



MASS TECHNOLOGY LEADERSHIP COUNCIL



# MASSACHUSETTS TECH PULSE INDEX

INSIGHTS FROM INDUSTRY LEADERS

NOVEMBER 2017

## Acknowledgments

Thank you to the following people who contributed to this report: Mohamad Ali, President & CEO, Carbonite; Steve Conine, Co-founder & Co-chairman, Wayfair; Michael Goodman, Executive Director, Public Policy Center at UMass Dartmouth, and Co-Editor, *MassBenchmarks*; Dave Krupinski, Co-Founder & CTO, Care.com; Annmarie Levins, Fellow, Data & Society Research Institute; Matthew Littlewood, Partner, PWC; Mike McCarthy, Research Associate, Public Policy Center at UMass Dartmouth; Steve O'Leary, Managing Director, Aeris Partners; Corey Thomas, President & CEO, Rapid7; Anthony Williams, Vice President, Global Talent Acquisition and Diversity at Akamai Technologies, and the 156 technology executives who participated in the Tech Pulse survey.

## About the *Massachusetts Tech Pulse Index, Insights from Industry Leaders*

In 2017, MassTLC commissioned the Public Policy Center at UMass Dartmouth (PPC) to conduct a semi-annual opinion survey of senior technology decision-makers in Massachusetts designed to elicit executive sentiment, insights, and future trends that could help business and policy leaders make decisions about the future. The *Massachusetts Tech Pulse Index, Insights from Industry Leaders* supplements MassTLC's annual *State of the Technology Economy* report, which utilizes federal data to benchmark the size, growth and impact of tech in Massachusetts, as well as MassTLC's industry reports, including those on IoT, Consumer Tech, Big Data, Robotics, and more.

## About the Mass Technology Leadership Council, Inc.

The Mass Technology Leadership Council (MassTLC) is the region's leading technology association and the premier network for tech executives, entrepreneurs, investors, and policy leaders. Representing more than half of the people working in the Massachusetts tech sector, MassTLC is the voice for tech in Massachusetts. MassTLC drives progress by connecting people from across the innovation ecosystem, providing access to industry-leading content and ideas, and offering a platform for collective impact. More at [www.masstlc.org](http://www.masstlc.org).

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The *Massachusetts Tech Pulse Index, Insights from Industry Leaders*, developed by the Public Policy Center at UMass Dartmouth (PPC) in collaboration with the Massachusetts Technology Leadership Council (MassTLC), finds that a shortage of skilled workers is the single greatest challenge facing technology companies in Massachusetts.

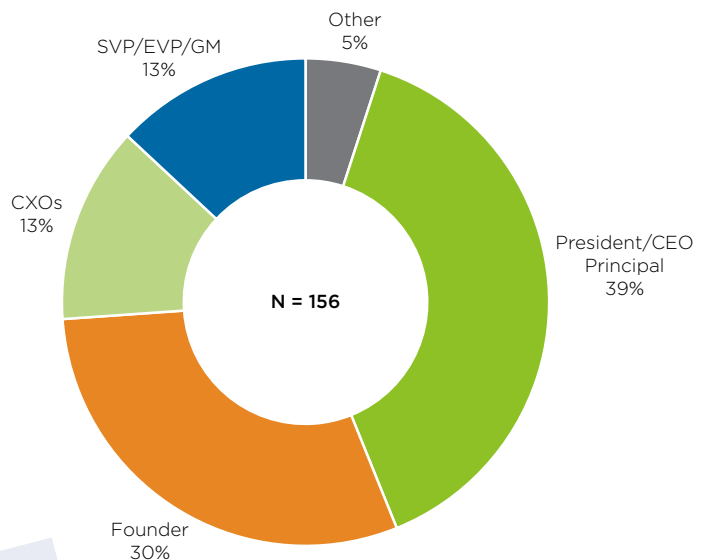
### The Tech Pulse Survey

The Tech Pulse was developed as a semi-annual checkpoint on executive sentiment, insights, and future trends from the decision-makers at our region's leading technology companies. We hope the insights garnered from the Tech Pulse will help business advocates and policy leaders make more informed decisions about the future.

Responses were received from industry leaders at 156 technology firms in the Massachusetts, 69% of whom are the founder, president, CEO, or principal at their organization. Another 24% identify as CXO, senior/executive vice president, or general manager. Of the companies represented, 86% are headquartered in Massachusetts. Many respondents also report having locations in other New England states (35%), in states outside of New England (88%), and in other countries (63%).


Adding insight to the empirical survey data, a panel of technology leaders representing a variety of tech sub-sectors reviewed and reacted to the findings. MassTLC Trustee Corey Thomas, CEO of Rapid7, was representative of the cohort, noting that "talent is both the source of strength and the source of potential weakness in Massachusetts. It is why people love being here but the shortage of talent is also why others are investing elsewhere."

