entrepreneur ecosystem, as engineers and technical staff at larger companies leave to start their own businesses. Second, they can provide *capital* to the ecosystem, whether through technology development partnerships with local universities, or via investment in or purchase of successful startup companies.

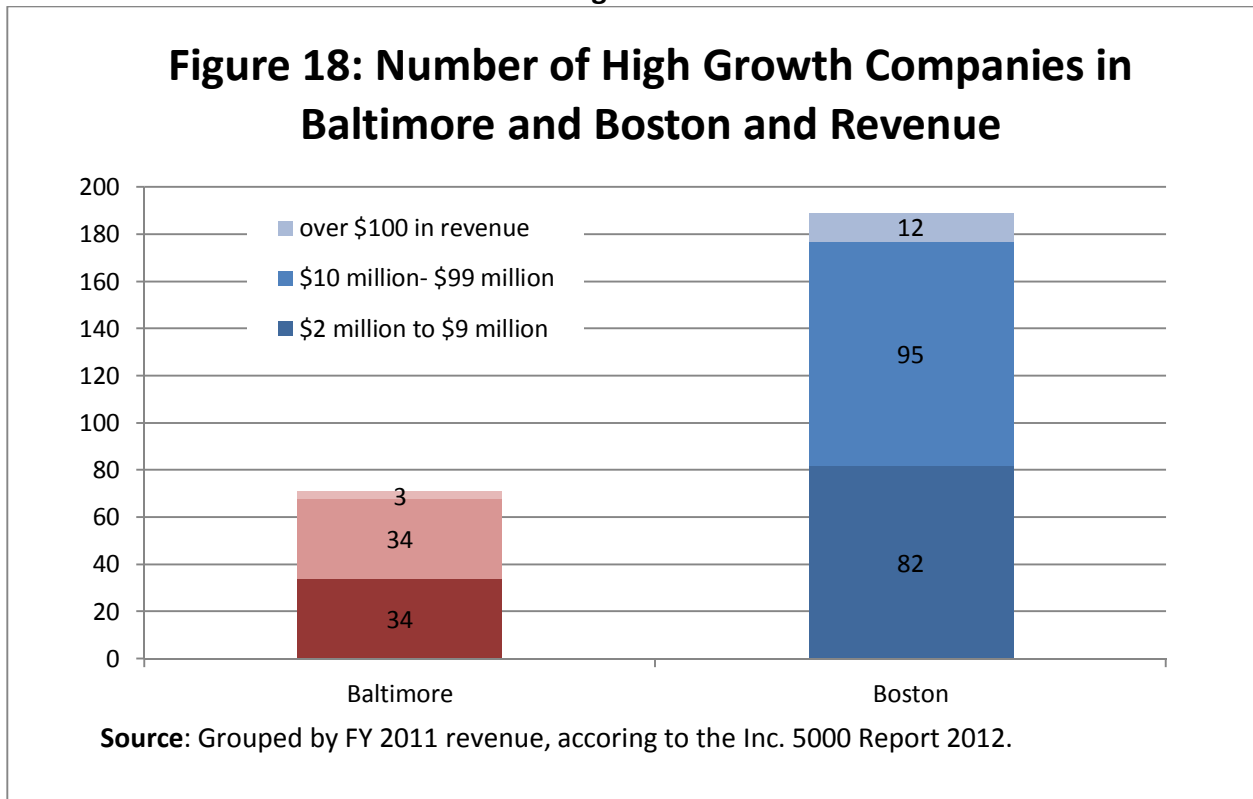
Finally, their presence encourages concentration of technology in the region.<sup>69</sup> The existing industrial base of each region often serves as the heart of an “industry cluster”—an area of economic specialization driven by the existing expertise of the companies and workers located in the area. Silicon Valley, for example, is known for large and high-profile technology companies like Apple, Google, and Facebook. These companies attract talent to the region, and their alumni populate many of the startup companies vying to become the next generation of tech successes. Similar roles are played by Amazon and Microsoft in Seattle and Dell and Samsung in Austin.

### Data review

This report looked at high-growth companies and patent density (not just patents from universities) as two measures of established companies.

**Top companies by growth.** Baltimore had 71 companies with annual revenue over \$2 million on Inc.’s list of 5000 high-growth companies, including three with annual revenue above \$100 million.<sup>70</sup> In contrast, Boston is home to 189 of Inc.’s fastest growing technology companies, 12 of which had 2012 revenue above \$100 million.<sup>71</sup>

Figure 19

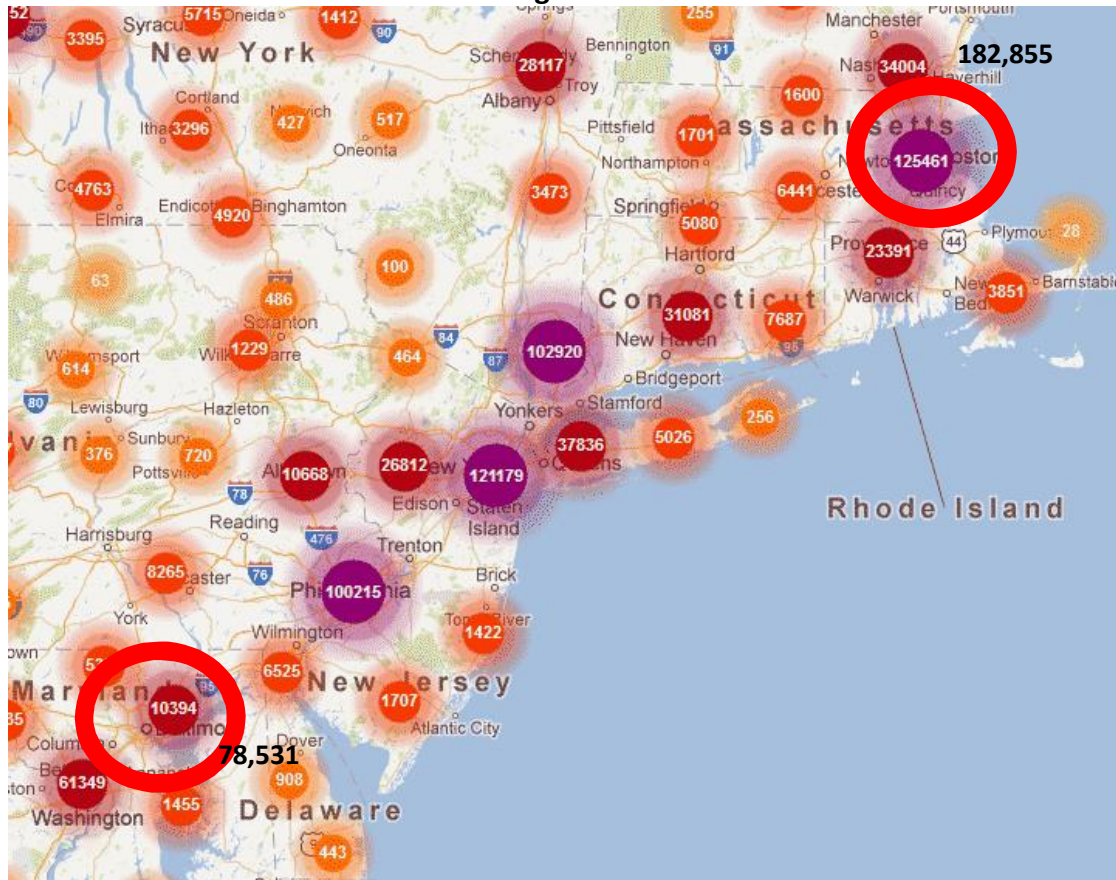


Geographic scope: MSA.

**Issued patent density by region.** Another indirect measure for level of technology companies in a region is to consider patents ownership, that is, patents held by any owner in a region. As Figure 20 shows, Boston has 12 times more patents in the city than Baltimore does.



Figure 20



**Timeframe and Source:** As of April 2013, Freepatentsonline.com/map

**Geographic scope:** Baltimore; D.C.; and Arundel, Talbot, Caroline, and Queen Anne counties; and Boston, Providence and Southern New Hampshire metropolitan regions.

**Top industry clusters.** Boston and Baltimore each are also the center of certain “industry clusters” that represent an accumulation of substantial human and physical capital in a specific industry. In Baltimore, developing or established clusters include in EdTech, life sciences, cybersecurity, drug and medical devices, mobile IT, gaming, health IT, and advertising. In Boston, areas of expertise include finance and insurance, technology and scientific services, education and health care.<sup>73</sup>

With respect to life sciences, Both Boston and Baltimore are ranked consistently in the top five metropolitan regions in the country in various measures of their life sciences industry clusters, which includes biotechnology, pharmaceuticals, medical research facilities, and related fields.<sup>74</sup> Maryland has more than 500 biotech companies as of 2010.<sup>75</sup>

With respect to EdTech, Baltimore’s educational technology cluster raised more than \$35 million in venture capital last year.<sup>76</sup> Jennifer Gunner-Meyer, Chief Operating Officer of the Economic Alliance of Greater Baltimore (EAGB), recently suggested that Baltimore’s emerging educational technology cluster was “positioned to take the lead in the EdTech industry.”<sup>77</sup> Nine members of the ETC (Emerging Technology Centers) Incubator are also in EdTech.<sup>78</sup>

Other sectors in the Baltimore region include manufacturing (as of 2009, 1,739 manufacturing companies had operations in greater Baltimore, 134 of which had 100 or more employees<sup>79</sup>) and Cyber Security (the recent Cyber Point/Abell report found 19,413 job openings at 1,800 companies across the state<sup>80</sup>).

**Summary of Established Technology Companies.** Boston’s ecosystem is “Established” on this dimension, and Baltimore’s is “Nascent.” Baltimore has substantially fewer established high-growth companies, especially among those with higher revenue levels.

## 6. Support Platforms

### Definition and context

Support programs include business incubators, online collaboration platforms, training programs, networking groups, and co-working spaces.

Support platforms can provide some or all of the four resources, but the most common resource provided is interconnectivity. Other services/supports include: office space, IT services, reception and office management services, guidance, mentoring, networking, educational services, and sometimes seed capital. In so doing, these organizations speed the flow of all four resources among entrepreneurs, mentors, investors, and other stakeholders: *talent, technology, capital, and network interconnectivity.*

These platforms can take many forms. They can be for-profit, government agencies, or nonprofit. They can exist in physical space or in cyberspace. They can be an organization, an event, or a set of events. They can be formal or informal, such as coffee shops. Specific examples include:

- Accelerators, incubators, co-work spaces
- Online and face-to-face informal collaboration platforms, including meet-up groups and events
- Business and technical skills learning programs
- Grantmakers and business plan competitions

The “Market Study and Gap Analysis Report: ‘A Canvas for Innovation’ Feasibility Study,” prepared by Facility Logix for The Abell Foundation, provides an overview of incubators, accelerators, and co-working spaces, including the differences between these three types of organizational models. It also contains detailed descriptions of organizations present in Baltimore, Boston, and elsewhere around the country.<sup>81</sup>

The table below illustrates the major functions played by support platform organizations:

Support platforms and their functions								
	Physical place?	Network connectivity	Talent	Ideas / Technology	Capital	Cost?	Baltimore Example	Boston Example
<b>Co-working space</b>	Yes, office space	Yes, via bumping elbows	Informal meetings and discussion	No	No	Fee	Beehive Baltimore (part of ETC)	Dogpatch Labs
<b>Incubator</b>	Yes, office	Yes, via intentional	Informal educational	Usually	No	Some-times	Emerging Technologies	iLab

Support platforms and their functions								
	Physical place?	Network connectivity	Talent	Ideas / Technology	Capital	Cost?	Baltimore Example	Boston Example
	space	network	programming			free	Center	
<b>Accelerator</b>	Usually	Yes, via intentional network	Structured mentorship programs	Promote development of ideas and technology	Grant and/or equity investment	Usually equity stake	Accelerate Baltimore	Mass Challenge
<b>Meetup group / event organizers</b>	No	Yes, via bumping elbows	Informal educational discussion	No	No	No	Ignite Baltimore, Baltimore Tech Breakfast, Co-Founders Lab	IDEAS Boston, Boston Venture Cafe
<b>Online collaboration platforms</b>	No	Yes, via awareness of potential collaborators and resources.	No	No	No	No	Baltimore TechNet.	Greenhorn Connect
<b>Government grant makers and seed funds</b>	Sometimes	Depends	May provide mentorship, oversight, or technical assistance	Fund technology development	Capital for startups	Maybe	TEDCO	MassVentures

There are many organizations performing one or more of these Support Platform roles in Baltimore, either exclusively or as part of a regional or statewide effort. A sampling includes the following:

- Baltimore’s **Emerging Technologies Center (ETC)**: supports Baltimore companies through incubation and mentorship, and includes incubation space, entrepreneurs in residence, mentorship, and networking
- **AccelerateBaltimore**: accelerator program within the ETC
- **Betamore**: co-working space and provider of educational services
- **Maryland Biotechnology Center**: supporting the state’s biotechnology sector
- **Maryland Center for Entrepreneurship (MCE)**: an initiative of the Howard County Economic Development Authority, to support the development of a regional entrepreneurial ecosystem
- **CyberMaryland**: connecting businesses with R&D, education, workforce and contracting opportunities
- **BioHealth Innovation Inc.**: supporting Central Maryland in becoming a leader in BioHealth commercialization
- The **Greater Baltimore Committee**: improving the business climate of the Greater Baltimore region through its organization of business and civic leaders
- The **Innovation and Technology Committee of the Greater Baltimore Committee**: serves as a public policy advocate on emerging technology issues

- **Maryland Department of Business Development and Economic Development:** supporting economic development across sectors
- **Baltimore Development Corporation:** supporting economic development for the City of Baltimore
- **Office of the Mayor, Deputy Chief, Economic Development, City of Baltimore:** overseeing and guiding economic development and other related functions

Data review and detail on selected Boston programs:

Baltimore and Boston both have a wide variety of support platforms for entrepreneurship. Twenty-six platforms were identified each in Baltimore and Boston. A few are described in greater detail below.

**Accelerator Programs.** AccelerateBaltimore is a Baltimore-based accelerator program. MassChallenge is Boston’s flagship accelerator program. As the chart indicates, MassChallenge is a larger program, awarding more money and involving more participants, applicants and mentors.

	AccelerateBaltimore	MassChallenge
<b>Number of Applicants</b>	118	733
<b>Application Fee</b>	\$0	\$99 early bird fee and \$199 entry fee
<b>Number of Funding Awards</b>	6	125 selected for accelerator/ 10-20 selected for funding awards at end of 90 days
<b>Amount of Funding Awards</b>	\$25,000 / upfront investment of 1/2 before entering accelerator, 1/2 within 6 weeks	\$50,000 and some \$100,000 awards at end of 90 days
<b>Equity Participation</b>	Up to \$25,000 in principal amount of convertible promissory note; simple interest accrues at (6%) per annum	no equity taken
<b>Length of Accelerator</b>	90 days	90 days
<b>Target Companies</b>	Ability to create, launch and generate user feedback from a viable product within three months	early stage entrepreneurs of any industry, high impact in terms of revenue, profit, job creation, helping a specific population, curing a disease
<b>Financial and in-kind support</b>	The Abell Foundation, with additional support/ from MD DBED, Millennial Media, R2integrated,/ L.E. Goldsborough & Son, SC&H, T.R. Klein & Co, Americas Remote Help Desk and Rosenberg Martin Greenberg, LLP	State of Massachusetts, John W. Henry Family Foundation, Perkins School for the Blind and VenCorps
<b>Number of Volunteer Mentors</b>	11	300-400
<b>Free office space</b>	Yes [also, ETC staff support companies with	Yes, and below-market rents

<b>and services</b>	strategic planning, decision-making and business analysis]	following 90-day period
---------------------	--	-------------------------

Since its founding in 2010, 361 MassChallenge alumni companies have raised a collective \$362 million in early stage capital, generated \$95 million in revenue and created nearly 3,000 jobs.<sup>82</sup>

Stakeholder interviews in Boston indicate that the quality and quantity of mentors participating in the MassChallenge is viewed as particularly high. Data from the AccelerateBaltimore, now in its second year, is being captured and tracked.<sup>83</sup>

**Incubators/co-working spaces.** According to a survey conducted by the Economic Alliance of Greater Baltimore, the Baltimore metro region has the third highest number of business incubators per capita.<sup>84</sup> There are more than 20 incubators in the state of Maryland.<sup>85</sup>

**Cambridge Innovation Center (CIC).** In Boston, the Cambridge Innovation Center is an important facility, in part because it is home to so many others.

The Center provides start-up business’ needs such as telecommunications infrastructure, conference rooms, reception, and office supplies. Bundling these services together with office space permits companies to share the costs and focus on other, critical activities.

CIC houses incubation programs and co-working spaces who themselves are tenants of CIC. It is also home to venture capital firms and startup companies who they may be invested in, as well as Boston-based tech media companies acting as cheerleaders. A concentrated center of activity increases the level of interconnectivity by encouraging interactions with entrepreneurs, investors, mentors, and other actors.

Note: CIC does not itself manage the incubation programs, but focuses on maintaining a space to meet needs of other entrepreneurship ecosystem actors. Borrowing from analysis of innovation policy expert Melba Kurman, the CIC is not a “cathedral,” where hierarchy exists and activities are coordinated centrally toward a desired outcome, but rather a “bazaar,” where capital, talent, and technology can flow freely and close proximity can lead to more tightly connected networks.<sup>86</sup>

Stakeholder	Description	Function within model
<b>Cambridge Innovation Center</b>	<ul style="list-style-type: none"> <li>Managed office services firm geared toward the needs of startup companies.</li> <li>Includes services such as month-to-month leases, scalable office space capacity, video conferencing, office management services.</li> </ul>	<ul style="list-style-type: none"> <li>Increase <i>network connectivity</i> by concentrating entrepreneurial density within a building.</li> <li>Speed <i>technology</i> development by giving startup companies a place to rapidly scale as they develop and market products,</li> <li>Help increase flow of <i>capital</i> by co-locating investors and entrepreneurs in the same building with a mix of traditional commercial real estate and non-traditional incubation</li> </ul>

Stakeholder	Description	Function within model
		space.

**Government as investor:** Most government initiatives can be fit into one or more categories. Maryland’s TEDCO, for example, serves as a *support platform* as well as an *investor*, a provider of *experienced mentors*, and a *cheerleader*.<sup>87</sup>

The following chart identifies government-sponsored investments affecting both cities.