Council Trustee Annmarie Levins, fellow, Data & Society Research Institute, adds that "we have great talent, but not enough, and the Commonwealth's ability to support the growth of existing companies and attract new ones depends on ensuring the availability of the right talent."



### Demand for STEM Degree Holders

Respondents to the survey emphasized the sector's workforce needs by specifying the demand for Science, Technology, Engineering, and Math (STEM) degree holders and applicants with a technical background.



“In Massachusetts, a talented STEM workforce is both our greatest advantage and our greatest challenge,” remarked Council Trustee Dave Krupinski, co-founder and CTO of Care.com. “To retain, attract, and develop talent, we need a multi-faceted approach that includes sustained investment in education at all levels, support for internships and co-op programs to keep university grads in the state, and national immigration policies that increase the flow of talent into the Commonwealth.”

Indeed, the majority of respondents reported that improving the pipeline of STEM graduates is very critical to the success of technology businesses in the Commonwealth.

“It is important that companies should actively encourage and support the development of STEM education initiatives for all Massachusetts students,” noted Council Trustee Matthew Littlewood, partner at PWC. “The long-term benefit to the state would go a long way to address the most significant challenges they face to grow their businesses.”

Although they report a shortage of technically qualified workers in the state, the tech leaders represented in the survey have a positive outlook about the future of their businesses and quality of the existing workforce, notwithstanding the challenges.

“In a state where over 50% of our workers have bachelors degree,<sup>1</sup> the only US state to have ever achieved this feat, we are suffering from one of the worse talent shortages ever,” remarked Council Trustee Mohamad Ali, CEO of Carbonite. “This is because we have transformed our Massachusetts economy to one where the core raw material is talent, such as technology and life-sciences,

1. “Education and State Economic Strength: A Snapshot of Current Data.” Massachusetts Budget and Policy Center, August 23, 2017.

and paradoxically the faster these industries grow, the quicker we deplete this pool of talent.”

## Challenges of Doing Business in MA

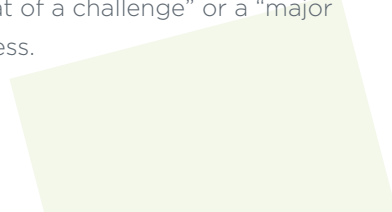
As Figure 1 demonstrates, cost of living was selected as a challenge of doing business in Massachusetts by more respondents than other factors.

However, when asked to select which of the options posed the greatest challenge to their business, respondents identified the availability of skilled workers as the single greatest challenge, with 25% of respondents selecting it (see Figure 2).

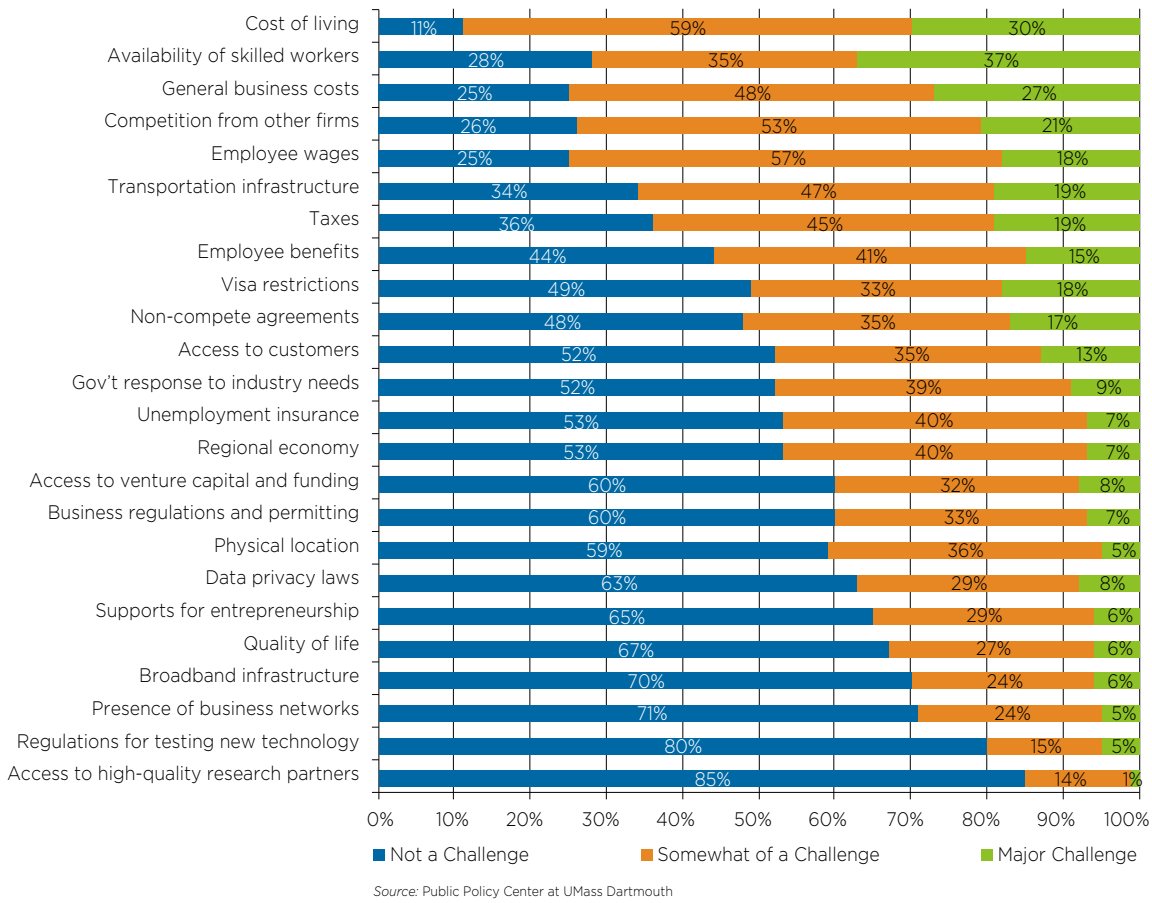
“CEOs rank talent as the #1 impediment to growth,” cautions Ali. “Unless Massachusetts takes significant steps to grow this talent pool even further, our state’s growth will stagnate.”