Government investment platforms	
Baltimore	Boston
TEDCO Capital Partners (together they make the top 100 list of for-profit VC firms nationally)	Mass Ventures (Formerly Mass Technology Development Corporation)
Invest Maryland	Massachusetts Growth Capital Corporation
Maryland Stem Cell Research Fund	Mass Development

Both Maryland and Massachusetts have state venture investment programs, via TEDCO and MassVentures. Each has invested millions of dollars in promising emerging technology companies in their respective states.

TEDCO spent \$15.6 million on innovation grants in 2012, \$12.4 million of which was invested specifically as part of the Stem Cell Research fund and went predominantly to university research. More than 90 percent of the \$100 million awarded from the Stem Cell Research Fund has gone to Baltimore City.<sup>88</sup>

TEDCO’s budget in 2012, including state allocation and a reinvestment of returns, was \$2.335M. Spending included \$890,000 invested across five university, technology transfer, entrepreneurship, and industrial partnerships funds in innovative projects and partnerships, and \$1.2 million on technology transfer support and technical assistance services. By comparison, MassVentures invested \$2.2 million in 11 Massachusetts companies, and managed a total investment portfolio value of \$17 million. Separating the stem cell research fund managed by TEDCO, the scale of Maryland and Massachusetts investments in their local technology entrepreneurship industry are similar.

**Summary of Support Platforms.** Boston’s and Baltimore’s ecosystems are “Established.” Baltimore and Boston have a large and diverse set of support programs. In Baltimore, every important support role is provided by at least one organization.

## 7. Cheerleaders

### Definition and context

Cheerleaders serve to increase *interconnectivity* by making connections and sharing information within the ecosystem. Cheerleaders can be individuals as well as organizations and include websites, blogs, news organizations, and social media platforms. Cheerleaders can be self-appointed, and may develop over time.

Cheerleaders are important. When actors are aware of each other’s exits, acquisitions, and resource needs, it is more likely that the right matches get made. At the same time, cheerleaders make

stakeholders aware of opportunities to engage one another—connections that might not have otherwise happened. And last, cheerleaders help to raise the profile of the entrepreneurial ecosystem, increasing the likelihood of attracting more actors and resources.

**Data review**

**Organizations and information portals.** Both Baltimore and Boston have several organizations and information sources that are performing Cheerleader functions in their respective ecosystems, as the following chart indicates. Some are focused exclusively on questions related to the entrepreneurial ecosystem, others have a broader scope.

Note: This list does not include organizations otherwise mentioned in this report that also perform cheerleader functions along with their other roles.

<b>Organizations performing Cheerleading roles</b>	
<b>Baltimore</b>	<b>Boston</b>
Baltimore Business Journal’s technology coverage	BostInnovation
Baltimore Collegetown	Boston Entrepreneurship
Baltimore County Tech Council	Boston Globe Tech section
BaltimoreTech.Net	Boston Herald Tech section
BaltTech	DartBoston
CityBizList	Greenhorn Connect
Economic Alliance of Greater Baltimore	Mass High-tech
Howard Tech Council	Mass Technology Leadership Council (Mass TLC)
Ignite Baltimore	Scott Kirsner’s Innovation Economy Blog (boston.com)
Newt Fowler’s Blog	Venture Fizz
Technically Baltimore	Xconomy Boston
The Baltimore Sun’s technology coverage, Balt Tech	

**Blogs per capita.** An innovative method to estimate the presence of online cheerleaders for entrepreneurial ecosystems is to measure blog creation and readership. More blogs imply more technological savvy, and more readership of locally focused blogs suggests more information sharing.

An analysis conducted by Boston-based venture capitalist and entrepreneur Joe Kinsella, found that Boston ranked fifth in the country in terms of number of blogs per 10,000 population (29.7), while Baltimore did not make the top 10<sup>89</sup>.

**Figure 21**

Rank	Blogs Per 10K Population	Area
1	59.27	Berkeley
2	42.63	Seattle
3	32.67	San Francisco
4	32.49	Palo Alto
5	29.71	Boston
6	27.13	Austin
7	25.15	Pittsburgh
8	24.80	Manhattan
9	24.17	Portland
10	23.44	Orlando

**Source and Timeframe:** As of Spring 2013 via HighTechInTheHub.com  
**Geographic scope:** City limits.

Quality as well as quantity of online content also matters; see Attachment C for further suggested research on the relationship between cheerleading platforms and ecosystem development.

Detail on selected Boston programs and institutions:

**Greenhorn Connect.** Greenhorn Connect is an online networking platform and social network geared towards engaging Boston-area students in the local startup scene. The platform includes an updated list of local resources for aspiring entrepreneurs, relevant articles, and jobs. It also sponsors volunteer student entrepreneurs “connectors” who serve as mentors to help those students with the entrepreneurial itch find their niche. It helps *connect* students to local ecosystem and in so doing helps cultivate a flow of *talent*.

Stakeholder	Description	Function within model
<b>Greenhorn Connect</b>	<ul style="list-style-type: none"> <li>Online platform for Boston’s aspiring entrepreneurs (“Greenhorns”) to connect with the entrepreneurship ecosystem. Includes a catalogue of local support platforms and events.</li> </ul>	<ul style="list-style-type: none"> <li>Increase <i>connectivity</i> between aspiring entrepreneurs and various kinds of support platforms and talent development resources.</li> </ul>

**Summary of Cheerleaders.** Boston’s and Baltimore’s ecosystems are “Established” on this dimension. Both have a diverse set of Cheerleaders.



## Environmental Factors of the Entrepreneurial Ecosystem

Thus far, this report has discussed how entrepreneurship ecosystem *actors* use, create, and exchange *assets*—talent, technology, and capital in connected networks—to foster ecosystem *outputs*.

Also important in an entrepreneurial ecosystem is the *environment* in which these actors operate. The physical, policy and regulatory, and arts and cultural environments also impact the innovation ecosystem. Three of these environmental factors are briefly explored in this section.

- **Policy incentives** that could encourage or discourage an entrepreneurial ecosystem.
- **Population density**, and strength **transportation systems**, both of which affect the level of connectivity in a community.
- **Arts and cultural environment** that contribute to entrepreneurial ecosystems.

### 1. Policy incentives

Here, policy incentives are defined as governmental laws and regulations that are distinct from the creation of programs or initiatives described above.

Policy incentives—in particular, tax policy—can substantially impact economic development activities, for example, by encouraging particular forms of investment.<sup>90</sup>

The policies that specifically affect entrepreneurship occur primarily at the state level. Both Maryland and Massachusetts offer a range of policy incentives, summarized in the table below, to encourage technology-driven entrepreneurship and support new and growing companies. The most common forms are tax credits, and also include state-funded or quasi-state managed investment funds, loan and grant programs, and other financing assistance programs.

Type of incentive	Maryland policy incentive	Description	Massachusetts policy incentive	Description
<b>Job creation</b>	Job Creation Tax Credit	One-time tax credit of \$1,000 (\$1,500 in identified revitalization areas) for each job created (minimum 60 jobs). <sup>91</sup>	Job Incentive Payments (Life sciences only)	Payments to companies for hiring a minimum of 10 workers in biomedical and medical device fields only. <sup>92</sup>
<b>Enterprise zones</b>	Enterprise Zone Tax Credit	Property tax and income tax credits of varying degrees for businesses in Baltimore and PGC. “Economically disadvantaged employees” can qualify employers for a \$6,000 income tax credit in pre-selected zones. <sup>93</sup>	(No enterprise incentives program.)	N/A
<b>Economically Disadvantaged</b>	Focus Area Tax Credit	Up to \$9,000 for hiring economically	(No focus area tax credit)	N/A

Type of incentive	Maryland policy incentive	Description	Massachusetts policy incentive	Description
<b>small businesses</b>		disadvantaged employees. <sup>94</sup>		
<b>Startup Tax credits</b>	Startup Tax Credit	Tax credit to cover startup or moving costs to identified “economically distressed areas” up to \$500,000. <sup>95</sup>	(No startup tax credit.)	N/A
<b>R&amp;D tax credits</b>	Research and Development Tax Credit	Up to 10 percent of R&D expenses above the 4-year running average. <sup>96</sup> Minimum of \$3 million. <sup>97</sup>	Research and Development Tax Credit	10 percent income tax credit for research expenditures and 15 percent for donations to nonprofit research organizations. The credit is permanent, which makes it more powerful. Very low minimum tax liability needed. <sup>98</sup>
<b>Life sciences sector tax credits</b>	Biotechnology Tax credit	Up to \$250,000 for investors in MD-based biotech companies. Available on first come-first served basis with application process. <sup>99</sup>	Life Sciences Tax Incentive Program	Up to \$25 million in through a package of tax incentives, including: Investment tax credit of up to 10% on life sciences business and technology investments (not just R&D), separate life sciences research tax credits, credits to cover FDA user fees, a refundable credit for hiring life science workers. <sup>100</sup>
<b>Energy sector credits</b>	Cellulosic Ethanol Technology R&D Tax credit	10% or up to \$250,000 for R&D expenses in cellulosic ethanol. <sup>101</sup>	MassClean Energy Center Investments in Job Creation	Growth capital investments in qualifying clean energy startup companies. Investments for both technology development companies and construction of generation projects.
<b>Talent development credits</b>	(No internship subsidy program)	N/A	Life Science Internship Challenge	State will reimburse life science technology companies at \$15 per hour for internships geared toward enhancing the <i>talent</i> pipeline in this key industry. <sup>102</sup> More applicable to growing companies, rather than startups.
<b>Direct loans and financing assistance</b>	Equity Participation Investment Program	Loans, loan guarantees and equity investments up to \$1 million for qualifying “economically disadvantaged”	Life Sciences Accelerator Program	Provides loans up to \$1 million to early stage life sciences companies. <sup>104</sup>

Type of incentive	Maryland policy incentive	Description	Massachusetts policy incentive	Description
		entrepreneurs. <sup>103</sup>		
<b>Direct loans and financing assistance</b>	Maryland Capital Access Program	Loans up to \$1 million to small businesses and nonprofits in “Priority funding areas.”	Mass Growth Capital Corporation	Provides a range of financial assistance instruments, including subordinated loans, lines of credit, term loans, and loan guarantees. Many of these loans are viable for mid-sized high growth companies, but not early stage startups.
<b>Export Program</b>	Export MD	Up to \$10,000 reimbursement for expenses related to international marketing.	State Trade and Export Program (STEP)	Grants up to \$10,000 to finance export operations in the state of Massachusetts. <sup>105</sup>
<b>Federal matching program</b>	(No federal matching program.)	N/A	Small Business Matching Grant Program / Mass Ventures START	Provides \$100,000 matching for companies winning federal SBIR grants. <sup>106</sup>

Two initial trends emerge from an initial review of these programs. A deeper analysis is recommended if revisions to policy incentives are considered; see the Recommendations section and Attachment C.

First, interviews indicate that the Maryland policy incentives are a substantial driver for investors in the Baltimore entrepreneurial ecosystem.

Second, Maryland has a greater number of programs designed specifically for “economically disadvantaged” and “economically distressed” use cases. These categories refer to neighborhoods and areas where local unemployment rates are substantially above the average, or where substantial economic upheaval threatens the local economic fabric.

**Summary of policy incentives.** Maryland and Massachusetts each have a set of policy incentives aimed at facilitating economic development. Further study would be required before determining whether Baltimore’s or Maryland’s policies should be changed to accelerate the entrepreneurial ecosystem.

## 2. Density and transportation

### Definition and context

Even in the age of the Internet, geographic proximity of entrepreneurial actors (and others kind of cooperative effort) matters.<sup>107</sup> Studies have shown that density matters for entrepreneurship and creation at the regional, city, neighborhood, and even office level.<sup>108</sup> To take the logic to the extreme, the research suggests that a single building would be the optimal distribution of entrepreneurs in a city. The intuition behind this leads to interventions like entrepreneur dorms and cohabitation places, occurring in places as varied as Kansas City and Singapore. There are sufficient “positive network

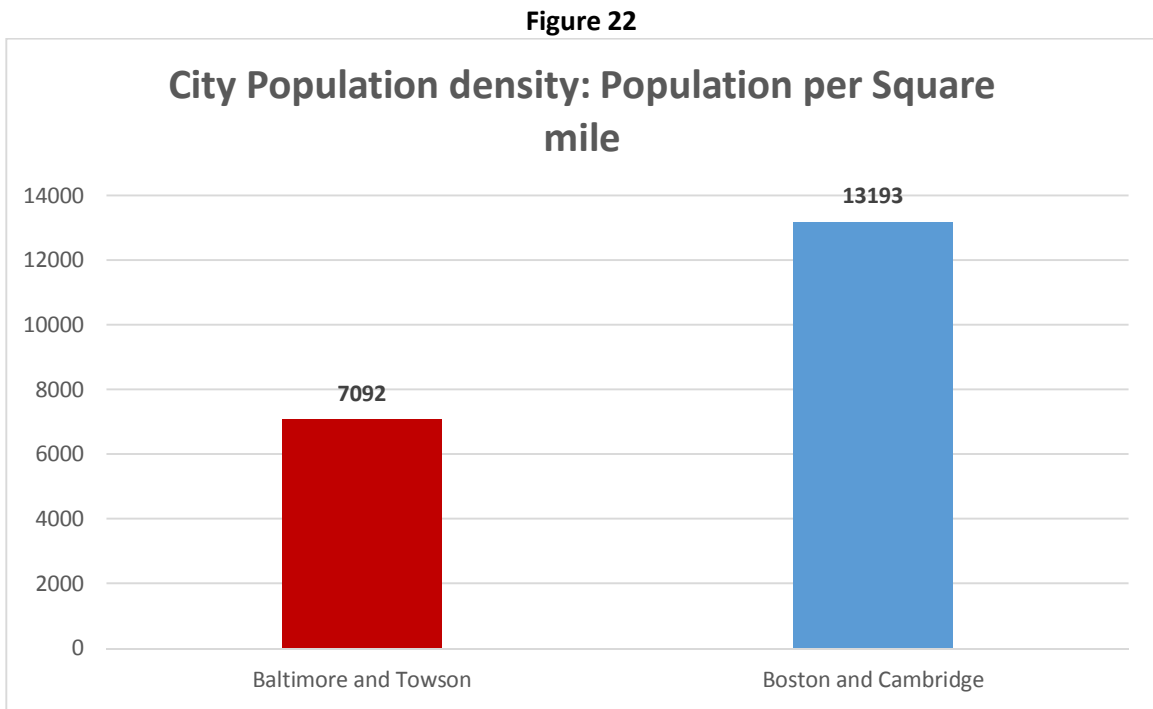
effects” such that policymakers in early stage entrepreneurial ecosystems should encourage the concentration, rather than diffusion, of actors and resources.

Closely related to density is the strength of the transportation system, in particular public transit options. Transportation systems can increase the “effective density” of an entrepreneurial community by connecting individual participants in the innovation who are otherwise separate. Scholar Richard Florida found that members of the “creative class,” which includes potential entrepreneurs, prefer to live in communities that are walkable and bikeable, and have effective public transit.<sup>109</sup>

A brief discussion of transit and density is provided below. Other Baltimore-area institutions, including the Greater Baltimore Committee, have conducted substantial analysis on Baltimore’s regional transit.<sup>110</sup>

**Data review**

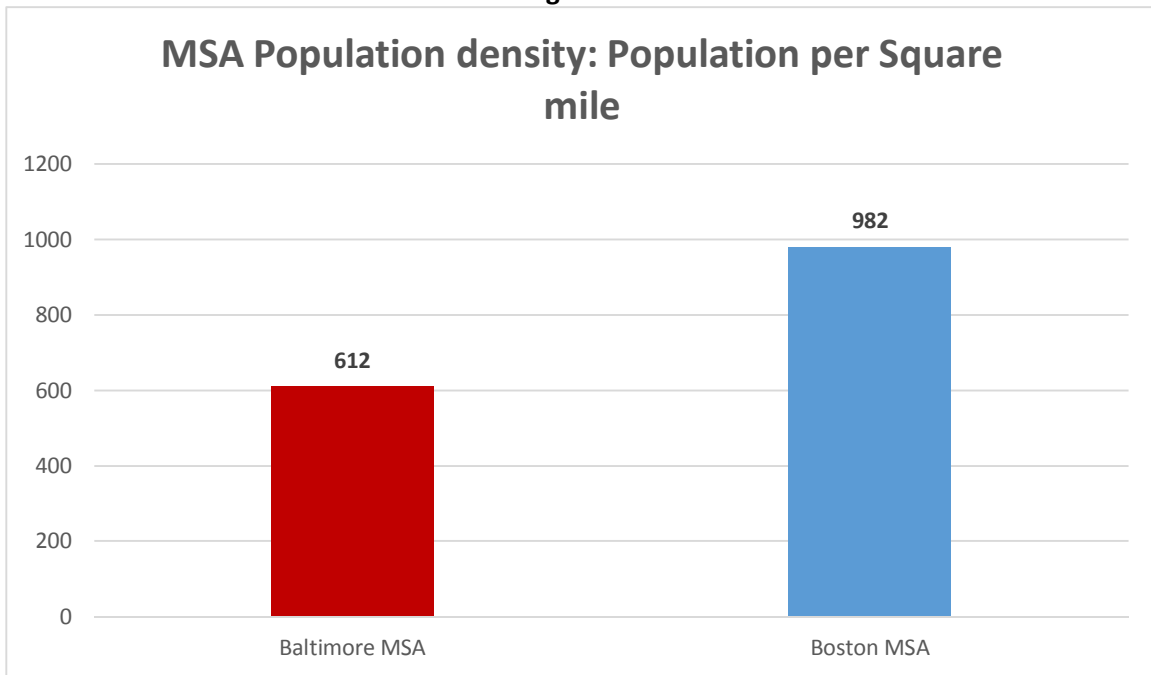
**Population density.** Boston is denser than Baltimore, both when considering the urban core (Figure 22) and the greater region (Figure 23).



**Source and Timeframe:** US Census Bureau, 2010.

**Geographic scope:** City political boundaries.

Figure 23



**Source and Timeframe:** US Census Bureau, 2010.  
**Geographic scope:** MSAs (Metropolitan Statistical Areas).

**Transit and transportation preferences.** As part of its “One-in-3” initiative, Boston surveyed its entrepreneurial demographic about transportation habits and found that 58 percent of these young, urban, and creative professionals walk, bike, or take public transit to work.

In Baltimore, Beth Strommen, Director of the City's Office of Sustainability, noted that 36 percent of Baltimore residents do not own a car. As the Greater Baltimore Committee reported on her comments at a recent planning meeting, “the share of new cars purchased by 18-34 year olds dropped 30 percent, and not just because they can't afford them, according to Strommen. They don't want to have to have them.”<sup>111</sup>

**Transit systems.** Boston's subway and bus system serves its major innovation regions.

Baltimore's subway and light rail systems do not connect the major innovation regions. There are multiple bus options available to some or all ecosystem participants (Charm City Circulator, Collegetown Network, Hopkins Shuttle, MTA). Anecdotal evidence suggests that these public networks are not effectively viewed as reliable connectors of Baltimore innovation neighborhoods—due less to the specifics of the Baltimore network than a general perception that subway and rail systems are more compelling than buses.

Travelling from Fells Point—an attractive neighborhood for young potential entrepreneurs—to Hopkins' Homewood campus, for example, requires a 5 mile/ 30 minute bus ride, and it is considered unusual for students to use public transportation to get between them. An analogous trip in Boston—between, say, Jamaica Plain and Harvard University—can be easily done via the “T.”<sup>112</sup>

**Boston ‘microapartments’.** City planners in Boston recently gave approval for continued development of so-called “microapartments,” small square footage units in dorm-like housing developments catering to the urban creative class in or near Boston’s innovation neighborhoods.<sup>113</sup>

**Boston’s Hubway bike-sharing program.** Boston has a bike-sharing program, the Hubway, with 112 stations and 1,100 bikes. The program has a monthly membership fee; in exchange, participants get unlimited rides for 30 minutes or less, and pay a fee to use a bike for a longer period. Bikes can be returned to any station.<sup>114</sup>

The program is viewed as a success. It is estimated to have replaced 13 percent of car trips in its first year of operation.<sup>115</sup> Program officials report the program has been viewed positively across the city, including by members of the potential entrepreneur demographic groups.<sup>116</sup>

**Summary of density and transportation.** Boston has higher density than Baltimore, in terms of people per square mile. Boston also has higher “effective density” for its entrepreneurial ecosystem centers because of the location of its transit system.

### ***3. Culture and Creativity***

#### **Definition and context**

Studies have found a strong correlation between arts, culture, and other indicators of “creativity” and effectiveness of entrepreneurial communities.<sup>117</sup>

As mentioned above, many of these environmental and entrepreneurial ecosystem factors intersect. For example, Richard Florida found that many in the “creative class,” which includes potential entrepreneur talent, want to live in walkable and bikeable neighborhoods, and in cities with effective public transit.<sup>118</sup>

#### **Data review and summary**

Both cities score high on cultural dimensions. On Richard Florida’s Creativity Index, Boston ranks number three overall, with Baltimore, including D.C., coming in at number nine.<sup>119</sup>

These findings support the anecdotal evidence that both cities have thriving artistic and cultural activity. In Baltimore that includes design firms, a rising foodie scene, art studios and collectives, festivals, organizations such as the Creative Alliance, multiple museums and performing arts institutions, and a premier arts school.<sup>120</sup>

## **Comparisons of the Entrepreneurial Ecosystems**

### ***Boston’s entrepreneurial ecosystem is “Established.”***

The data indicate that Boston is an “Established” ecosystem. Boston has the actors needed for success in abundance and those actors are well connected by information sharing platforms, frequently collaborating to share technology, talent, and capital to create new startups.

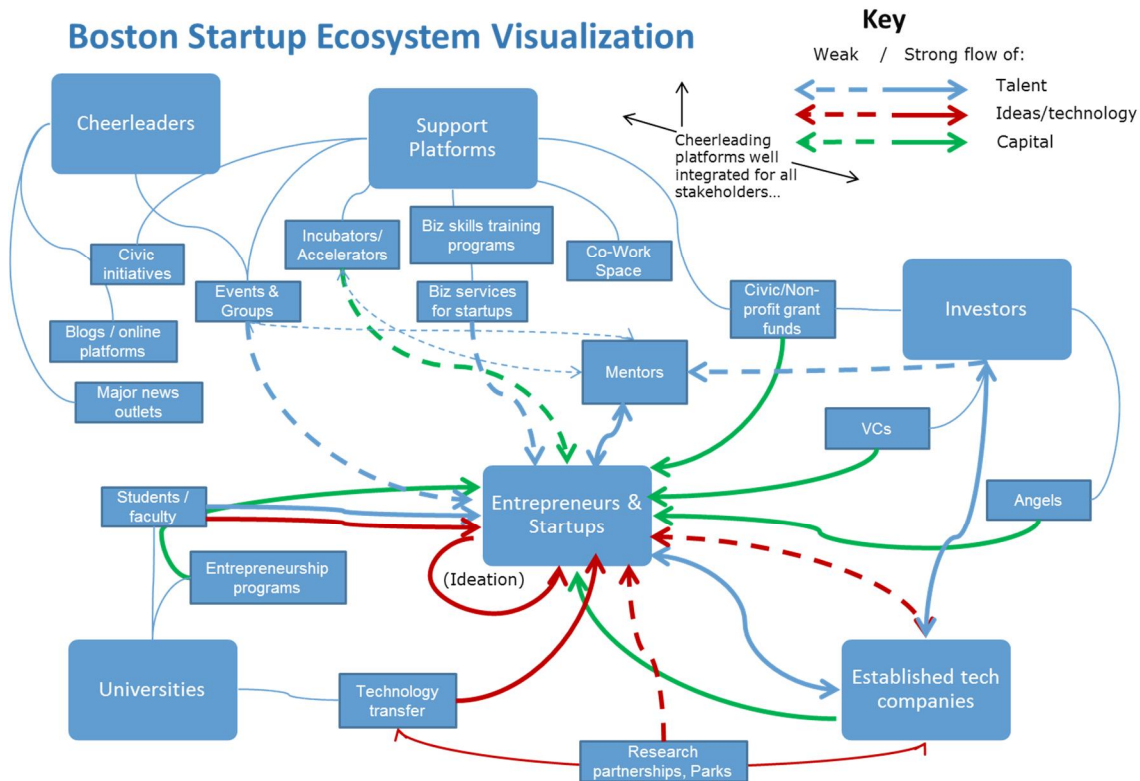
The following charts summarize an actor-level analysis of both Boston and Baltimore. Green text refers to indicators that an ecosystem is “Established,” yellow is for “Emerging,” and Blue is for “Nascent.”

Boston	Name	Evaluation	Supporting Evidence
Outputs	Startup companies	Established	<ul style="list-style-type: none"> <li>1,647 self-identified startup companies in the Boston metropolitan region.</li> <li>189 larger high-growth companies in metropolitan region.</li> </ul>
	Wealth and jobs	Established	<ul style="list-style-type: none"> <li>At least \$3 billion in 2012 revenue from high-growth firms.</li> <li>Almost 5,000 people employed in “high-tech” for every 100,000 population.</li> </ul>
Ecosystem Actors	Entrepreneurs	Established	<ul style="list-style-type: none"> <li>Large number of startups, above</li> <li>Large pool of potential entrepreneurs, including those between ages 20 and 34 (35% of population) or with a higher education degree.</li> </ul>
	Mentors	Established	<ul style="list-style-type: none"> <li>14 mentor/entrepreneur matching services identified.</li> </ul>
	Investors	Established	<ul style="list-style-type: none"> <li>\$3.2 billion invested in 448 venture-backed startup deals in New England.</li> <li>12.7% of all early stage deals by deal count (New England).</li> <li>91 seed and growth capital organizations have offices within 15 miles of Boston.</li> </ul>
		Established	<ul style="list-style-type: none"> <li>At least 29 institutions of higher education located in Boston and Cambridge cities, with about 153,000 students enrolled.</li> <li>21% of the population in Boston and Cambridge cities enrolled in higher education.</li> <li>Research universities and medical centers in the state of Massachusetts invested \$5.4 billion in research in 2011.</li> <li>13 institutional technology transfer offices filed for and received 526 patents in 2011.</li> <li>73 tech startups from university/medical center innovations formed in 2011.</li> <li>At least seven programs geared explicitly toward engaging student populations in entrepreneurship.</li> </ul>
	Universities	Established	<ul style="list-style-type: none"> <li>At least 29 institutions of higher education located in Boston and Cambridge cities, with about 153,000 students enrolled.</li> <li>21% of the population in Boston and Cambridge cities enrolled in higher education.</li> <li>Research universities and medical centers in the state of Massachusetts invested \$5.4 billion in research in 2011.</li> <li>13 institutional technology transfer offices filed for and received 526 patents in 2011.</li> <li>73 tech startups from university/medical center innovations formed in 2011.</li> <li>At least seven programs geared explicitly toward engaging student populations in entrepreneurship.</li> </ul>
	Established tech firms	Established	<ul style="list-style-type: none"> <li>189 firms in Boston made the Inc. top 5,000 “high-growth” companies list; of these, 12 had annual 2012 revenue figures above \$100 million.</li> <li>125,000 patents held in the Boston metropolitan region (including nonprofit research institutions).</li> </ul>
	Support platforms	Established	<ul style="list-style-type: none"> <li>26 support platforms identified.</li> </ul>
Cheerleaders	Established	<ul style="list-style-type: none"> <li>Eleven cheerleading platforms exist.</li> </ul>	

Figure 24 presents a visualization of the Boston startup ecosystem. Blue boxes represent actors, with several subcategories of actors broken out for reference. Lines represent flow of the three resources,

with the overall number of lines serving as a proxy for the level of connectedness of the ecosystem overall. Each line delineates a specific kind of relationships between specific kinds of actors, although the lines shown are not comprehensive. Solid lines represent a stronger flow, dotted lines a weaker one.

**Figure 24**



***Baltimore’s entrepreneurial ecosystem is “Emerging,” and has the potential to become “Established.”***

Baltimore	Name	Description	Data
Outputs	Startups	Emerging	<ul style="list-style-type: none"> <li>345 technology startup companies in the metropolitan region.</li> <li>71 larger high-growth companies in metropolitan region.</li> <li>Almost 3,000 people employed in “high-tech” for every 100,000 population.</li> </ul>
	Wealth and jobs	Emerging	<ul style="list-style-type: none"> <li>See startup count, above</li> <li>At least \$1.6 billion in 2012 revenue from high-growth Baltimore companies.</li> </ul>
Ecosystem Actors	Entrepreneurs	Emerging	<ul style="list-style-type: none"> <li>See startup count, above.</li> <li>26% of the population between ages 20 and 34 in the city proper.</li> </ul>

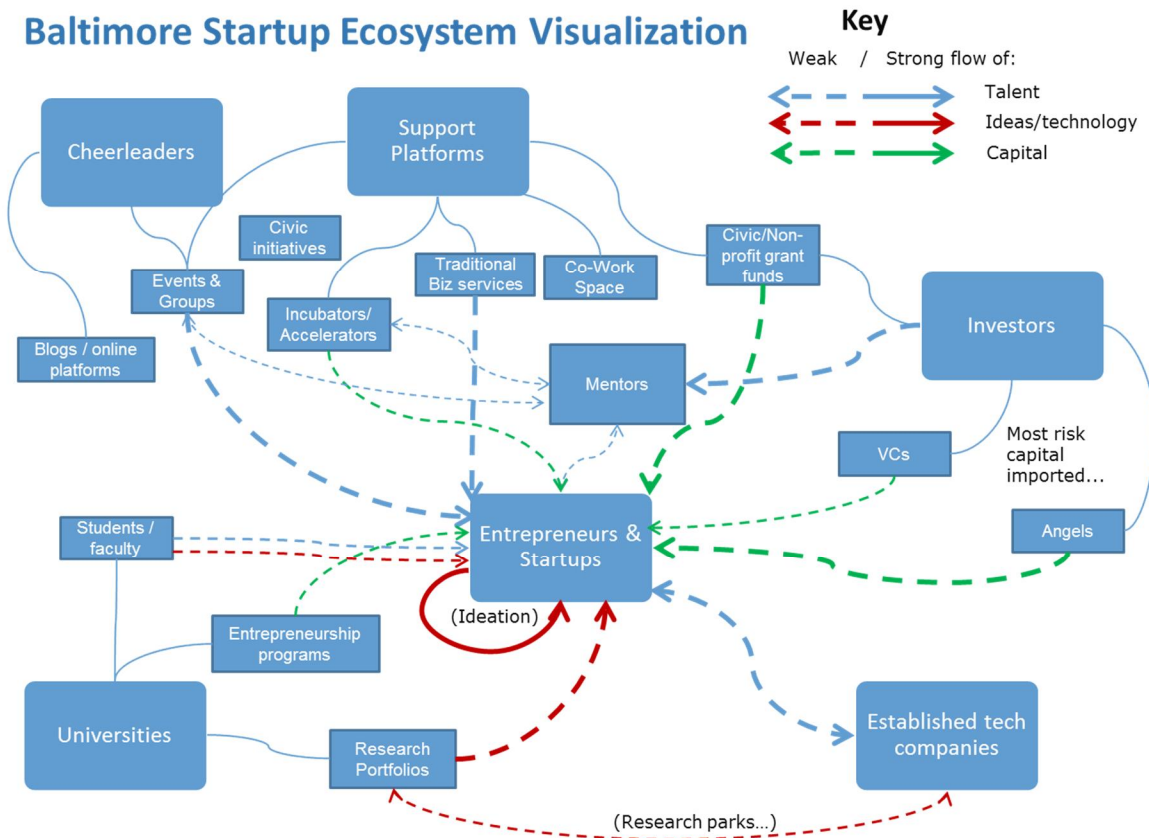


Baltimore	Name	Description	Data
	<b>Mentors</b>	Emerging	<ul style="list-style-type: none"> <li>• Eight entrepreneur/mentor matchmaking services identified.</li> </ul>
	<b>Investors</b>	Emerging	<ul style="list-style-type: none"> <li>• \$725 million invested in 164 venture-backed startup deals in the region in 2012.</li> <li>• 8.3% of deals (Mid-Atlantic) by deal count.</li> <li>• Eight seed and growth capital organizations have offices within 15 miles of Baltimore.</li> </ul>
	<b>Universities</b>	Emerging	<ul style="list-style-type: none"> <li>• At least 17 institutions of higher education located within Baltimore and Towson, with 112,000 students enrolled.</li> <li>• 17% of the population in Baltimore and Towson currently enrolled in higher education.</li> <li>• 148 technologies patented and 18 new startup companies launched from university research.</li> <li>• \$3.7 billion in research invested.</li> <li>• Nine university programs identified as involved in commercialization and campus entrepreneurship.</li> </ul>
	<b>Established tech firms</b>	Nascent	<ul style="list-style-type: none"> <li>• 71 firms in Baltimore made the Inc. top 5,000 “high-growth” companies list; of these, three had annual 2012 revenue figures above \$100 million.</li> </ul>
	<b>Support platforms</b>	Established	<ul style="list-style-type: none"> <li>• 26 support platforms identified.</li> </ul>
	<b>Cheerleaders</b>	Established	<ul style="list-style-type: none"> <li>• 13 cheerleading platforms identified.</li> </ul>

Figure 25 is the visualization of the Baltimore startup ecosystem.

Figure 25

## Baltimore Startup Ecosystem Visualization



### Specific comparisons

- Baltimore has fewer entrepreneurs than Boston. There are also more potential entrepreneurs from the 20 to 34-year-old demographic group in Boston.
- Boston has more investment in entrepreneurial ventures than Baltimore—in particular, smaller amounts of private risk capital flowing from investors to entrepreneurs than Boston.
- There are fewer established high-growth firms in Baltimore.
- The flow of resources from university into the entrepreneurial ecosystem are stronger in Boston than they are in Baltimore.
- Boston has stronger real density and effective density, due in part to the strength of the transit system.
- Both cities have strong support platforms.
- Both cities have strong cheerleaders.
- Both cities have strong arts and cultural resources.

### Guiding Principles for Recommendations

This report has identified a structural framework, the logic model; collected evidence against that framework; and evaluated the two cities against that framework. The final topic to be addressed, then,

is recommendations for Baltimore’s ecosystem based on Boston’s experience, as well as the literature review.

Before discussing these specific recommendations for Baltimore, however, it is useful to briefly explain the guiding principles that were used to formulate the recommendations, and could guide an evaluation of a comprehensive portfolio of initiatives. Five principles undergird the recommendations:

**1. *Invest in core activities.***

Interventions should be focused on activities that directly increase the desired outputs: startups, jobs, wealth creation and interconnectivity. For any other interventions not focused directly on these outputs, the burden exists to prove that a direct investment would not yield a greater return.

As noted in the introduction to the report, whether organically or through programming—or, most likely, a combination of both—Boston has more startups, entrepreneurs, and entrepreneurial veteran mentors. The question for Baltimore, then, is how to catch up quickly.

**2. *Go short and go long.***

In “Startup Communities,” Brad Feld notes that it can take a decade or more for real transformation of a startup ecosystem to take place. As a result, a community looking to accelerate its entrepreneurial ecosystem should consider initiatives that (a) increase entrepreneurship today (resources and outputs), and (b) strengthen long-term actors, resources, and environmental factors.

**3. *Make the most of existing assets.***

Because it is easier to work with what you have than to create or build something new, communities should build on the strengths of their resources and actors. In Baltimore’s case, this includes emerging clusters such as EdTech, life sciences, and cybersecurity. Assets also include organizations, projects and programs that are already contributing to the entrepreneurial ecosystem.

An important caveat to this guidance is to recognize the opportunity, and potential limitations, of planning and programming focused at particular sectors, versus allowing entrepreneurial ecosystem actors to take advantage of “content neutral” programming. Industrial policy is a tricky thing.<sup>121</sup>

**4. *Think holistically.***

There is a “chicken and egg” problem among the goals of driving talent, technology, capital, and interconnectivity: All must be addressed together, no one approach can succeed alone.

As a result, interventions should not only consider the individual elements—quantity and quality of actors—but also their interconnectivity. The goal of any investment, then, should be to maximize flows of talent, technology, capital, and network connectivity across the ecosystem’s actors.

**5. *Look at the bang for the buck.***

It is difficult to measure the Return on Investment (ROI) on civic (or private) investments like an entrepreneurial ecosystem. But it is essential to try.