“It is becoming increasingly competitive to secure top talent across engineering, software development, and data science,” noted Council Trustee Steve Conine, co-founder and co-chairman of Wayfair. “As a fast-growing tech company with a massive market opportunity ahead of us, we will need a very robust pipeline of STEM talent entering the market to help fuel our significant momentum and growth.”

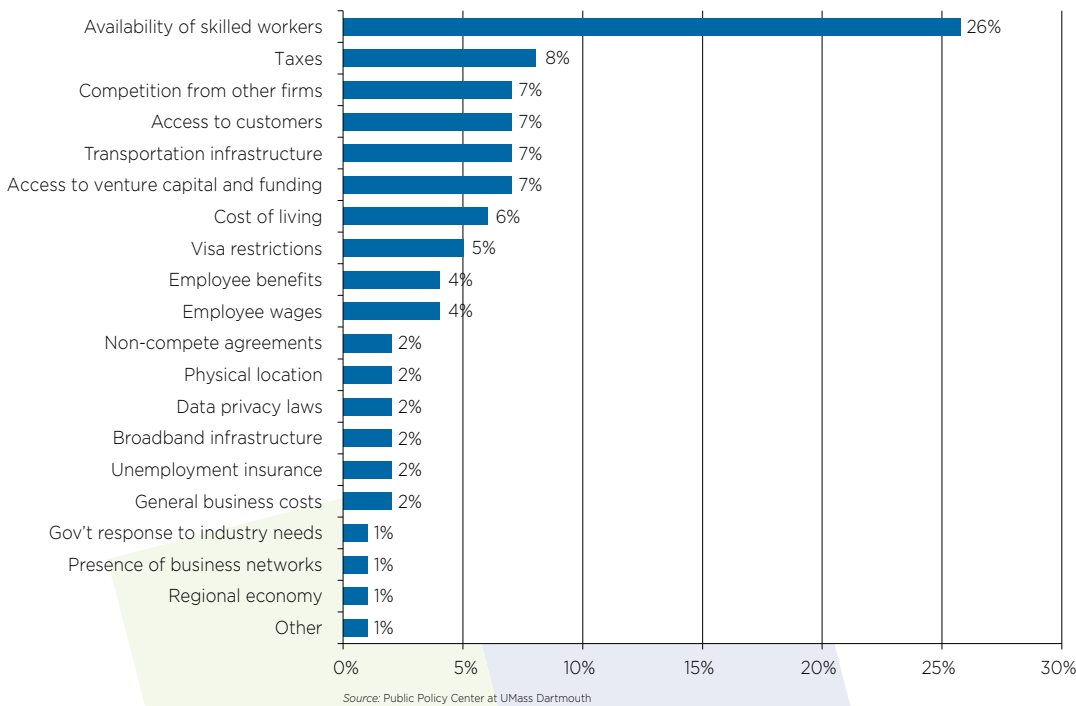
Outside of the workforce needs of the tech sector, general issues are more challenging to businesses than those that are sector-specific. General business costs, competition from other firms, employee wages, transportation infrastructure, taxes, and employee benefits are all concerns that at least 50% of respondents identified as either “somewhat of a challenge” or a “major challenge” to their business.




**Figure 1. Challenges of Doing Business in Massachusetts**



**Figure 2. "What Is the Single Greatest Challenge of Doing Business in Massachusetts?"**





“Cost of living and transportation infrastructure (and availability of skilled workers) are all linked together, remarked Council Trustee Steve O’Leary, managing director at Aeris Partners. “Tech companies are increasingly seeking to anchor themselves in the density of the Boston/Cambridge metro center. Not coincidentally, these are among the most costly places to live and are surrounded by very expensive suburbs. Better rail is a must. We must unlock radial access to the core by rail from all points to maintain the growth. Transportation must improve. Period.”

Conine adds that “as a region, we need to raise visibility nationally and internationally around the innovation and business growth coming out of Massachusetts. We also need to invest in infrastructure particularly around public transportation and affordable housing, which will make the area even more attractive to young people starting careers and families.”

Of sector-specific issues, non-compete agreements and visa restrictions are the only issues that the majority of respondents identify as challenges.

### **Advantages of Doing Business in MA**

Despite identifying the lack of skilled workers as the most pressing challenge facing the tech sector, the majority of respondents (52%) selected talent as the single greatest advantage to doing business in the Commonwealth (see Figure 3).

Overall, 66% of respondents rate the Commonwealth’s skilled workforce as a “major advantage” of doing business in the state (see Figure 4).

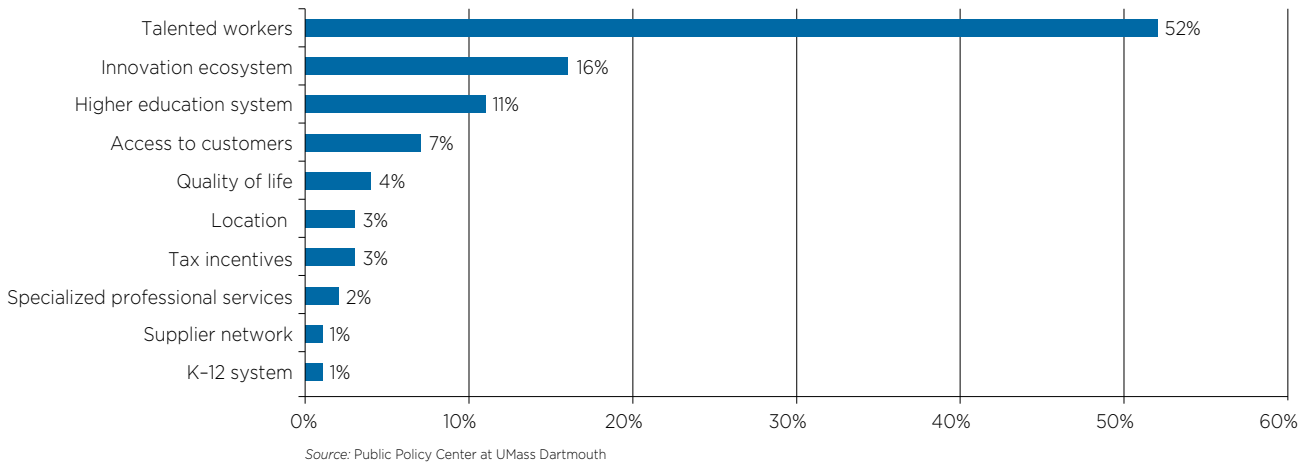
This theme was reflected in the other highly ranked competitive advantages identified by respondents—Massachusetts’ higher education system and the innovation ecosystem are rated as a “major advantage” by 64% and 47% of all respondents, respectively.

“Massachusetts offers a talented workforce that is particularly strong in the STEM fields,” noted Conine. “We employ more than 1,000 engineers and data scientists in our Boston headquarters who represent the best and brightest talent in our industry.”