Besides counting startups, entrepreneurs, and capital flows, one of the most important and challenging elements to measure is the level of interconnectivity between resources. This can be estimated through surveys (such as the one conducted by the Innovation Alliance) and proxies like blog readership. Interconnectivity is such a fundamental element of an ecosystem that meaningful resources should be allocated to measure it.

The cost (financial cost plus leadership time and attention), impact (contribution to addressing relevant gaps and delivering outputs), and risk (likelihood of success) of potential interventions should be calculated and used to make resource allocation decisions. Over time, the quality of this information can be improved and enhanced.

### Recommendations

Baltimore should consider nine interventions to accelerate the City’s entrepreneurial ecosystem.

Initiatives with potential near-term impact (six to 18 months) are included. They are prioritized by estimated size of impact (high = large impact) and ease of implementation (high = easier to implement).

Name	Size of impact	Ease of implementation
1. Create, find or hire more entrepreneurs.	High	Medium
2. Expand early stage investment.	High	Medium
3. Identify and codify existing entrepreneurship ecosystem-related programs and projects.	Low	High
4. Create an Innovation District.	Medium	High for initial stages/ Low for follow-on stages
5. Leverage existing pools of technology.	Medium	Medium
6. Consider regulatory and tax reforms.	Medium	Medium
7. Pursue short-term investments in supporting public transit.	High	Low-medium
8. Invest in measurement of Baltimore’s entrepreneurial ecosystem.	Low	High
9. Consider an “Entrepreneurial Moon Shot”—a dramatic, comprehensive investment in Baltimore’s entrepreneurial ecosystem.	High	Low

*[Note: See Statement of Potential Conflict of Interest, discussed in the introduction. Canterbury Road Partners’ principal line of business is technology transfer support services. The firm is engaged in technology licensing, entrepreneur recruitment, and intellectual property analysis in Maryland and across the country.]*

## **1. Create, find or hire more entrepreneurs.**

**Size of impact:** High

**Ease of implementation:** Medium

Baltimore has fewer entrepreneurs and startups than Boston. Entrepreneurs are a fundamental component of an entrepreneurial ecosystem, as both a key driver of the ecosystem and the ultimate output that these policies seek to maximize. In Boston, the net result of formal and informal programs of entrepreneurship training, pairing, mentoring and incubating programs is strong connectivity between potential entrepreneurs and opportunities.

Baltimore should identify, recruit, and connect many more entrepreneurs. This could be done through a proactive local and national search for current and potential entrepreneurs, and then hiring them (preferably with a combination of equity and salary) to launch startup companies in Baltimore.

Baltimore could focus recruitment on the emerging centers of entrepreneurial activity—e.g., medical devices, EdTech, and cybersecurity. Additionally, Baltimore could secure pre-commitments that entrepreneurs who launch businesses here will get solid consideration for funding from public and private early stage investors.

The design of any such program should take into account Principle #5, Bang for the Buck. Proposals to attract or create entrepreneurs should be evaluated based on likely impact on wealth, jobs, and startups (outputs); program cost; and program risks.

To achieve this, Baltimore could allocate funding for entrepreneur creation through a competitive bid process that emphasized quality and cost effectiveness, or it could structure a prize-based system (similar to the X Prize<sup>122</sup>) to encourage nontraditional proposals.

An example of a higher ROI method is to hire or recruit *parallel* entrepreneurs, who launch multiple startup companies at once.<sup>123</sup> Similarly, accelerator programs could create or find entrepreneurs cost-effectively; hiring, adopting or modifying Boston programs and organizations such as Tech Stars and Venture Well/Village Capital could be explored.

One area of focus could be connecting potential entrepreneurs at local universities with the entrepreneurship ecosystem. This includes current graduate and undergraduate students, recent alumni, and researchers. Given the strength of the human capital and technology assets associated with Baltimore's internationally leading institutions, bridging the gap between the academic research community and the entrepreneurship community could be game-changing.

Several efforts to tackle this are already underway, including TEDCO's Maryland Innovation Initiative, Venture for America placements in Baltimore,<sup>124</sup> JHU's and USM's innovation and entrepreneurship programming such as MIPS and the new JHU program FastForward, this spring's "Startup Crawl" that connected students and entrepreneurs, and the work of Wasabi Ventures at Loyola University.<sup>125</sup>

Other interventions aimed at the student population could include:

- Paying/subsidizing entrepreneurial Baltimore firms to hire Baltimore student interns.

- *“Be in MD” Program*: Modeled after Boston’s “Stay in MA” program, a low-cost program to fund students curious in entrepreneurship to attend conferences, summits, and otherwise get involved in Baltimore’s tech scene could help build awareness and increase the network connectivity between the campus community and entrepreneurial networks.
- *Incubator on campus*: Taking a page out of Boston’s UMass Venture Development Center, instead of busing students to startup companies, the city could do the reverse, and bring the startups to the students. By partnering with local universities to establish high-quality incubation programs on campus, civic leaders could help increase interaction with potential entrepreneurs, increasing the chances of their staying in Baltimore and pursuing entrepreneurship.

A second area of focus could relate to increasing the retention of students after they graduate, whether or not they directly plan on participating in the entrepreneurial ecosystem. Several initiatives and activities are underway in this area in Baltimore; ONEin3 Boston provides useful context for these efforts.

## **2. Expand early stage investment.**

**Size of impact:** High

**Ease of implementation:** Medium

Early stage capital is another essential ingredient in a strong entrepreneurial ecosystem. Baltimore receives less venture and angel funding, and has fewer angel and venture organizations located within its borders, than Boston.

To increase early stage investment, Baltimore should **increase the size of investment pools** and **increase the flow of investment from existing pools**.

**Increase the size of investment pools** – Additional investment pools could come from institutions or from individuals. Examples of methods to increase investments from *institutions* include (a) expanding state investment programs targeted to Baltimore and (b) creating or expanding pools of institutional investment aimed at Baltimore-specific projects.

With respect to individual *investors*, additional Baltimore-region high net worth individuals could be encouraged to consider angel investing. One way to do this would be to work with Baltimore Angels and support their efforts to bring in additional members. Another approach, suggested by local Angel investor John Cammack, is to create a pre-Angels group. This would invite high net worth individuals with Baltimore connections who have not previously participated in angel investing. Participants would be identified and invited by trusted Baltimore leaders. Participants would commit to review at least 12 early stage fundraising proposals from Baltimore startups in 12 months. The program could be structured with no obligation to invest—only to share feedback on their decision.

The entrepreneurs would submit their proposals to this group in a brief, easy-to-understand “Common Application” format—likely based on AngelList and Gust. Some staff role (which could be handled, for example, through an investment firm), would vet the proposals and provide quality control.

Finally, there could be educational and social activities, to encourage mixing between potential investors and new entrepreneurs, further enhancing the network connectivity between investors, seasoned business veterans, and budding entrepreneurs.

***Increase the flow of investment from existing investment pools*** – This could occur, for example, through process changes. One process change could be the articulation and development of a Baltimore-wide investment thesis. A second could be a shared commitment to speed up investment decisions—e.g., returning definitive investment decisions within two weeks.

### ***3. Identify and codify existing entrepreneurship ecosystem-related programs and projects.***

***Size of impact:*** Low

***Ease of implementation:*** High

Our preliminary review of the Baltimore ecosystem identified many programs and interventions that are strengthening the entrepreneurial ecosystem. There are almost certainly other institutions and organizations in the Baltimore region working on these issues that the initial census did not uncover.

We expect these programs could generate greater collective effectiveness and efficiency if ideas, tactics, and information were more broadly shared.<sup>126</sup> An organization might discover another initiative already underway in the City that is aiming to solve a challenge that the first organization may be considering undertaking. Knowing about the presence of that other organization could lead to coordinated efforts that could be collectively more effective.

Existing programs and organizations are already beginning to tackle this challenge, including BaltimoreTech.Net, the document maintained by former *Baltimore Sun* writer Gus Sentementes, and the Central Maryland Bio Health Entrepreneur’s Resource and Financing Guide, created by The Economic Alliance of Greater Baltimore, Bio Health Innovation, and the Baltimore Business Journal.<sup>127</sup>

To accelerate this outcome, Baltimore could organize a “summit” for entrepreneurship ecosystem stakeholders. At this session, all initiatives and efforts could be shared, and brainstorming and coordination could be encouraged (e.g., via a “speed-dating” exercise, whereby organizations explain their initiatives briefly, while in pairs). Participants could explore and recommend opportunities to collectively optimize the region’s substantial assets for entrepreneurial activity. Then, this information could be codified.

### ***4. Create an Innovation District.***

***Size of impact:*** Medium

***Ease of implementation:*** High for initial stages, low for follow-on stages

Baltimore could name a formal Innovation District, similar to Boston, that encourages and facilitates increased connectivity. At its simplest level, such a district could be “created” through communication and coordination. At a greater level of investment, such an initiative could be coupled with tax or cash incentives for relocation, a budget for cultural programming and activities, or a range of other options to help cement the district’s vibrancy and magnetism to the creative urban class. At a substantial level of investment, real estate development could be targeted.

In designing this District, Baltimore can learn from Boston’s experiences. In particular, a district can run the risk of “overheating”—generating so much interest that rents rise dramatically, effectively pricing the young, aspiring, or early stage entrepreneurs out of the market.<sup>128</sup> To mitigate this risk, civic leaders could proactively ensure public, co-working spaces are included in neighborhood plans. These can be either formally developed within new commercial real estate developments, or can include planned utilization of other public/quasi-public spaces such as nearby libraries, schools, or cafes.<sup>129</sup>

If a District were created, Baltimore should use this as an opportunity to further broadcast the strong entrepreneurship ecosystem-specific assets available to the region, potentially via the Baltimore organizations who are “sharing the story” about Baltimore’s strengths, including but not limited to the Baltimore Development Corporation, the Economic Alliance of Greater Baltimore, the Emerging Technology Centers, the Greater Baltimore Committee (whose Innovation Committee is planning an entrepreneurial asset showcase), the Greater Baltimore Technology Council and Live Baltimore. The goals of such an effort would be multi-faceted: to encourage current regional residents to explore entrepreneurship, to help reduce “brain drain” by making graduating students in Baltimore-area schools feel more open to staying in Baltimore to start their technology careers and to attract aspiring entrepreneurs or even startup companies from other cities looking for a place to launch.

### ***5. Leverage existing pools of technology.***

***Size of impact:*** Medium

***Ease of implementation:*** Medium

In keeping with guiding principle #3, making the most of existing assets, Baltimore could further invest in commercializing more ideas created at local research institutions.

Several such initiatives are already underway in the region and State, including—but not limited to—the work of university and research center technology transfer and entrepreneurship programming (e.g., MTech, the Johns Hopkins University Business Plan competition), Maryland Innovation Initiative, TEDCO, The Tech Council of Maryland, and Bio Health Innovation. A statewide innovation portal, a function performed by the Massachusetts Tech Transfer Center, is also included in the FY2014 budget.<sup>130</sup>

One possible method is to review licensing policies across the region, compare them to other regions and institutions, and explore opportunities for modification or coordination. Another option is to use quantitative analytic tools to analyze the region’s intellectual property assets for commercialization potential. Several commercial software packages are available for this task, such as Pantros IP and Thomson. Such analysis could help prioritize commercialization opportunities for internal and external stakeholders and find commercialization partners.

### ***6. Consider regulatory and tax reforms.***

***Size of impact:*** Medium

***Ease of implementation:*** Medium

If legislative or other policy changes are desired, an opportunity may exist to further support the development of an entrepreneurial ecosystem. One area, for example, could be to further normalize



incentives across existing and new companies. For example, the Job Creation Tax Credit currently covers firms with more than 60 employees.<sup>131</sup>

Before such a path is pursued, potential policy changes should be reviewed to consider whether adjustments would deliver a sufficient return on investment, not only for the entrepreneurial ecosystem but also to the City and State as a whole.

### **7. Pursue short-term investments in supporting public transit.**

**Size of impact:** High

**Ease of implementation:** Low-medium

A major difference between Boston and Baltimore is that Boston has a subway system that connects major universities and entrepreneurial neighborhoods, and Baltimore does not. This is an important distinction—another essential element of the entrepreneurial ecosystem is connectivity, including physical connectivity. As noted above, greater density (population per square mile) and “effective density” (density adjusted for ease of transportation) are both important contributors to a strong entrepreneurial ecosystem.

Many in the Baltimore region have recognized the importance of public transit and strongly pushed for improvements. For example the Greater Baltimore Committee (GBC), the Baltimore region’s organization of business and civic leaders, has made transportation improvements a substantial focus of its efforts. Mass transit investments are included in Governor O’Malley’s 2013 transportation law.

The developing plans for a Bikeshare program led by GBC, for example, are an example of a program with a high ROI in this arena. A Bikeshare program would likely have a low cost per rider relative to other transportation interventions, and be recognized and appreciated by members of the entrepreneurial community.<sup>132</sup>

Baltimore should also consider additional high ROI investments in Baltimore-specific transportation for the entrepreneurial ecosystem. Baltimore may wish to adopt a bold *near term* transit goal—for example, that current and would-be entrepreneurs could reliably wait no longer than 5 minutes for public transportation to innovation centers (Fells Point, Harbor East, JHU Medical Campus, USM, UMB, Homewood, Station North, North Charles). An explicit goal of any transit program could be to encourage recent graduates to stay or move to the city and to connect current and potential innovation centers.

Other potential interventions that might have a high ROI include: adding Wi-Fi to buses; collecting real-time bus information tied to smart phones, as has been launched in New York City;<sup>133</sup> and expanding and coordinating the Collegetown shuttle, Charm City Circulator and college shuttle services.

### **8. Invest in measurement of Baltimore’s entrepreneurial ecosystem.**

**Size of impact:** Low

**Ease of implementation:** High

Baltimore should measure the current state and rate of change of its entrepreneurial ecosystem, in particular outputs (startups, jobs, and wealth) and resources (connectivity, talent, technology, capital).

A local model for data collection and analysis is the Baltimore Neighborhood Indicators Alliance at the Jacob France Institute. Employment estimates could be taken directly through surveys of startups or estimated through proxy measures, e.g. extrapolating from a count of startups adjusted for revenue and industry.

This initiative is related to, but different from, recommendation #3, to identify and codify *existing programs* and *projects*, which focused on finding initiatives and connecting participants working on those initiatives. Recommendation #9 should be an ongoing data collection and analytic effort of the *state* of the entrepreneurial ecosystem.

With this information, policymakers and stakeholders could evaluate the relative effectiveness of interventions aimed at strengthening the entrepreneurial ecosystem, to make and refine resource allocation decisions.

### ***9. Consider an “Entrepreneurial Moon Shot”—a dramatic, comprehensive investment in Baltimore’s entrepreneurial ecosystem.***

***Size of impact:*** High

***Ease of implementation:*** Low

This report concluded that Baltimore is an “Emerging” entrepreneurial ecosystem. To maximize the likelihood that Baltimore becomes an Established ecosystem, it could adopt a broad-scale, comprehensive, substantially funded and coordinated effort, focused on high ROI investments.

One analogy to such an investment is the “Moon Shot,” President Kennedy’s call to land a human on the moon and return him safely to earth.<sup>134</sup>

This initiative would pursue many or all of the above initiatives simultaneously or in quick succession, and would likely include a pre-commitment of additional early stage investment in promising companies.

As an example, consider the recent news that St. Louis’ civic leadership announced plans to invest \$100 million in startups.<sup>135</sup>

Under the right conditions, including strong civic support, substantial progress could be made on all eight initiatives within six months. Both the risks and rewards of such a comprehensive program are greater than pursuing individual initiatives. Such an effort would not only directly contribute to the ecosystem, but would also, by virtue of its boldness, signal a shared commitment to other stakeholders who could support the effort.

## Attachment A: List of Baltimore startups.

See “Outputs of the Entrepreneurial Ecosystem” for a definition of what was included and excluded.