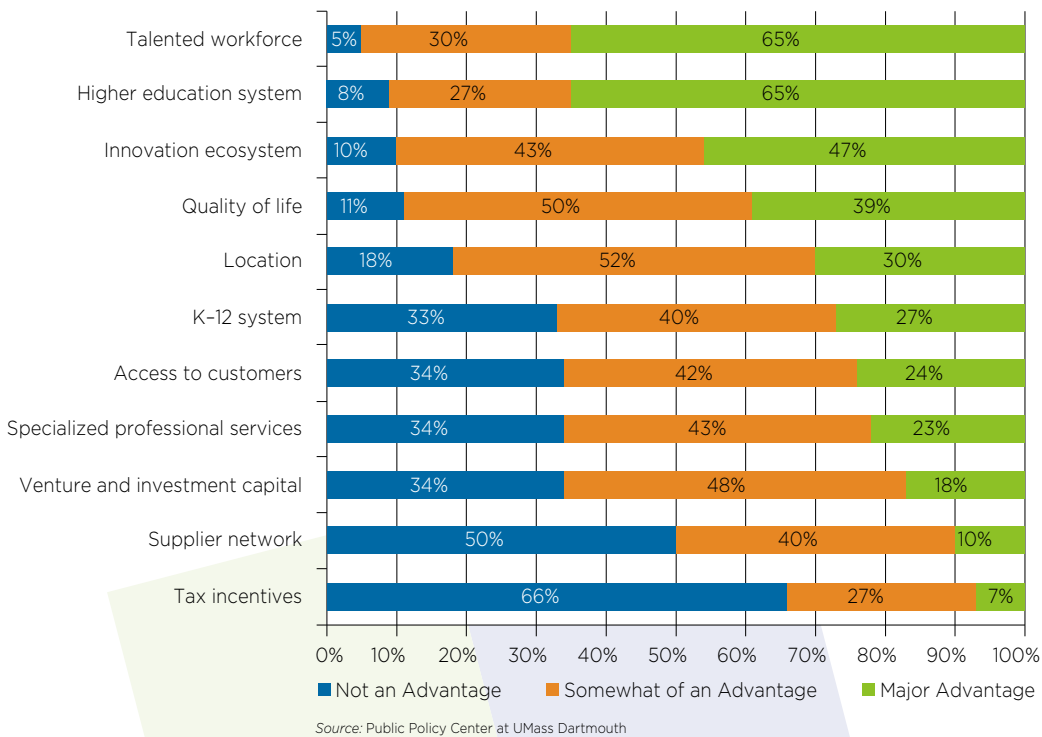
“I’ve never seen a better time to start or expand a tech company in Massachusetts,” remarked Krupinski. “We have a vibrant, dynamic, and diverse tech ecosystem fueled by our talented STEM workforce.”

Another advantage, notes O’Leary, is that “capital is abundant—not just venture capital but also private equity. In many ways private equity has become a much more effective vehicle for capitalizing larger, expansion-stage tech companies than the public markets (IPOs) were—this phenomenon should also be considered in the region’s success—we have a strong ecosystem of private equity in the area.”

**Figure 3.** “What Is the Greatest Advantage of Doing Business in Massachusetts?”



**Figure 4.** Advantages of Doing Business in Massachusetts





## STEM Policies are Critical for MA

Respondents identify improving the pipeline of STEM graduates as the policy action most critical to the future success of their business in Massachusetts (see Figure 5).

The majority of respondents (60%) report that improving access to new graduates of the state's vaunted higher education institutions was "very critical," while just over a third of respondents (37%) consider improving the STEM pipeline to be "somewhat critical." Just under half of respondents (47%) identify the need to reduce healthcare costs as "very critical."

The importance of STEM graduates to the technology sector is reinforced elsewhere in the survey. For example, when considering applicants, respondents report that they value analytical thinkers with strong communication skills, prior experience in a professional setting, and a STEM education (see Figure 6).

Respondents again point to the importance of a STEM education, with 53% indicating that a STEM bachelor's degree is a "very important" credential for a new hire to have. However, college graduates in non-STEM fields are considered less valuable. Notably, respondents indicated a preference for a four-year degree, with 50% of respondents reporting that an associate's degree in a STEM discipline is "not important" when they are considering a new hire.

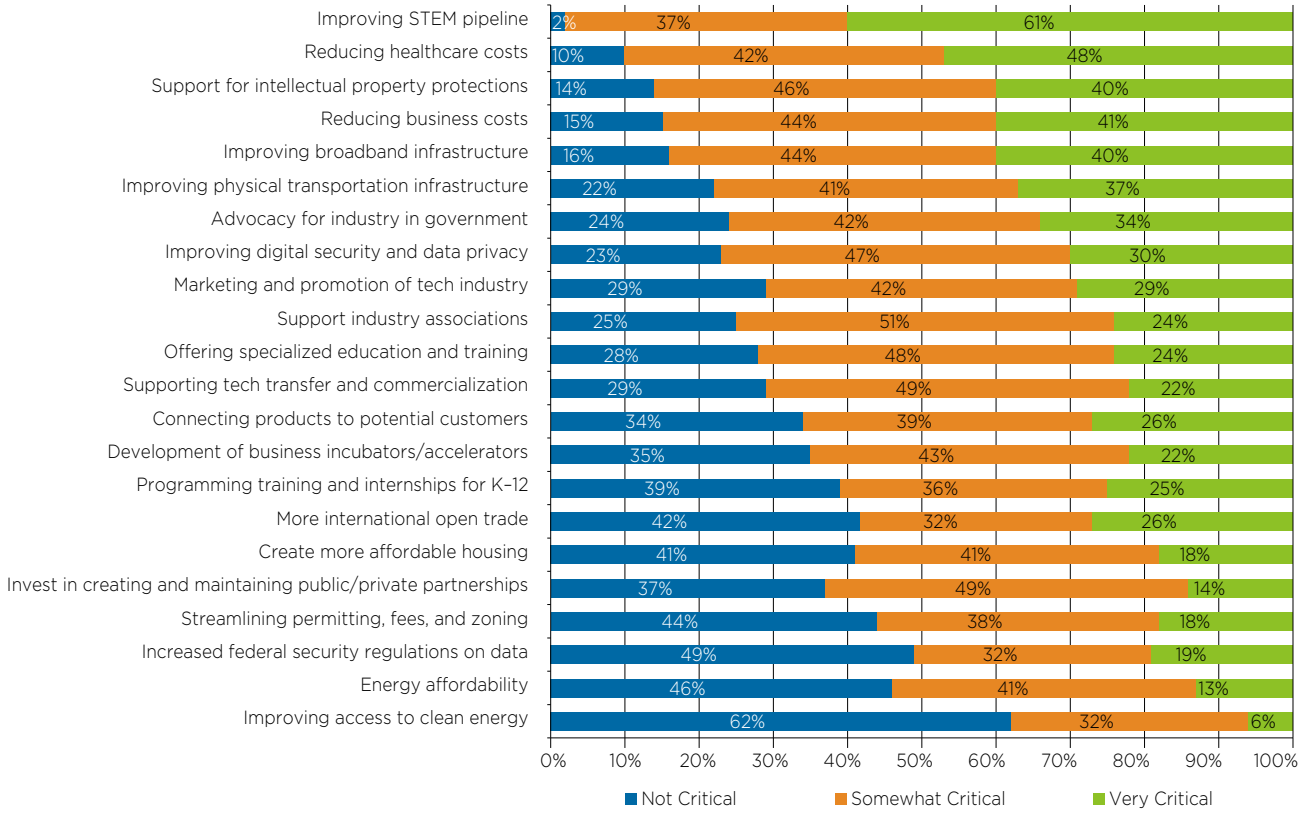
Other qualifications that have a higher value to the technology firms surveyed include logical and analytical skills, which 85% of respondents rate as "very important"; communication and business skills, which 78% of respondents rate "very important"; and prior professional experience, which 62% of respondents rate as "very important."

Nearly six in ten respondents (57%) report an unfilled job opening at their technology firm. These vacancies appear to be concentrated in technical positions. Respondents indicate that there is a greater need for technical staff compared to non-technical staff of the same level—68%, 72%, and 52% of respondents report needing senior, mid-level, and entry-level technical staff, respectively, compared with 37%, 41%, and 30% for senior, mid-level nontechnical, entry-level staff (see Figure 7).

Regarding specific positions, the greatest demand is reported for developers/engineers (54%), software engineers (49%), and sales (39%). Nearly a quarter of respondents also indicate that their organization recently experienced difficulty when searching for candidates to fill program or project managers (24%) and senior management (24%) positions (see Figure 8).