27Legal, LLC	Authntk	Common Curriculum
2fold Collective	AVDawn.com	Communications Scientific
410Labs	Ayasdi, Inc.	International
6th Street Commerce	Baltimore Bioworks	CommunityDNS
AccelerEyes	Band Happy LLC	Companion Data Services
Acentech Solutions, Inc.	Bandura, LLC	Converge
ACS Lab	Beck Radiological	Convergent Technologies
ADASHI Systems	Innovations	Incorp
Advanced Video Systems, Inc.	BeerGivr	CosmosID
Advancing Synergy, LLC	Believe Wireless Broadband	Course Canary
Advertising.com (AOL)	Benesyle Technologies Inc.	CowTrip
Aegis Mobile	Betanews	Creative Systems & Design, LLC
Agira, Inc.	BetaPunch	CrowdStitch
Ainsley & Co.	Bill Me Later	CSA Medical, Inc. (CSAM)
Airphoton, LLC	BioFortis, Inc.	Curiosityville
Allegis Group	Biomedica Management Corp.	C-volve
Allinio	Bizelo	CWR Technologies
Allovue	Blue Wave Semiconductors, Inc.	Cyber Security Engineering Associates
Alpha Omega Technologies	BOSS Medical LLC	Cybergroup, Inc.
American Business Forms & Envelopes	BriJen BIOTECH, LLC	CyberHive/CyberMap
Amethyst Technologies, LLC	BTS Software Solutions	DaSol Solar Energy Science & Technology
Amidus LLC	Bullhorn Mobile	DataPoint
ANCILE Solutions	BusyGrad	DB Networks
Ankota	CACI International	Derigo Technology, Inc.
Apkudo	Calvert Systems Engineering	Diagnostic Biochips, LLC
Appistry	Canterbury Road Partners	Dimetek Digital Medical Technologies
Applied Communication Sciences	CapitolMac Baltimore	Direct Dimensions, Inc.
Applied Sensor Research & Development Corp	CardioMed Device	DYCENT Biotech Company
Arcion Therapeutics	Consultants	DynPort Vaccine Company LLC
Ark Sciences	Casekey	E21 LLC provides Mid- Atlantic
Artichoke	Celsis In Vitro Technologies	Early Charm Ventures LLC
ASET Partners	Cerecor Inc	Earn & Learn Enterprises, LLC
Assured Information Security	CervoCheck LLC	Echelon Service Company/Hirewave
Athena Environmental Sciences, Inc.	Charm City Networks	Technologies
Auctionopia	Clean Green Chesapeake, LLC	EchoPhi
Audacious Inquiry	Clear Resolution Consulting	
Aurora Analytics, LLC	Clovis Group	
	CodePupil	
	Columbia Technologies, LLC	
	Comcast	

E-ISG Asset Intelligence  
El Dorado Technologies  
EnDepth Solutions  
Energy Conservation  
Research Ventures  
Energy Dynamics LLC  
ENG Solutions  
EntreQuest, Inc.  
Envidient, Inc.  
Epitaxial Technologies  
ESDA LLC  
EventRebels  
Evolve Communications  
Excel Life  
Exis  
Farfield Systems, Inc.  
Fearless Solutions  
Fiberight, LLC  
Figure 53  
Five Directions  
FlexEI LLC  
Foodem  
Friends of The Web  
Fund the Republic  
Futech Engineering Solutions  
Fyodor Biotechnologies Inc.  
geographIT  
Get 10k Fans  
Getwele Natureceuticals  
GiveCorps  
Given.to  
Gliknik Inc.  
Global Scientific Solutions  
Global Virus Network  
GlobalNet Services, Inc.  
Glodon Company, Ltd.  
Gloto  
Goddard Planetary  
Heliophysics  
Gramophone  
graphtrack  
Groove Commerce  
Group Z  
GSAtrain  
Hahler  
Handteq

HDScores  
Home Track (HMG)  
iCore Networks  
ICS Learning Group  
Idea-Evolver  
IGI Technologies  
ignition72  
Immersive 3D LLC  
immotions medical, inc.  
Impari Systems, Inc.  
Indus Links  
Infinite Biomedical  
Technologies  
Informous  
INFORMS  
Innovative Bios, LLC  
Innovative Consultants, LLC  
Innovostics  
InstantLabs  
Integrata Security  
Intellibit  
Intridea, Inc  
InTTENSITY  
Investment & Venture Fund  
of Tatarstan (IVFRT)  
Ionescu Technologies LLC  
IRAZÚ BioDiscovery, LLC  
iWebGate  
JobOn  
JSC National Scientific and  
Technology Holding  
Company of Kazakhstan  
Juxtopia® is a privately  
owned  
Keffa Coffee  
KHAFRA Engineering  
Kitchen Table Financial Corp  
Kithly  
KnotFriends  
KoDiscovery, LLC  
KoolSpan  
Kydes Pharmaceuticals, LLC  
Laudeo Media LLC  
LeadCloud  
Light Point Security  
LightGrid

LinkLetter LLC  
Litecast, LLC  
Local Golfer  
Localist  
LocalPlunge  
LocalUp Solutions  
LookingGlass  
Lookingglass Cyber Solutions  
Magpie Sensing  
Management CV  
Medella Medical  
Med-IQ  
Micros  
MIE Labs, Inc.  
Millennial Media  
Mina Mar Group  
Mind Over Machines, Inc.  
Mindgrub Technologies  
Moodlrooms  
mp3Car.com  
My Hopeful Journey  
MyCity4Her  
MyGenostics  
Nanolytics, LLC  
NaturalCheck  
Nemetschek Vectorworks,  
Inc.  
NETWAR DEFENSE  
New Sapience, LLC  
NewsUp  
Next Breath, LLC  
Nimobus  
Noxilizer, Inc.  
NV3 Technologies  
Observation Baltimore  
Ocular Proteomics, LLC  
Oculus Labs  
Offer 'n Buy  
OmniSpeech, LLC  
ONeil Interactive  
Oomph Marketing  
OpenOnward  
OpiaTalk  
Paisley Green, LLC  
PaRaBaL, Inc.  
Paragon Bioservices

Parking Panda  
PathSensors  
Pearl LifeScience Partners,  
LLC  
Phezu Space LLC  
Physicians Practice, Inc.  
Pieran LLC  
Plant Sensory Systems, LLC  
Plasmonix, Inc.  
PointClickSwitch.com  
PrintLess Plans  
Procurely  
Project Gado/Gado Images  
Prolitec  
ProSpect Pharma, Inc.  
Pure Bang Games  
Quality Solutions, LLC  
R2integrated (R2i)  
Rakta Therapeutics Inc.  
Ratio Clothing  
Reify Health  
Remedium Technologies Inc.  
Renova Life Inc.  
Research Circle Associates  
Resensys LLC  
Resumes.io  
Retirement Living TV  
(RLTV)/Erickson  
Right Source Marketing  
Riskive, Inc.  
RMF Engineering, Inc.  
Roadmap  
Rowdy Orbit IFC + Sundance  
+ Culturally Relevance  
RTGX - Ross Technologies,  
Inc.  
Rush Computer Rentals  
Safe Equine Technologies,  
Inc.  
SAJE Consulting LLC  
SAJE Pharma LLC

SameGrain, Inc.  
Secured Sciences Group  
secureRAD LLC  
Sentinel IT Solutions  
SeSys  
Shandong Province Liaison  
Office  
ShapeShot LLC  
Sickweather  
Signalway Antibody Biotech  
Company  
SilcsBio, LLC  
SmartLogic Solutions LLC  
Snake Hill  
SNBL Clinical Pharmacology  
Center  
Social Pollen  
SocialToaster LLC  
Sonata Venture Solutions  
Soshag.com  
Sourcefire, Inc.  
Specialty Food Sales  
Splurge App LLC  
SpotCrime  
SpotKick (BankLook.com)  
Spry Enterprises, Inc.  
Staq  
Stone Action  
StoreFront Consulting, Inc.  
Storm Center  
Communications, Inc  
StraighterLine  
Strategic Results  
Superior Technology  
Solutions  
Sustainable Infrastructure  
SustainaMetrix  
Synaptic Research, LLC  
Syndecion, LLC  
SYSTAAQ Diagnostic Products  
Inc.

TargetGov  
TeamGantt  
TechEdge USA  
TechGuard Security, LLC  
Technisource  
Technology Security  
Associates  
TeleCommunication Systems,  
Inc.  
Teltek  
TheraCord LLC  
Therataxis LLC  
Tiresias Technologies  
TLC JR  
ToolSpinner  
Totus Lighting Solutions, Inc.  
Trusted Technologies LLC  
Uber  
URecFit  
Valens Therapeutics, Inc.  
Vallinex LLC  
Veris Group  
viaPlace LLC  
Videology  
Vidstructor  
Vigilant Bioservices, LLC  
Vigilant Medical, Inc.  
ViiNetwork  
VisibleThread  
VisiSonics Corporation  
Voxilate  
Vulcan International  
WeLearn Educational  
Software  
Woofound Inc.  
Za Za Ltd.  
Zayo Group  
Zentech Manufacturing, Inc.  
Zero Gravity Creations,LLC  
Zymetis

## Attachment B: Interviewees

#	Name	Title	City
1	Chloe Ryan	Manager, ONEin3 Program, City of Boston	Boston
2	David Cutler	Boston Innovation Challenge	Boston
3	Edel Freitas	UMass Venture Development Center	Boston
4	Gina Marciano	Center for Women in Enterprise	Boston
5	Kate Castle	Vice President of Marketing at Flybridge Capital Partners	Boston
6	Maggie Raibel	Recent Johns Hopkins University graduate	Baltimore
7	Mike Brenner	Founder, Betamore	Baltimore
8	Mike Subelsky	Cofounder/CTO at Staq	Baltimore
9	Newt Fowler	Partner at Rosenberg Martin Greenberg, LLP, TEDCO Board Member	Baltimore
10	Renuka Babu Brown	Director of Business Development and New Ventures at Boston University's Kindle Program	Boston
11	Scott Kirsner	Innovation Economy Blog	Boston
12	Tighe Greenhalgh	Partner at Leawood Associates, Venture Facilitator, Think Big Baltimore	Baltimore

## Attachment C: Potential Areas of Additional Study

Data collection and analysis for this report uncovered several additional questions that could be analyzed that relate to strengthening an entrepreneurial ecosystem. They include:

- **Comparison of Baltimore to other entrepreneurial ecosystems.**
- **Further data capture and analysis of interconnectivity of ecosystem actors.**
- **Quantitative media analysis to measure entrepreneurial ecosystem participation:** A study of media coverage of startup/tech beat using big data. This would be a powerful way to measure entrepreneurship activity, by looking at all published articles relating to key entrepreneurship key words and phrases in each ecosystem and comparing quantitatively the amount of unique activity happening.
- **Further analysis of environmental factors,** e.g., transit, policy incentives, and culture and creativity, as well as a deeper assessment of current and potential workforce composition, such as public versus private and protected versus merit positions, and the relative importance of government versus private-sector economic contributions.
- **Gender analysis of demographic groups,** and implications for entrepreneurship.
- **Historical analysis/regression analysis:** a quantitative model to calculate the impact of individual interventions in accelerating an entrepreneurial ecosystem, and in particular, changes to the Boston entrepreneurial ecosystem over time.

## Attachment D: List of Organizations Identified in Baltimore and Boston Entrepreneurial Ecosystems (Excluding Startup Companies)

Actor Name	Geographic Scope	Actor type
.406 Ventures	Boston/New England	Investor
@Ventures	Boston/New England	Investor
Abell Investments	Baltimore	Investor
ABS Capital	Baltimore	Investor
ABS Ventures	Boston/New England	Investor
AccelerateBaltimore	Baltimore	Support Platform
Activate (UMBC)	Baltimore County	University Platform
Adams Capital Management	Boston/New England	Investor
Advanced Technology Ventures	Boston/New England	Investor
Alerion Partners	Boston/New England	Investor
Anthem Capital	Baltimore/Mid-Atlantic	Investor
ARCH Venture Partners	Boston/New England	Investor
Argo Global Capital	Boston/New England	Investor
Ascent Venture Partners	Boston/New England	Investor
Atlas Venture	Boston/New England	Investor
Avalon Ventures	Boston/New England	Investor
Awesome Baltimore Chapter	Baltimore	Investor
Bain Capital Ventures	Boston/New England	Investor
Baltimore Angels	Baltimore	Investor
Baltimore County Tech Council	Baltimore/Metro Region	Support Platform
Baltimore Development Corporation	Baltimore	Support Platform
Baltimore Foundry	Baltimore	Support Platform
Baltimore on Rails	Baltimore	Support Platform
Baltimore Students for Startups	Baltimore	University Platform
Baltimore Tech Breakfast	Baltimore	Support Platform
BaltimoreTech.Net	Baltimore	Cheerleader
Battery Ventures	Boston/New England	Investor
Bessemer Venture Partners	Boston/New England	Investor
Betamore	Baltimore	Support Platform
Betascape	Baltimore/Mid-Atlantic	Support Platform
Betaspring	Boston/ Rhode Island	Support Platform
Biohealth Innovations (BHI)	Baltimore/Mid-Atlantic	Support Platform
Black Coral Capital	Boston/New England	Investor
Blue Chip Venture Company	Boston/New England	Investor
Borealis Ventures	Boston/New England	Investor
BostInno	Boston	Cheerleader
Boston Capital Ventures	Boston/New England	Investor
Boston Community Venture Fund	Boston/New England	Investor
Boston Entrepreneurship	Boston	Cheerleader
Boston Innovation Challenge	Boston	Support Platform



<b>Actor Name</b>	<b>Geographic Scope</b>	<b>Actor type</b>
<b>Boston Innovation District</b>	Boston	Support Platform
<b>Boston Urban Business Accelerator (BUBA)</b>	Boston	University Platform
<b>BostonBeta</b>	Boston	Support Platform
<b>Braemar Energy Ventures</b>	Boston/New England	Investor
<b>BREW Boston (Boston Region Entrepreneurship Week)</b>	Boston	Support Platform
<b>Brook Venture Partners</b>	Boston/New England	Investor
<b>BU Institute for Technology Entrepreneurship and Commercialization</b>	Boston	University Platform
<b>BU Kindle</b>	Boston	University Platform
<b>C Change Investments</b>	Boston/New England	Investor
<b>Cambridge Innovation Center</b>	Boston/Cambridge	Support Platform
<b>CambridgeLight Partners</b>	Boston/New England	Investor
<b>Camden Partners</b>	Baltimore	Investor
<b>Castile Ventures</b>	Boston/New England	Investor
<b>Cedar Fund</b>	Boston/New England	Investor
<b>Center for Integration of Medicine and Innovative Technology (CIMIT)</b>	Boston/New England	Support Platform
<b>Center for Women &amp; Enterprise Boston</b>	Boston/National	Support Platform
<b>Charles River Ventures</b>	Boston/New England	Investor
<b>Chesapeake Crescent Initiative</b>	Baltimore/Mid-Atlantic	Support Platform
<b>Chesapeake Innovation Center</b>	Baltimore/Maryland	Support Platform
<b>CityBizList</b>	Baltimore	Cheerleader
<b>Clarus Ventures</b>	Boston/New England	Investor
<b>Cocoa (iOS meetup)</b>	Baltimore	Support Platform
<b>Co-Founders Lab</b>	Baltimore/Metro Region	Support Platform
<b>CoFoundersLab</b>	Baltimore/National	Support Platform
<b>College Town Network</b>	Baltimore/Metro Region	Support Platform
<b>CommonAngels</b>	Boston/New England	Investor
<b>Commons Capital</b>	Boston/New England	Investor
<b>Commonwealth Capital Ventures</b>	Boston/New England	Investor
<b>CreateBaltimore</b>	Baltimore	Support Platform
<b>Cue Ball</b>	Boston/New England	Investor
<b>Cutlass Capital</b>	Boston/New England	Investor
<b>Cyber Maryland</b>	Baltimore/Maryland	Cheerleader
<b>CyberMaryland</b>	Maryland	Support Platform
<b>Dace Ventures</b>	Boston/New England	Investor
<b>DartBoston</b>	Boston	Cheerleader
<b>Dingman Center Angels</b>	Baltimore/Mid-Atlantic	Investor
<b>Dogpatch Labs, Cambridge Location</b>	Boston	Support Platform
<b>Early Charm Ventures</b>	Baltimore	Investor
<b>Economic Alliance of Greater Baltimore</b>	Baltimore/Metro Region	Cheerleader

<b>Actor Name</b>	<b>Geographic Scope</b>	<b>Actor type</b>
<b>Edison Venture Fund</b>	Boston/New England	Investor
<b>Egan-Managed Capital</b>	Boston/New England	Investor
<b>Emerging Technology Centers</b>	Baltimore/Metro Region	Support Platform
<b>ENET</b>	Boston / National	Support Platform
<b>ePowerhouse</b>	Boston	Support Platform
<b>EuroUS Ventures</b>	Boston/New England	Investor
<b>Evergreen</b>	Baltimore	Investor
<b>Excel Venture Management</b>	Boston/New England	Investor
<b>FA Technology Ventures</b>	Boston/New England	Investor
<b>Fairhaven Capital</b>	Boston/New England	Investor
<b>Fidelity Biosciences</b>	Boston/New England	Investor
<b>Flagship Ventures</b>	Boston/New England	Investor
<b>Fletcher Spaght Ventures</b>	Boston/New England	Investor
<b>Flybridge Capital Partners</b>	Boston/New England	Investor
<b>Founder Collective</b>	Boston/New England	Investor
<b>General Catalyst Partners</b>	Boston/New England	Investor
<b>Globespan Capital Partners</b>	Boston/New England	Investor
<b>Gold Hill Capital</b>	Boston/New England	Investor
<b>Google Ventures</b>	Boston/New England	Investor
<b>GrandBanks Capital</b>	Boston/New England	Investor
<b>Great Hill Partners</b>	Boston/New England	Investor
<b>Greater Baltimore Committee</b>	Baltimore/Metro Region	Support Platform
<b>Greenhorn connect</b>	Boston	Cheerleader
<b>Greenspring Associates</b>	Baltimore/ Mid-Atlantic	Investor
<b>Greylock Partners</b>	Boston/New England	Investor
<b>Harvard I-Lab</b>	Boston/Cambridge	Support Platform
<b>HealthCare Ventures</b>	Boston/New England	Investor
<b>Highland Capital Partners</b>	Boston/New England	Investor
<b>Hopkins Carey School Innovate! Program</b>	Baltimore	University Platform
<b>Housatonic Partners</b>	Boston/New England	Investor
<b>Howard Tech Council</b>	Baltimore/Metro Region	Support Platform
<b>IDEAS Boston</b>	Boston	University Platform
<b>Ignite Baltimore</b>	Baltimore	Cheerleader
<b>Indus Entrepreneur</b>	Boston	Support Platform
<b>InflectionPointVentures</b>	Boston/New England	Investor
<b>Innovation and Technology Committee, Greater Baltimore Committee</b>	Baltimore/Metro Region	Support Platform
<b>Innovation Economy Blog / Scott Kirsner</b>	Boston	Cheerleader
<b>International Entrepreneurship Center</b>	Boston	Support Platform
<b>Ironside Capital</b>	Boston/New England	Investor
<b>Its All Here MA (Massachusetts Office of Business Development)</b>	Boston/Massachusetts	Support Platform
<b>Kepha Partners</b>	Boston/New England	Investor