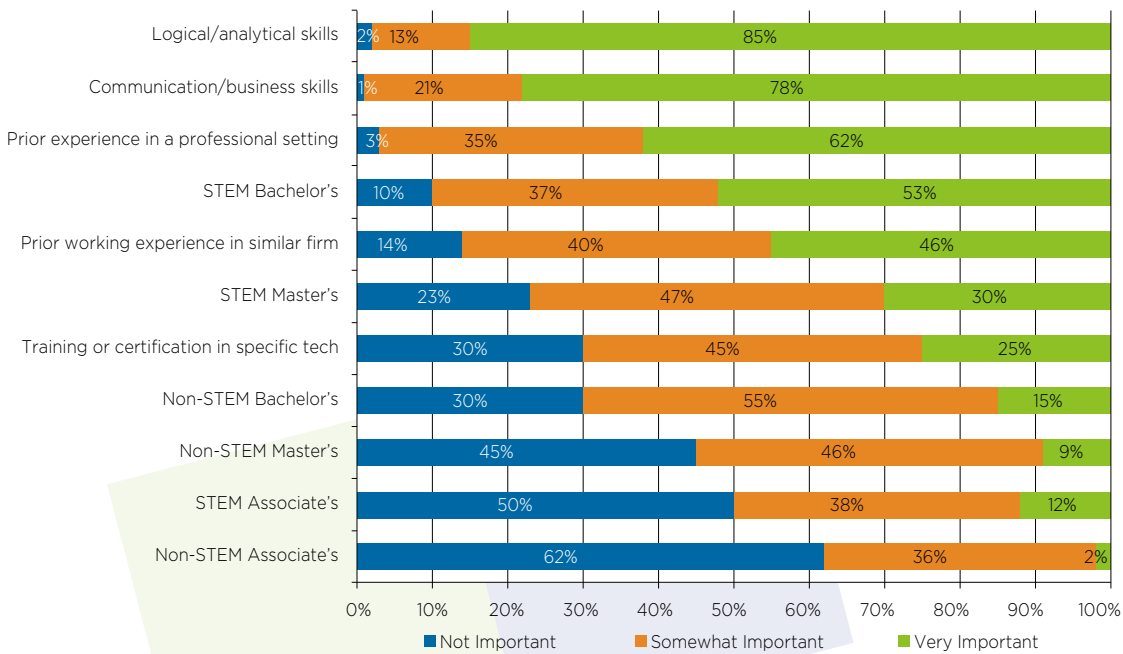


**Figure 5. Policies Critical to Success of Businesses in Massachusetts**



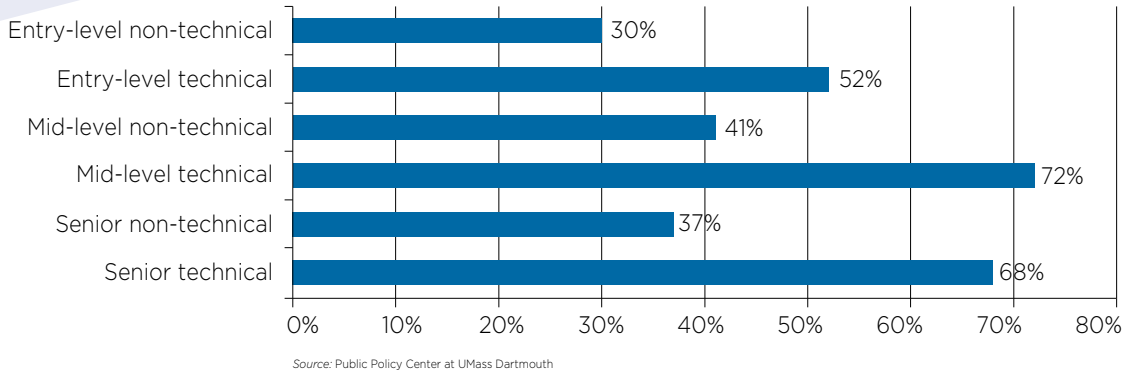
Source: Public Policy Center at UMass Dartmouth