<b>Actor Name</b>	<b>Geographic Scope</b>	<b>Actor type</b>
<b>Kestrel Management</b>	Boston/New England	Investor
<b>Key Venture Partners</b>	Boston/New England	Investor
<b>Kinetic Ventures, LLC</b>	Baltimore/ Mid-Atlantic	Investor
<b>Kodiak Venture Partners</b>	Boston/New England	Investor
<b>LaunchCapital</b>	Boston/New England	Investor
<b>Lee Munder Capital Group</b>	Boston/New England	Investor
<b>Long River Ventures</b>	Boston/New England	Investor
<b>Longriver Ventures</b>	Boston / New England	Investor
<b>Longworth Venture Partners</b>	Boston/New England	Investor
<b>Loyola- Wasabi partnership</b>	Baltimore/Metro Region	University Platform
<b>M/C Venture Partners</b>	Boston/New England	Investor
<b>MA High-tech Council</b>	Boston/Massachusetts	Cheerleader
<b>Makaira Venture Partners</b>	Boston/New England	Investor
<b>Maryland Biotechnology Center</b>	Maryland	Support Platform
<b>Maryland Center for Entrepreneurship (MCE) is an initiative of the Howard County Economic Development Authority</b>	Central Maryland	Support Platform
<b>Maryland Department of Business Development and Economic Development</b>	Maryland	Support Platform
<b>Maryland Industrial Partnerships</b>	Maryland	University Platform
<b>Maryland Technology Development Corp.</b>	Baltimore/Maryland	Support Platform
<b>Maryland Technology Enterprise Institute (Mtech, UMD College Park)</b>	Baltimore/Metro Region	University Platform
<b>MassChallenge</b>	Boston/Global	Support Platform
<b>Mass Technology Leadership Council (Mass TLC)</b>	Boston/Massachusetts	Cheerleader
<b>Massachusetts Innovation &amp; Technology Exchange (MITX)</b>	Boston/New England	Support Platform
<b>Massachusetts technology transfer center</b>	Boston / Massachusetts	Support Platform
<b>Masthead Venture Partners</b>	Boston/New England	Investor
<b>Matrix Partners</b>	Boston/New England	Investor
<b>Mediphase Venture Partners</b>	Boston/New England	Investor
<b>MIT Enterprise Forum, Cambridge location</b>	Boston/Cambridge	Support Platform
<b>MIT Venture Mentoring Service (VMS)</b>	Boston/Cambridge	Support Platform
<b>MPM Capital</b>	Boston/New England	Investor
<b>MVM Life Science Partners</b>	Boston/New England	Investor
<b>NCIIA Venture Well / Village Capital</b>	Boston/National	Support Platform
<b>Needham Capital Partners</b>	Boston/New England	Investor
<b>New Atlantic Ventures</b>	Boston/New England	Investor
<b>New Markets Venture Partners</b>	Baltimore/Mid-Atlantic	Investor

<b>Actor Name</b>	<b>Geographic Scope</b>	<b>Actor type</b>
<b>NIH Office of Technology Transfer</b>	Baltimore/Bethesda/National	University Platform (federal lab)
<b>North Atlantic Capital</b>	Boston/New England	Investor
<b>North Bridge Venture Partners</b>	Boston/New England	Investor
<b>North Hill Ventures</b>	Boston/New England	Investor
<b>Norwich Ventures</b>	Boston/New England	Investor
<b>Office of the Deputy Chief, Economic Development, City of Baltimore</b>	Baltimore	Support Platform
<b>One-in-3 Boston</b>	Boston	Support Platform
<b>OpenView Venture Partners</b>	Boston/New England	Investor
<b>OSTP Ventures</b>	Baltimore/ Mid-Atlantic	Investor
<b>Oxford Bioscience Partners</b>	Boston/New England	Investor
<b>Point Judith Capital</b>	Boston/New England	Investor
<b>Polaris Venture Partners</b>	Boston/New England	Investor
<b>Prism VentureWorks</b>	Boston/New England	Investor
<b>Progress Ventures</b>	Boston/New England	Investor
<b>Provenance Venture Partners</b>	Boston/New England	Investor
<b>PureTech Ventures</b>	Boston/New England	Investor
<b>Red Abbey Venture Partners</b>	Baltimore/ Mid-Atlantic	Investor
<b>Refresh Baltimore</b>	Baltimore	Support Platform
<b>RockPort Capital Partners</b>	Boston/New England	Investor
<b>Romulus Capital</b>	Boston/New England	Investor
<b>Rudyard Partners</b>	Boston/New England	Investor
<b>Saturn Partners</b>	Boston/New England	Investor
<b>Schooner Capital</b>	Boston/New England	Investor
<b>Seaflower Ventures</b>	Boston/New England	Investor
<b>Sherbrooke Capital</b>	Boston/New England	Investor
<b>Sigma Partners</b>	Boston/New England	Investor
<b>Skyline Ventures</b>	Boston/New England	Investor
<b>SoftBank Capital</b>	Boston/New England	Investor
<b>Solstice Capital</b>	Boston/New England	Investor
<b>Spark Capital</b>	Boston/New England	Investor
<b>Spray Venture Partners</b>	Boston/New England	Investor
<b>Stage 1 Ventures</b>	Boston/New England	Investor
<b>Stata Venture Partners</b>	Boston/New England	Investor
<b>Stay in MA</b>	Boston/Massachusetts	Support Platform
<b>Sterling Partners</b>	Baltimore/ Mid-Atlantic	Investor
<b>Still River Funds</b>	Boston/New England	Investor
<b>Summerhill Venture Partners</b>	Boston/New England	Investor
<b>Summit Partners</b>	Boston/New England	Investor
<b>SV Life Sciences</b>	Boston/New England	Investor
<b>Tech Council of MD</b>	Baltimore/Maryland	Support Platform
<b>Technically Baltimore</b>	Baltimore	Cheerleader
<b>Tenaya Capital</b>	Boston/New England	Investor
<b>The Awesome Foundation Boston Chapter</b>	Boston	Investor
<b>The Venture Cafe</b>	Boston	Support Platform

<b>Actor Name</b>	<b>Geographic Scope</b>	<b>Actor type</b>
<b>theNode</b>	Baltimore	Support Platform
<b>Third Rock Ventures</b>	Boston/New England	Investor
<b>Towson Global</b>	Baltimore/Metro Region	University Platform
<b>Tudor Ventures</b>	Boston/New England	Investor
<b>TVM Capital</b>	Boston/New England	Investor
<b>Ultralight Startups</b>	Boston	Support Platform
<b>UMass Venture Development Center</b>	Boston	University Platform
<b>UMD Bioinnovation center</b>	Baltimore/ Mid-Atlantic	Support Platform
<b>University of Baltimore Center for Entrepreneurship</b>	Baltimore	University Platform
<b>Venrock</b>	Boston/New England	Investor
<b>Venture Capital Fund of New England</b>	Boston/New England	Investor
<b>Venture Fizz</b>	Boston/Metro Region	Cheerleader
<b>Venture for America</b>	Nationwide	Support Platform
<b>Vesbridge</b>	Boston/New England	Investor
<b>VIMAC Ventures</b>	Boston/New England	Investor
<b>Volition Capital</b>	Boston/New England	Investor
<b>Walnut Venture Associates</b>	Boston/New England	Investor
<b>Wasabi Ventures</b>	Baltimore/Mid-Atlantic	Investor
<b>Weston Presidio</b>	Boston/New England	Investor
<b>Windspeed Ventures</b>	Boston/New England	Investor
<b>Work Bar</b>	Boston	Support Platform
<b>XConomy Boston</b>	Boston	Cheerleader
<b>YAS Broadband Ventures</b>	Boston/New England	Investor
<b>Yolland Capital</b>	Boston/New England	Investor

## Attachment E: Selected Bibliography

Note: These are some of the articles that were considered in writing this report. A full list of sources cited for this report is available in the End Notes.

Article	Hyperlink
"If You Want Innovation, Then You Need Interaction," He Said. "If You Want Productivity, Then You Want People Working From Home."	<a href="http://www.nytimes.com/2013/02/26/technology/yahoo-orders-home-workers-back-to-the-office.html?ref=business&amp;pagewanted=all">http://www.nytimes.com/2013/02/26/technology/yahoo-orders-home-workers-back-to-the-office.html?ref=business&amp;pagewanted=all</a>
5 Percent "Startup Innovation Space"	<a href="http://www.boston.com/business/technology/innoeco/2013/02/can_cambridges_proposed_5_perc.html">http://www.boston.com/business/technology/innoeco/2013/02/can_cambridges_proposed_5_perc.html</a>
6 Phases Of Entrepreneurship	<a href="http://www.forbes.com/sites/ericwagner/2013/02/27/new-report-on-entrepreneurship-reveals-5-key-insights/">http://www.forbes.com/sites/ericwagner/2013/02/27/new-report-on-entrepreneurship-reveals-5-key-insights/</a>
A Conversation With David Skok Of Matrix Partners	<a href="http://www.boston.com/business/technology/innoeco/2012/10/a_conversation_with_david_skok.html">http://www.boston.com/business/technology/innoeco/2012/10/a_conversation_with_david_skok.html</a>
A Ribbon Cutting For 3-D Printing (Using 3-D Printed Scissors)	<a href="http://www.technologyreview.com/view/429686/a-ribbon-cutting-for-3-d-printing-using-3-d-printed-scissors/">http://www.technologyreview.com/view/429686/a-ribbon-cutting-for-3-d-printing-using-3-d-printed-scissors/</a>
Angel Sites: Match.Com For Start-Ups, Investors	<a href="http://www.usatoday.com/story/money/business/2012/11/25/efficient-small-business-funding-angel-investors/1704863/">http://www.usatoday.com/story/money/business/2012/11/25/efficient-small-business-funding-angel-investors/1704863/</a>
Baltimore Angels: 8 Investments Worth \$850K In 2012, With Plans For More In 2013	<a href="http://technicallybaltimore.com/business-2/baltimore-angels-8-investments-worth-850k-in-2012-with-plans-for-more-in-2013">http://technicallybaltimore.com/business-2/baltimore-angels-8-investments-worth-850k-in-2012-with-plans-for-more-in-2013</a>
Blackstone Charitable Foundation Expands Campus Entrepreneurship Platform Bringing "Blackstone Launchpad" To Pennsylvania	<a href="http://www.marketwatch.com/story/blackstone-charitable-foundation-expands-campus-entrepreneurship-platform-bringing-blackstone-launchpad-to-pennsylvania-2012-12-03">http://www.marketwatch.com/story/blackstone-charitable-foundation-expands-campus-entrepreneurship-platform-bringing-blackstone-launchpad-to-pennsylvania-2012-12-03</a>
Blackstone Charitable Foundation Will Spend \$3 Million On Philadelphia-Area Entrepreneurship Effort	<a href="http://articles.philly.com/2012-12-04/business/35572508_1_entrepreneurship-business-college-birthday-party">http://articles.philly.com/2012-12-04/business/35572508_1_entrepreneurship-business-college-birthday-party</a>
Boston A Finalist For \$5M In National Competition For Innovative Problem-Solving	<a href="http://www.bizjournals.com/boston/news/2012/11/05/boston-could-win-5m-for-creativity.html?page=all">http://www.bizjournals.com/boston/news/2012/11/05/boston-could-win-5m-for-creativity.html?page=all</a>
Boston Doesn't Pound Its Chest Enough, By Brad Feld	<a href="http://boston.com/business/innovation/blogs/inside-the-hive/2012/10/26/brad-feld-boston-doesn-pound-its-chest-enough/1DinUf8AbLL019yPL0kLeK/blog.html">http://boston.com/business/innovation/blogs/inside-the-hive/2012/10/26/brad-feld-boston-doesn-pound-its-chest-enough/1DinUf8AbLL019yPL0kLeK/blog.html</a>
Boston Entrepreneurship Program Trio For Undergrads	<a href="http://www.bostonglobe.com/business/technology/scott-kirsner/2012/11/18/which-are-coolest-companies-graduating-from-accelerators-scott-kirsner-top-ten/yoratDi64KyS1nRO7fr2yJ/story.html">http://www.bostonglobe.com/business/technology/scott-kirsner/2012/11/18/which-are-coolest-companies-graduating-from-accelerators-scott-kirsner-top-ten/yoratDi64KyS1nRO7fr2yJ/story.html</a>
Boston World Class Hub Of Entrepreneurship	<a href="http://www.boston.com/business/blogs/global-business-hub/2012/12/greater_boston.html">http://www.boston.com/business/blogs/global-business-hub/2012/12/greater_boston.html</a>

Article	Hyperlink
Boston-Area Tech Sector Is Scrambling To Fill Jobs	<a href="http://www.bostonglobe.com/business/2012/12/04/boston-area-tech-recruiters-battle-for-talent/IICvqL32d5ZRINB8Gp0LpJ/story.html">http://www.bostonglobe.com/business/2012/12/04/boston-area-tech-recruiters-battle-for-talent/IICvqL32d5ZRINB8Gp0LpJ/story.html</a>
Brookings: Patenting Innovation	<a href="http://www.brookings.edu/~media/Research/Files/Reports/2013/02/patenting%20prosperity%20rothwell/patenting%20prosperity%20rothwell.pdf">http://www.brookings.edu/~media/Research/Files/Reports/2013/02/patenting prosperity rothwell/patenting prosperity rothwell.pdf</a>
Cambridge Innovation Center Expand To Baltimore	<a href="http://bostonglobe.com/business/2013/02/18/cambridge-innovation-center-branches-out/sj1BQX2remrMgAkZdSRWbM/story.html">http://bostonglobe.com/business/2013/02/18/cambridge-innovation-center-branches-out/sj1BQX2remrMgAkZdSRWbM/story.html</a>
Customer Development In Japan: A History Lesson	<a href="http://steveblank.com/2012/11/13/customer-development-in-japan-a-history-lesson/">http://steveblank.com/2012/11/13/customer-development-in-japan-a-history-lesson/</a>
Early Adopters Could Give Boston Entrepreneurs A Boost	<a href="http://www.bostonglobe.com/business/2012/12/30/wanted-for-local-consumer-tech-early-adopters/h6tSKnFoSeRiYs5xl00zk/story.html">http://www.bostonglobe.com/business/2012/12/30/wanted-for-local-consumer-tech-early-adopters/h6tSKnFoSeRiYs5xl00zk/story.html</a>
East Lansing Business Incubator	<a href="http://www.lansingstatejournal.com/interactive/article/20121118/BUSINESS/311180059/Business-incubators-look-cultivate-entrepreneurial-spirit?odyssey=mod newswell text p&amp;nclick_check=1">http://www.lansingstatejournal.com/interactive/article/20121118/BUSINESS/311180059/Business-incubators-look-cultivate-entrepreneurial-spirit?odyssey=mod newswell text p&amp;nclick_check=1</a>
Entrepreneur Assistance Programs Multiplying	<a href="http://www.crainscleveland.com/article/20121112/SUB1/311129983">http://www.crainscleveland.com/article/20121112/SUB1/311129983</a>
Entrepreneurs Team Up To Open Data Center	<a href="http://www.boston.com/business/innovation/2012/11/07/big-data-center-opening-cambridge/Suutqva9ORpZ1j2n1URkMP/story.html">http://www.boston.com/business/innovation/2012/11/07/big-data-center-opening-cambridge/Suutqva9ORpZ1j2n1URkMP/story.html</a>
Growing Importance Of Civic Innovation And Entrepreneurship Stuff	<a href="http://www.southernstar.ie/News/Report-confirms-growing-importance-of-local-authorities-fostering-innovation-and-entrepreneurship-24042013.htm">http://www.southernstar.ie/News/Report-confirms-growing-importance-of-local-authorities-fostering-innovation-and-entrepreneurship-24042013.htm</a>
Has The Ideas Machine Broken Down?	<a href="http://www.economist.com/news/briefing/21569381-idea-innovation-and-new-technology-have-stopped-driving-growth-getting-increasing">http://www.economist.com/news/briefing/21569381-idea-innovation-and-new-technology-have-stopped-driving-growth-getting-increasing</a>
How To Build A Vibrant Entrepreneurial Ecosystem, Harvard Business Review	<a href="http://www.technologytransfertactics.com/content/2013/01/09/how-to-build-a-vibrant-innovation-ecosystem/">http://www.technologytransfertactics.com/content/2013/01/09/how-to-build-a-vibrant-innovation-ecosystem/</a>
How To Jump-Start Entrepreneurship	<a href="http://online.wsj.com/article/SB10001424127887324705104578147434070952310.html">http://online.wsj.com/article/SB10001424127887324705104578147434070952310.html</a>
In Nationwide Innovation Battle, Baltimore Area Lags On Patents	<a href="http://articles.baltimoresun.com/2013-02-01/business/bs-bz-baltimore-patents-20130201_1_patent-growth-baltimore-region-baltimore-area">http://articles.baltimoresun.com/2013-02-01/business/bs-bz-baltimore-patents-20130201_1_patent-growth-baltimore-region-baltimore-area</a>
Incubator Grads Take Work, Hopes Into Real World	<a href="http://bostonglobe.com/business/technology/scott-kirsner/2012/11/18/which-are-coolest-companies-graduating-from-accelerators-scott-kirsner-top-ten/yoratDi64KyS1nRO7fr2yJ/story.html">http://bostonglobe.com/business/technology/scott-kirsner/2012/11/18/which-are-coolest-companies-graduating-from-accelerators-scott-kirsner-top-ten/yoratDi64KyS1nRO7fr2yJ/story.html</a>
Introducing the Entrepreneurship Ecosystem: Four Defining	<a href="http://www.forbes.com/sites/danisenberg/2011/05/25/introducing-the-entrepreneurship-ecosystem-four-defining-">http://www.forbes.com/sites/danisenberg/2011/05/25/introducing-the-entrepreneurship-ecosystem-four-defining-</a>

Article	Hyperlink
Characteristics	<a href="#">characteristics/</a>
Invest Maryland Challenge	<a href="http://articles.baltimoresun.com/2012-09-25/business/bal-investmaryland-challenge-startups-20120925_1_maryland-venture-fund-investmaryland-program-startup-weekend">http://articles.baltimoresun.com/2012-09-25/business/bal-investmaryland-challenge-startups-20120925_1_maryland-venture-fund-investmaryland-program-startup-weekend</a>
InvestMaryland Venture Fund Program Makes First Investment	<a href="http://www.prweb.com/releases/2012/10/prweb9975217.htm">http://www.prweb.com/releases/2012/10/prweb9975217.htm</a>
Is Your Region Creative, Innovative, Productive... Or Populated?	<a href="http://martinprosperity.org/2012/10/12/insight-is-your-region-creative-innovative-productive-or-just-populated/">http://martinprosperity.org/2012/10/12/insight-is-your-region-creative-innovative-productive-or-just-populated/</a>
Kendall Square Boom Times Squeeze Out Start-Ups	<a href="http://www.boston.com/business/innovation/2012/10/24/cambridge-tries-hold-onto-start-ups/fMoJbD0g90WG38rShIZRwO/story.html">http://www.boston.com/business/innovation/2012/10/24/cambridge-tries-hold-onto-start-ups/fMoJbD0g90WG38rShIZRwO/story.html</a>
Learnlaunch Formed To Drive Greater Boston Ed Tech Innovation	<a href="http://www.businesswire.com/news/home/20121204006119/en/LearnLaunch-Formed-Drive-Greater-Boston-Ed-Tech">http://www.businesswire.com/news/home/20121204006119/en/LearnLaunch-Formed-Drive-Greater-Boston-Ed-Tech</a>
Manufacturing Platform To Aid Innovators In Philly	<a href="http://articles.philly.com/2012-11-19/business/35187664_1_evan-malone-nextfab-machine-shop">http://articles.philly.com/2012-11-19/business/35187664_1_evan-malone-nextfab-machine-shop</a>
MassChallenge	<a href="http://www.boston.com/business/blogs/global-business-hub/2012/10/innovation_week.html">http://www.boston.com/business/blogs/global-business-hub/2012/10/innovation_week.html</a>
MassChallenge Awards \$1 Million To 16 Start-Ups	<a href="http://www.boston.com/business/innovation/2012/10/23/masschallenge-awards-million-start-ups/ver0HgppsQ6MHm02XQAT9H/story.html">http://www.boston.com/business/innovation/2012/10/23/masschallenge-awards-million-start-ups/ver0HgppsQ6MHm02XQAT9H/story.html</a>
MIT Hatching Companies By The Dozens	<a href="http://www.nytimes.com/2012/11/25/business/mit-lab-hatches-ideas-and-companies-by-the-dozens.html?pagewanted=all&amp;_r=0">http://www.nytimes.com/2012/11/25/business/mit-lab-hatches-ideas-and-companies-by-the-dozens.html?pagewanted=all&amp;_r=0</a>
Off To Torrid Start, Harvard I-Lab Marks Its First Year	<a href="http://bostonglobe.com/business/2012/11/12/off-torrid-start-harvard-innovation-lab-marks-first-anniversary/G0oimnOz5CActctQ8e13vUJ/story.html">http://bostonglobe.com/business/2012/11/12/off-torrid-start-harvard-innovation-lab-marks-first-anniversary/G0oimnOz5CActctQ8e13vUJ/story.html</a>
On The Fall And Rise Of Boston Tech	<a href="http://www.bizjournals.com/boston/blog/startups/2012/10/brad-feld-history-of-boston-tech.html">http://www.bizjournals.com/boston/blog/startups/2012/10/brad-feld-history-of-boston-tech.html</a>
One-Stop Incubators Hatching Social Enterprise Startups	<a href="http://www.forbes.com/sites/annefield/2012/04/20/one-stop-incubators-hatching-social-enterprise-startups/">http://www.forbes.com/sites/annefield/2012/04/20/one-stop-incubators-hatching-social-enterprise-startups/</a>
Perception That Baltimore Is Anything But Strong Is Due To Ignorance	<a href="http://technicallybaltimore.com/baltimore-2-0/baltimore-as-tech-startup-hub-the-perception-is-anything-but-strong-due-to-ignorance/?utm_source=feedburner&amp;utm_medium=feed&amp;utm_campaign=Feed%3A+startupbaltimore+%28Technically+Baltimore%29">http://technicallybaltimore.com/baltimore-2-0/baltimore-as-tech-startup-hub-the-perception-is-anything-but-strong-due-to-ignorance/?utm_source=feedburner&amp;utm_medium=feed&amp;utm_campaign=Feed%3A+startupbaltimore+%28Technically+Baltimore%29</a>
Phila Seed Fund To Finance Startups	<a href="http://articles.philly.com/2012-10-27/business/34750645_1_nyc-entrepreneurial-fund-national-venture-capital-association-seed-capital-fund">http://articles.philly.com/2012-10-27/business/34750645_1_nyc-entrepreneurial-fund-national-venture-capital-association-seed-capital-fund</a>
Philly Drexel Fund & "Innovation Neighborhood"	<a href="http://medcitynews.com/2012/10/university-to-launch-venture-fund-to-enhance-philadelphias-entrepreneur-ecosystem/">http://medcitynews.com/2012/10/university-to-launch-venture-fund-to-enhance-philadelphias-entrepreneur-ecosystem/</a>
Philly: Fund Lets Students Follow Their Dreams	<a href="http://articles.philly.com/2012-12-06/business/35623842_1_venture-capital-fund-college-students-vc">http://articles.philly.com/2012-12-06/business/35623842_1_venture-capital-fund-college-students-vc</a>
Phillyinc: Eight Local Tech Firms	<a href="http://articles.philly.com/2012-11-">http://articles.philly.com/2012-11-</a>



Article	Hyperlink
Get Some Funding	<a href="http://www.27/business/35367562_1_invite-media-phillyinc-contact-mike-armstrong">27/business/35367562_1_invite-media-phillyinc-contact-mike-armstrong</a>
Phillyinc: What Happens When Seed Capital Fails To Make Start-Ups Sprout?	<a href="http://articles.philly.com/2013-01-07/business/36194853_1_cb-insights-venture-capital-industry-venture-capitalists">http://articles.philly.com/2013-01-07/business/36194853_1_cb-insights-venture-capital-industry-venture-capitalists</a>
Pretending Baltimore Is A Startup Hotbed Isn't Going To Make Us Magically Awesome	<a href="http://technicallybaltimore.com/opinions/pretending-baltimore-is-a-startup-hotbed-isnt-going-to-make-us-magically-awesome/">http://technicallybaltimore.com/opinions/pretending-baltimore-is-a-startup-hotbed-isnt-going-to-make-us-magically-awesome/</a>
San Francisco Edged Out As "Smartest" City	<a href="http://blog.sfgate.com/cityinsider/2012/12/10/san-francisco-edged-out-as-smartest-city/">http://blog.sfgate.com/cityinsider/2012/12/10/san-francisco-edged-out-as-smartest-city/</a>
Seed Financing Survey 2011: Internet/Digital Media And Software Industries	<a href="http://www.fenwick.com/publications/Pages/Seed-Finance-Survey-2011.aspx">http://www.fenwick.com/publications/Pages/Seed-Finance-Survey-2011.aspx</a>
Singapore Hunts For New Zuckerberg With Stanford-Style Dorm	<a href="http://www.bloomberg.com/news/2013-01-24/singapore-joins-hunt-for-new-zuckerberg-with-stanford-style-dorm.html">http://www.bloomberg.com/news/2013-01-24/singapore-joins-hunt-for-new-zuckerberg-with-stanford-style-dorm.html</a>
Six Startups Will Pitch Boston's 'Shark Tank' Investors This Thursday	<a href="http://www.boston.com/business/technology/innoeco/2012/10/six_startups_will_pitch_boston.html">http://www.boston.com/business/technology/innoeco/2012/10/six_startups_will_pitch_boston.html</a>
Smart Building: Group Plans Innovation Hub	<a href="http://thedailyrecord.com/2013/03/12/smart-building-group-plans-innovation-hub/">http://thedailyrecord.com/2013/03/12/smart-building-group-plans-innovation-hub/</a>
Start Ups Make Dive Into Boston Shark Tank	<a href="http://bostonglobe.com/business/2012/10/28/start-ups-make-pitches-boston-shark-tank-session/eU5ph2WLjIF2fd5qICj1GO/story.html">http://bostonglobe.com/business/2012/10/28/start-ups-make-pitches-boston-shark-tank-session/eU5ph2WLjIF2fd5qICj1GO/story.html</a>
Startup Genome Coverage	<a href="http://techcrunch.com/2012/11/20/startup-genome-ranks-the-worlds-top-startup-ecosystems-silicon-valley-tel-aviv-l-a-lead-the-way/">http://techcrunch.com/2012/11/20/startup-genome-ranks-the-worlds-top-startup-ecosystems-silicon-valley-tel-aviv-l-a-lead-the-way/</a>
Startup Genome Report	<a href="http://blog.startupcompass.co/pages/entrepreneurship-ecosystem-report">http://blog.startupcompass.co/pages/entrepreneurship-ecosystem-report</a>
Startup Math: Boston > SF	<a href="http://www.boston.com/business/blogs/global-business-hub/2012/11/startup_math_bo.html">http://www.boston.com/business/blogs/global-business-hub/2012/11/startup_math_bo.html</a>
Take A Tour Of 1871, A New 50,000 Sq-Ft Coworking Space In Chicago	<a href="http://tech.co/tour-1871-coworking-space-chicago-2012-05">http://tech.co/tour-1871-coworking-space-chicago-2012-05</a>
Tech Entrepreneurs Get New Collaborative Work Space	<a href="http://thedailyrecord.com/2012/12/03/tech-entrepreneurs-get-new-collaborative-work-space/">http://thedailyrecord.com/2012/12/03/tech-entrepreneurs-get-new-collaborative-work-space/</a>
The Atlantic: A Tech Lab Leading Innovation From Downtown Detroit	<a href="http://www.theatlantic.com/sponsored/goldman-sachs-progress/archive/2012/10/a-tech-lab-leading-innovation-from-downtown-detroit/263863/?oref=goldman-ob">http://www.theatlantic.com/sponsored/goldman-sachs-progress/archive/2012/10/a-tech-lab-leading-innovation-from-downtown-detroit/263863/?oref=goldman-ob</a>
The Entrepreneur's Best Friend	<a href="http://epaper.bostonglobe.com/epaper/viewer.aspx">http://epaper.bostonglobe.com/epaper/viewer.aspx</a>
The Philadelphia Shared Space Game	<a href="http://www.philasocialinnovations.org/site/index.php?option=com_content&amp;view=article&amp;id=466%3Acan-philanthropy-get-into-the-shared-space-game-&amp;catid=57%3Aperspectives-and-predictions&amp;Itemid=102&amp;showall=1">http://www.philasocialinnovations.org/site/index.php?option=com_content&amp;view=article&amp;id=466%3Acan-philanthropy-get-into-the-shared-space-game-&amp;catid=57%3Aperspectives-and-predictions&amp;Itemid=102&amp;showall=1</a>
There Are 27 Incubators In	<a href="http://technical.ly/baltimore/2013/03/19/md-incubator-map-">http://technical.ly/baltimore/2013/03/19/md-incubator-map-</a>

<b>Article</b>	<b>Hyperlink</b>
Maryland	<a href="#">there-are-27-business-incubators-throughout-maryland-map/</a>
Top 10 States By Patenting Activity	<a href="http://money.cnn.com/gallery/smallbusiness/2012/10/24/states-patent-invention/2.html">http://money.cnn.com/gallery/smallbusiness/2012/10/24/states-patent-invention/2.html</a>
U. Of I. To Unveil Plan For Tech Research Center In Chicago	<a href="http://articles.chicagotribune.com/2013-01-24/business/ct-biz-0124-ui-labs-20130124_1_tech-research-center-loop-urbana-champaign">http://articles.chicagotribune.com/2013-01-24/business/ct-biz-0124-ui-labs-20130124_1_tech-research-center-loop-urbana-champaign</a>
Venture Capitalist Brad Feld On How Startup Communities Work	<a href="http://www.boston.com/business/technology/innoeco/2012/11/venture_capitalist_brad_feld_o.html">www.boston.com/business/technology/innoeco/2012/11/venture_capitalist_brad_feld_o.html</a>

## Endnotes

---

- <sup>1</sup> Tim Kane, “The Importance of Startups in Job Creation and Job Destruction” Kauffman Foundation Research Series: Firm Formation and Economic Growth, July 2010, available: [http://www.kauffman.org/uploadedFiles/firm\\_formation\\_importance\\_of\\_startups.pdf](http://www.kauffman.org/uploadedFiles/firm_formation_importance_of_startups.pdf).
- <sup>2</sup> <http://www.s.co/>
- <sup>3</sup> Brookings Metropolitan Policy Program, “Accelerate: A Minneapolis Saint Paul Regional Prospectus for Stimulating the Entrepreneurial Ecosystem,” available at: <http://www.stpaul.gov/index.aspx?nid=4244>.
- <sup>4</sup> Jonathan Sallet, Ed Paisley, Justin Masterman, “The Geography of Innovation,” American Progress 2009, available at: <http://scienceprogress.org/2009/09/the-geography-of-innovation/>.
- <sup>5</sup> Atkinson, Robert, Ezell, Stephen, “Innovation Economics: The Race for Global Advantage,” Yale University Press, 2012.
- <sup>6</sup> Brad Feld, “Startup Communities,” Wiley, 2012.
- <sup>7</sup> Richard Florida, “The Great Reset: How the Post Crash Economy Will Change the Way we Live and Work,” Harper Business, 2012; see also: Florida, “The Rise of the Creative Class,” Harper Business, 2005.
- <sup>8</sup> See, e.g., Brad Feld, “Startup Communities,” Wiley, 2012.
- <sup>9</sup> <http://www.abell.org/pubsitems/EC-CanvasforInnovation.pdf>
- <sup>10</sup> Cyber Point International and The Abell Foundation, “Cyber Security Jobs Report,” January 2013.
- <sup>11</sup> Michael E. Porter, “Clusters and the New Economics of Competition,” Harvard Business Review, November – December 1998. Available at: [http://www.clustermapping.us/lite/general.liteDownload/?file=files%2Fblocks\\_resource\\_item%2Fbinary%2FClusters\\_and\\_the\\_New\\_Economics\\_of\\_Competition.pdf](http://www.clustermapping.us/lite/general.liteDownload/?file=files%2Fblocks_resource_item%2Fbinary%2FClusters_and_the_New_Economics_of_Competition.pdf).
- <sup>12</sup> Towson is an unincorporated community of Baltimore County. See [http://en.wikipedia.org/wiki/Towson,\\_Maryland](http://en.wikipedia.org/wiki/Towson,_Maryland).
- <sup>13</sup> <http://www.arabianbusiness.com/building-entrepreneurial-ecosystem-495633.html>
- <sup>14</sup> <http://www.babson.edu/enterprise-education-programs/babson-global/Pages/entrepreneurship-ecosystem.aspx>
- <sup>15</sup> See <http://www.kauffman.org/research-and-policy/the-ascent-of-americas-high-growth-companies.aspx>.
- <sup>16</sup> Here the authors are particularly indebted to Kauffman Foundation’s research and analysis conducted by Yasuyuki Motoyama and Brian Danley, available at <http://www.kauffman.org/research-and-policy/the-ascent-of-americas-high-growth-companies.aspx>.
- <sup>17</sup> See discussion in Preface, above. See also <http://www.forbes.com/sites/danisenberg/2011/05/25/introducing-the-entrepreneurship-ecosystem-four-defining-characteristics/>.
- <sup>18</sup> <http://www.paulgraham.com/growth.html>
- <sup>19</sup> [http://en.wikipedia.org/wiki/Logic\\_model](http://en.wikipedia.org/wiki/Logic_model)
- <sup>20</sup> <http://www.forbes.com/sites/danisenberg/2011/05/25/introducing-the-entrepreneurship-ecosystem-four-defining-characteristics/>
- <sup>21</sup> For another framework that uses “Emerging” and “Established”, see [http://www.us.am.joneslanglasalle.com/ResearchLevel1/US%20High-Technology%20Outlook\\_2012.pdf](http://www.us.am.joneslanglasalle.com/ResearchLevel1/US%20High-Technology%20Outlook_2012.pdf).
- <sup>22</sup> <http://boston.areastartups.com/companies>
- <sup>23</sup> [www.bwtechumbc.com//facilities/clientlist.html](http://www.bwtechumbc.com//facilities/clientlist.html)
- <sup>24</sup> Companies listed on [www.etcbbaltimore.com/action/companies.html](http://www.etcbbaltimore.com/action/companies.html).
- <sup>25</sup> [http://articles.baltimoresun.com/2012-08-23/business/bal-maryland-tech-companies-tough-recruiting-and-capital-needs-20120823\\_1\\_short-term-rentals-direct-dimensions-ron-schmelzer](http://articles.baltimoresun.com/2012-08-23/business/bal-maryland-tech-companies-tough-recruiting-and-capital-needs-20120823_1_short-term-rentals-direct-dimensions-ron-schmelzer)
- <sup>26</sup> <http://www.mtech.umd.edu/mi2/companies.html>
- <sup>27</sup> <http://www.mtech.umd.edu/create/portfolio.html>
- <sup>28</sup> <http://www.towsonglobal.com/dotnetnuke/>
- <sup>29</sup> <http://www.umbiopark.com/tenants.aspx>

- <sup>30</sup> [http://articles.baltimoresun.com/2012-05-03/business/bal-accelerator-at-loyola-university-maryland-names-three-startups-20120503\\_1\\_hybrid-accelerator-tech-startups-tech-incubator](http://articles.baltimoresun.com/2012-05-03/business/bal-accelerator-at-loyola-university-maryland-names-three-startups-20120503_1_hybrid-accelerator-tech-startups-tech-incubator)
- <sup>31</sup> Foreign government agencies and foreign investment funds were included in the startup count, as they may resemble companies more closely than traditional government agencies. Service providers on one of the nine lists were also included, unless they were identified as not being a startup.
- <sup>32</sup> Source: interviews.
- <sup>33</sup> Florida et al., "Is Your Creative, Innovative, Productive, ... or Just Populated?" Martin Prosperity Institute 2012, available at: [http://martinprosperity.org/media/MSA%20Patents%20Insight\\_v01.pdf](http://martinprosperity.org/media/MSA%20Patents%20Insight_v01.pdf).
- <sup>34</sup> [http://www.us.am.joneslanglasalle.com/ResearchLevel1/US%20High-Technology%20Outlook\\_2012.pdf](http://www.us.am.joneslanglasalle.com/ResearchLevel1/US%20High-Technology%20Outlook_2012.pdf)
- <sup>35</sup> <http://www.inc.com/inc5000/list/2012/metro/baltimore/x/revenue>
- <sup>36</sup> <http://www.inc.com/inc5000/list/2012/metro/baltimore/x/revenue>
- <sup>37</sup> See <http://www.businessnewsdaily.com/3790-young-entrepreneurs.html>. The Kauffman Foundation found in a 2010 study that by the time they turn 24, four in 10 young people have thought about starting a business. YouthPulse 2010, Kauffman Foundation report by Harris Interactive, available: [http://www.kauffman.org/uploadedFiles/youth\\_eship\\_report\\_2010.pdf](http://www.kauffman.org/uploadedFiles/youth_eship_report_2010.pdf). One potential explanation is that members of this group have enough flexibility and mobility in their professional lives to consider starting a business. Of course, entrepreneurship is not limited to the 20-34 demographic. See, e.g., *New York Times*, "Why Innovators Get Better With Age," Tom Agan, March 30, 2013.
- <sup>38</sup> [http://www.onein3boston.com/wp-content/uploads/2009/07/ONEin3DemographicBreakdown\\_12.12.12.pdf](http://www.onein3boston.com/wp-content/uploads/2009/07/ONEin3DemographicBreakdown_12.12.12.pdf)
- <sup>39</sup> <http://www.feld.com/wp/archives/2011/10/entrepreneurial-density-revisited.html>
- <sup>40</sup> Brad Feld, "Startup Communities," 2012, p. 6.
- <sup>41</sup> [http://www.onein3boston.com/wp-content/uploads/2009/07/ONEin3DemographicBreakdown\\_12.12.12.pdf](http://www.onein3boston.com/wp-content/uploads/2009/07/ONEin3DemographicBreakdown_12.12.12.pdf)
- <sup>42</sup> <http://www.baltimorehealth.org/neighborhoodmap.html>
- <sup>43</sup> See, e.g., [http://www.creativeclass.com/rfcgdb/articles/Entrepreneurship\\_Creativity\\_and\\_Regional\\_Development.pdf](http://www.creativeclass.com/rfcgdb/articles/Entrepreneurship_Creativity_and_Regional_Development.pdf), at 6: "Studies of national growth find a clear connection between the economic success of nations and their human capital, as measured by the level of education. This connection has also been found in regional studies of the United States. In a series of studies, Edward Glaeser and his collaborators, for example, have found considerable empirical evidence that human capital is the central factor in regional growth." (Citations omitted). Al Zubeidi, "Higher Education and Entrepreneurship: The Relation Between College Educational Background and Small Business Success in Texas," University of North Texas Doctoral Thesis, available at: <http://digital.library.unt.edu/ark:/67531/metadc4795/>.
- <sup>44</sup> Baltimore: <http://www.baltimorecountymd.gov/Agencies/economicdev/baltimorecountybusiness/choosebaltimorecounty/demographicsindex.html> and Boston: <http://www.bizjournals.com/baltimore/news/2013/01/25/super-bowl-xlvi-census-style.html>
- <sup>45</sup> [http://www.onein3boston.com/wp-content/uploads/2009/07/ONEin3DemographicBreakdown\\_12.12.12.pdf](http://www.onein3boston.com/wp-content/uploads/2009/07/ONEin3DemographicBreakdown_12.12.12.pdf)
- <sup>46</sup> <http://www.onein3boston.com/mayors-advisory-council/>
- <sup>47</sup> <http://www.onein3boston.com/mayors-advisory-council/>
- <sup>48</sup> Source: interviews.
- <sup>49</sup> <http://www.nlc.org/documents/Find%20City%20Solutions/Research%20Innovation/Economic%20Development/Boston.pdf> and <http://www.bostonglobe.com/business/2013/05/22/south-boston-district-hall-open-june/vbG3t2zKpGurkqgKYixLWM/story.html>
- <sup>50</sup> <http://www.businessweek.com/articles/2012-03-21/bostons-so-called-innovation-district-eagerly-awaits-more-innovators>
- <sup>51</sup> <http://www.bostonglobe.com/business/2013/05/22/south-boston-district-hall-open-june/vbG3t2zKpGurkqgKYixLWM/story.html>
- <sup>52</sup> <http://bostinno.com/channels/can-bostons-innovation-district-truly-be-an-innovation-district/>
- <sup>53</sup> Screen grab from: <http://www.innovationdistrict.org/>

---

<sup>54</sup> <http://www.cityofboston.gov/news/default.aspx?id=6008>

<sup>55</sup> <http://www.boston.com/business/innovation/2012/10/24/cambridge-tries-hold-onto-start-ups/fMoJbD0g90WG38rShIZRwO/story.html>

<sup>56</sup> Brad Feld, "Startup Communities," 2012, p. 6.

<sup>57</sup> Note there is likely a time lag with this figures for estimating the entrepreneurial ecosystem: Venture Capital investors today usually invest in companies that are 2-4+ years old. Therefore, these figures do a better job of measuring where an entrepreneurship ecosystem was 2 or more years ago.

<sup>58</sup> <http://www.angelresourceinstitute.org/research/halo-report.aspx#2012HaloReport>

<sup>59</sup> <http://www.angelresourceinstitute.org/research/halo-report.aspx#2012HaloReport>

<sup>60</sup> <http://venture-capital.entrepreneur.com/>

<sup>61</sup> <http://www.choosemaryland.org/businessresources/pages/marylandventurefund.aspx>

<sup>62</sup> [http://mass-ventures.com/about\\_us/](http://mass-ventures.com/about_us/)

<sup>63</sup> <http://www.choosemaryland.org/businessresources/pages/investmaryland.aspx>

<sup>64</sup> <http://www.massdevelopment.com/financing/specialty-loan-programs/emerging-technology-fund/>

<sup>65</sup> [http://wsbe.unh.edu/Centers\\_CVR/cap\\_locator.cfm](http://wsbe.unh.edu/Centers_CVR/cap_locator.cfm)

<sup>66</sup> <http://collegestats.org/colleges>

<sup>67</sup> [http://www.baltimoresun.com/business/bs-bz-baltimore-patents-20130201\\_0,5502849.story](http://www.baltimoresun.com/business/bs-bz-baltimore-patents-20130201_0,5502849.story)

<sup>68</sup> <http://chronicle.com/article/What-Theyre-Worth/136933/>

<sup>69</sup> Startups provide benefits for established companies by providing a talent pipeline, a source of potential acquisitions, and media attention that can help attract talent and capital to the region.

<sup>70</sup> <http://www.inc.com/inc5000/list/2012/metro/baltimore/x/revenue>

<sup>71</sup> <http://www.inc.com/inc5000/list/2012/metro/baltimore/x/revenue>

<sup>72</sup> [freepatentsonline.com/maps](http://freepatentsonline.com/maps)

<sup>73</sup> <http://www.bostonredevelopmentauthority.org/PDF/ResearchPublications/Economy%20Report%202013-FINAL.pdf>

<sup>74</sup> See Industry Cluster Analyses: [http://www.boston.com/business/technology/innoeco/2013/01/boston\\_remains\\_top\\_life\\_scienc.html](http://www.boston.com/business/technology/innoeco/2013/01/boston_remains_top_life_scienc.html); <http://www.biorealty.com/articles/the-biomedical-industrys-emerging-clusters.html>; and <https://www.ubalt.edu/downloads/Microsoft%20Word%20-%20BaltimoreReport--TeamPeru.pdf>

<sup>75</sup> <http://marylandbiocenter.org/bioscience%20of%20maryland/pages/factsandfigures.aspx>. In addition, 715 biotech-related organizations are listed on the BioMaryland Center directory: <http://bio.maryland.gov/Pages/default.aspx>. Last visited 6/14/13.

<sup>76</sup> <http://www.bizjournals.com/baltimore/print-edition/2012/04/20/venture-capitalists-give-baltimore.html>

<sup>77</sup> <http://www.greaterbaltimore.org/blog/edtech-index-measuring-how-baltimore-stacks-in-the-edtech-market-nationally/>; see the SXSW presentation here: [http://www.youtube.com/watch?v=Z8\\_fjTSMOTE&feature=youtu.be&t=01s](http://www.youtube.com/watch?v=Z8_fjTSMOTE&feature=youtu.be&t=01s). Evidence includes: Baltimore's relatively high proportion of IT professionals (10th of 30 metropolitan regions surveyed by EAGB), the number of Inc. 5000 'high-growth' education companies per capita (4th of 30), and quality of the public education system (Maryland is ranked first).

<sup>78</sup> Source: interviews.

<sup>79</sup> [http://www.greaterbaltimore.org/UploadedPDFs/manufacturing\\_profile.pdf](http://www.greaterbaltimore.org/UploadedPDFs/manufacturing_profile.pdf)

<sup>80</sup> Cyber Point International and The Abell Foundation, "Cyber Security Jobs Report," January 2013.

<sup>81</sup> Facility Logix, "Market Study and Gap Analysis Report: A Canvas for Innovation," The Abell Foundation, May 2012, pages 16-21, available: <http://www.abell.org/publications/detail.asp?ID=196>

<sup>82</sup> <http://masschallenge.org/accelerator/results>

<sup>83</sup> Source: interviews.

<sup>84</sup> [http://www.youtube.com/watch?v=Z8\\_fjTSMOTE&feature=youtu.be&t=01s](http://www.youtube.com/watch?v=Z8_fjTSMOTE&feature=youtu.be&t=01s)

<sup>85</sup> <http://marylandbiocenter.org/resources/pages/Incubators.aspx>

<sup>86</sup> <http://scienceprogress.org/2011/10/innovation-is-like-love/>

<sup>87</sup> Information about TEDCO programming is available at <http://tedco.md/programs/>.

- 
- <sup>88</sup> Source: interviews.
- <sup>89</sup> <http://www.hightechinthehub.com/2010/10/top-10-boston-high-tech-blogs/>
- <sup>90</sup> For an excellent overview and analysis of these questions, see <http://www.bos.frb.org/economic/neppc/dp/2009/neppcdp0903.pdf>.
- <sup>91</sup> See Peter Franchot, Comptroller of Maryland, "A Guide To Maryland Business Tax Credits," 2012, available: [http://www.choosemaryland.org/businessresources/Documents/2012\\_tax\\_credit\\_guide.pdf](http://www.choosemaryland.org/businessresources/Documents/2012_tax_credit_guide.pdf)
- <sup>92</sup> <http://www.mass.gov/dor/businesses/help-and-resources/legal-library/tirs/tirs-by-years/2004-releases/tir-04-19-jobs-incentive-payment.html>
- <sup>93</sup> See Peter Franchot, Comptroller of Maryland, "A Guide To Maryland Business Tax Credits," 2012, available: [http://www.choosemaryland.org/businessresources/Documents/2012\\_tax\\_credit\\_guide.pdf](http://www.choosemaryland.org/businessresources/Documents/2012_tax_credit_guide.pdf)
- <sup>94</sup> See Peter Franchot, Comptroller of Maryland, "A Guide To Maryland Business Tax Credits," 2012, available: [http://www.choosemaryland.org/businessresources/Documents/2012\\_tax\\_credit\\_guide.pdf](http://www.choosemaryland.org/businessresources/Documents/2012_tax_credit_guide.pdf)
- <sup>95</sup> See Peter Franchot, Comptroller of Maryland, "A Guide To Maryland Business Tax Credits," 2012, available: [http://www.choosemaryland.org/businessresources/Documents/2012\\_tax\\_credit\\_guide.pdf](http://www.choosemaryland.org/businessresources/Documents/2012_tax_credit_guide.pdf)
- <sup>96</sup> See Peter Franchot, Comptroller of Maryland, "A Guide To Maryland Business Tax Credits," 2012, available: [http://www.choosemaryland.org/businessresources/Documents/2012\\_tax\\_credit\\_guide.pdf](http://www.choosemaryland.org/businessresources/Documents/2012_tax_credit_guide.pdf)
- <sup>97</sup> See Peter Franchot, Comptroller of Maryland, "A Guide To Maryland Business Tax Credits," 2012, available: [http://www.choosemaryland.org/businessresources/Documents/2012\\_tax\\_credit\\_guide.pdf](http://www.choosemaryland.org/businessresources/Documents/2012_tax_credit_guide.pdf)
- <sup>98</sup> <http://www.mass.gov/hed/business/incentives/r-and-d-tax-credit.html>
- <sup>99</sup> See Peter Franchot, Comptroller of Maryland, "A Guide To Maryland Business Tax Credits," 2012, available: [http://www.choosemaryland.org/businessresources/Documents/2012\\_tax\\_credit\\_guide.pdf](http://www.choosemaryland.org/businessresources/Documents/2012_tax_credit_guide.pdf)
- <sup>100</sup> <http://www.masslifesciences.com/taxincentive.html>
- <sup>101</sup> See Peter Franchot, Comptroller of Maryland, "A Guide To Maryland Business Tax Credits," 2012, available: [http://www.choosemaryland.org/businessresources/Documents/2012\\_tax\\_credit\\_guide.pdf](http://www.choosemaryland.org/businessresources/Documents/2012_tax_credit_guide.pdf)
- <sup>102</sup> <http://www.masslifesciences.com/grants/challenge.html>
- <sup>103</sup> <http://www.mmgroup.com/interior.cfm?page=epip>
- <sup>104</sup> <http://www.masslifesciences.com/accelerator.html>
- <sup>105</sup> <http://www.mass.gov/hed/economic/eohed/moiti/exporting/step-program/>
- <sup>106</sup> <http://mass-ventures.com/start-program/how-it-works/>
- <sup>107</sup> <http://www.smartplanet.com/blog/pure-genius/why-proximity-matters-for-innovation/7403>
- <sup>108</sup> Kyungjoon Lee et al., "Does Collocation Inform the Impact of Collaboration?" *PLOS One*, December 2010; and Kraut, et al., "Understanding Effects of Proximity on Collaboration" in *Lessons from Collected Work*, available at: [www.psychology.sunysb.edu/sbrennan-/papers/kraut.pdf](http://www.psychology.sunysb.edu/sbrennan-/papers/kraut.pdf).
- <sup>109</sup> See, e.g., [http://www.mlive.com/news/detroit/index.ssf/2013/02/creative\\_class\\_author\\_richard.html](http://www.mlive.com/news/detroit/index.ssf/2013/02/creative_class_author_richard.html)
- <sup>110</sup> For an additional analysis of Baltimore's regional transit issues see GBC's 2011 report, [http://www.gbc.org/reports/2011StateoftheRegion\\_FINAL\\_print.pdf](http://www.gbc.org/reports/2011StateoftheRegion_FINAL_print.pdf). See also "Jay Brodie: Greater Baltimore needs a transportation system," at: <http://www.bizjournals.com/baltimore/blog/real-estate/2013/06/jay-brodie-greater-baltimore-needs-a.html>.
- <sup>111</sup> <http://www.gbc.org/news/2504/>
- <sup>112</sup> Source: Google Maps.
- <sup>113</sup> [http://www.bizjournals.com/boston/blog/mass\\_roundup/2013/03/micro-apartments-in-boston.html](http://www.bizjournals.com/boston/blog/mass_roundup/2013/03/micro-apartments-in-boston.html)
- <sup>114</sup> <http://www.thehubway.com/news/page/5> and
- <sup>115</sup> <http://southend.patch.com/articles/hubway-rides-replace-13-percent-of-car-trips-in-boston>
- <sup>116</sup> Source: interviews. See also: <http://www.thehubway.com/>.
- <sup>117</sup> Kevin Stolaric, et al., "Are Creative Metropolitan Areas Also Entrepreneurial?" *Regional Science Policy and Practice*, 2011, available: <http://onlinelibrary.wiley.com/doi/10.1111/j.1757-7802.2011.01041.x/abstract>; also see: <http://www.theatlanticcities.com/jobs-and-economy/2012/08/creativity-entrepreneurship-connection/2847/>.
- <sup>118</sup> Florida, et al., "Is Your Creative, Innovative, Productive... or Just Populated?" *Martin Prosperity Institute* 2012, available at: [http://martinprosperity.org/media/MSA%20Patents%20Insight\\_v01.pdf](http://martinprosperity.org/media/MSA%20Patents%20Insight_v01.pdf).
- <sup>119</sup> <http://martinprosperity.org/2012/06/27/insight-rise-revisited-creativity-index/>

---

<sup>120</sup> See, e.g., <http://www.bizjournals.com/baltimore/news/2013/05/14/film-festival-shines-spotlight-on.html?page=all>, [http://articles.baltimoresun.com/2011-12-30/entertainment/bs-ae-arts-2012-20111230\\_1\\_kwame-kwei-armah-marin-also-baltimore-art-scene](http://articles.baltimoresun.com/2011-12-30/entertainment/bs-ae-arts-2012-20111230_1_kwame-kwei-armah-marin-also-baltimore-art-scene), <http://citypaper.com/baltimannual/the-arts-scene-1.1389582>, and [http://www.baltimore.to/Guide/baltimore\\_art\\_scene.html](http://www.baltimore.to/Guide/baltimore_art_scene.html).

<sup>121</sup> For a cautionary example, see Rhode Island's recent experience. Matt Bai, "Thrown for a Curve," New York Times, April 20, 2013. <http://www.nytimes.com/2013/04/21/business/curt-schilling-rhode-island-and-the-fall-of-38-studios.html?pagewanted=all&r=0>

<sup>122</sup> <http://www.xprize.org/>

<sup>123</sup> <http://dealbook.nytimes.com/2013/05/27/entrepreneurs-help-build-start-ups-by-the-batch/>

<sup>124</sup> <http://ventureforamerica.org/vfa-launch-baltimore/>

<sup>125</sup> <http://www.loyola.edu/Media/News/2012/0327-business-accelerator.aspx>

<sup>126</sup> As Newt Fowler noted, such a codification could identify areas for collaboration/coordination among existing organizations, as well as areas for optimal "cooption"—a balance of collaboration and competition, such as startup support programs collocating and competing for startups.

<sup>127</sup> <http://www.greaterbaltimore.org/blog/the-economic-alliance-biohealth-innovation-and-the-baltimore-business-journal-partner-to-announce-the-maryland-biohealth-entrepreneurs-resource-and-financing-guide/>

<sup>128</sup> <http://www.businessweek.com/articles/2012-03-21/bostons-so-called-innovation-district-eagerly-awaits-more-innovators>. See also: <http://www.boston.com/business/innovation/2012/10/24/cambridge-tries-hold-onto-start-ups/fMoJbD0g90WG38rShIZRwO/story.html>.

<sup>129</sup> Other potential remedies include: (a) commitment of incubators and co-working spaces in the district to direct companies that can afford to move out of subsidized spaces do so, and (b) requiring all new commercial property owners above a certain size to reserve space for startup companies at affordable rents in any new building development or re-development in the Innovation District. See

<http://www.boston.com/business/innovation/2012/10/24/cambridge-tries-hold-onto-start-ups/fMoJbD0g90WG38rShIZRwO/story.html>

<sup>130</sup> <http://www.governor.maryland.gov/blog/?p=8583>

<sup>131</sup> <http://www.choosemaryland.org/businessresources/pages/jobcreationtaxcredit.aspx>

<sup>132</sup> <http://www.gbc.org/news/2504/>

<sup>133</sup> <http://transportationnation.org/2013/03/13/manhattan-buses-will-have-real-time-status-updates-a-bit-later-than-planned/>

<sup>134</sup> [http://en.wikipedia.org/wiki/Apollo\\_program](http://en.wikipedia.org/wiki/Apollo_program) and <http://history.nasa.gov/Apollo/Apollo5.pdf>.

<sup>135</sup> <http://online.wsj.com/article/SB10001424127887324904004578539373656398096.html>