**Figure 6. Importance of Credentials when Considering a New Hire**

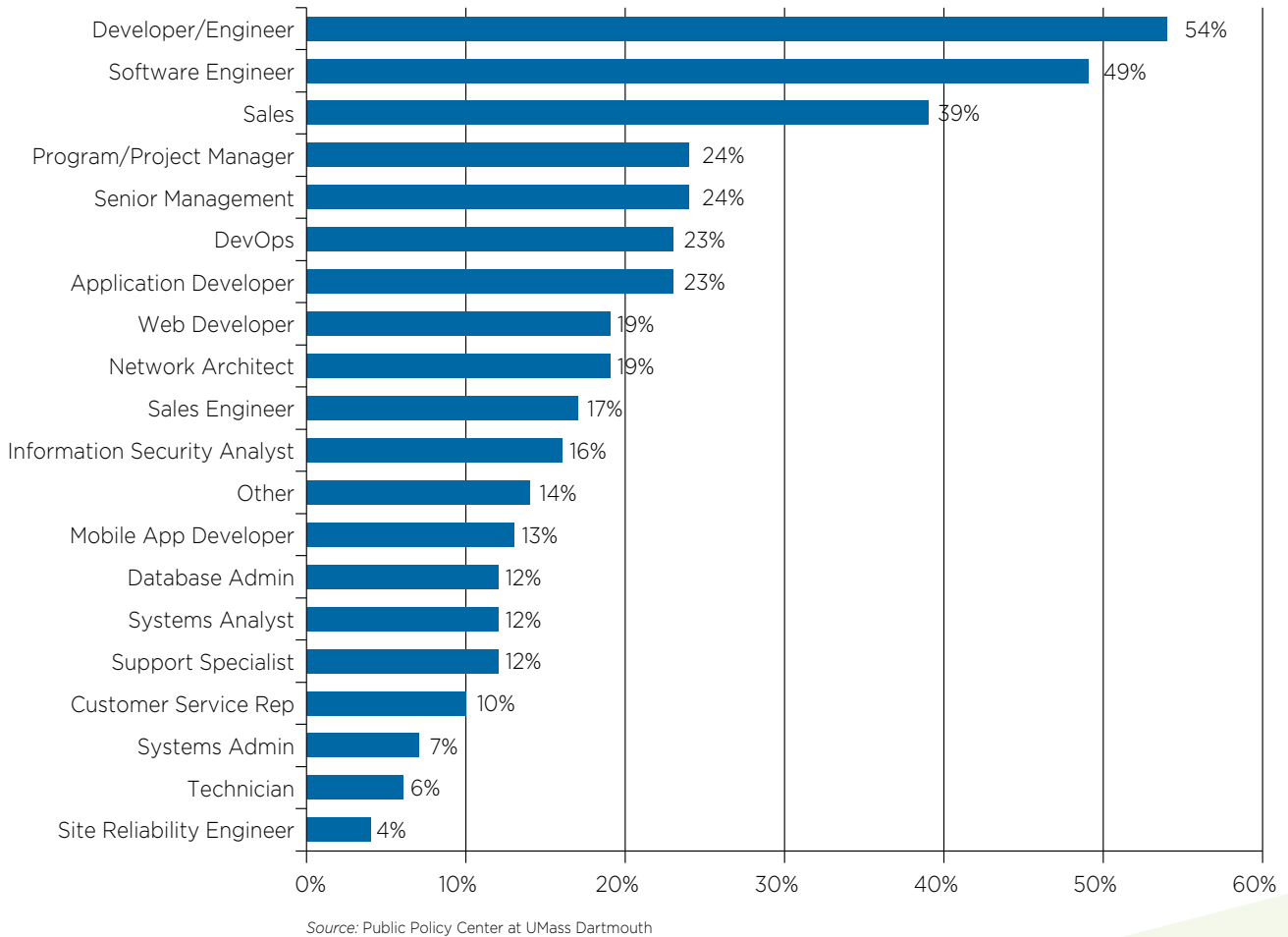


Source: Public Policy Center at UMass Dartmouth

**Figure 7.** Current Hiring Needs by Category



**Figure 8.** Current Open Positions by Title



**Figure 9.** Open Response — Source of New Employees outside of Massachusetts



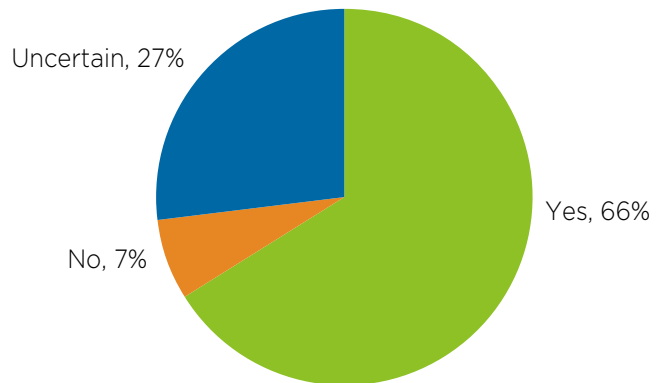
### Expanding Beyond MA for Talent

Given the outsized demand for employees in the industry, it is perhaps unsurprising that respondents are more likely to rate “the U.S. but outside of Massachusetts” as the most important source of new employees. California is the most cited source of new employees outside of Massachusetts (15% of respondents), followed by New York (12%), New Hampshire (6%), and Texas (5%). When reporting foreign-sources of labor, respondents cite India (7%) as the most importance source, followed by China (3%), Russia (2%), and Canada (2%).

### Economic Outlook Strong in MA

Tech sector leaders are confident about their potential for expansion in the next twelve months. Two-thirds of respondents (66%) feel that the next year would be a good time to grow their business in Massachusetts (see Figure 10).

**Figure 10.** “Do You Think the Next Twelve Months Will Be a Good Time to Expand in Massachusetts?”



Source: Public Policy Center at UMass Dartmouth

The most cited reasons for this outlook are positive sales prospects (60%), access to a talented workforce in the state (43%), and the positive economic conditions in Massachusetts (39%) and, less so, nationwide (36%). Among those who are uncertain about the next twelve months, sales prospects (50%) and the national political climate (40%) are the top reasons for their outlook.

## Business Expansion Outlook

Respondents also have a positive outlook for the future, with the majority anticipating business expansion in the next twelve months and an increase in employees in next six months.

Technology employers also reported plans to expand employment over the next six months. The majority of respondents (70%) expect an increase in employment at their organization, while 27% anticipate stability.

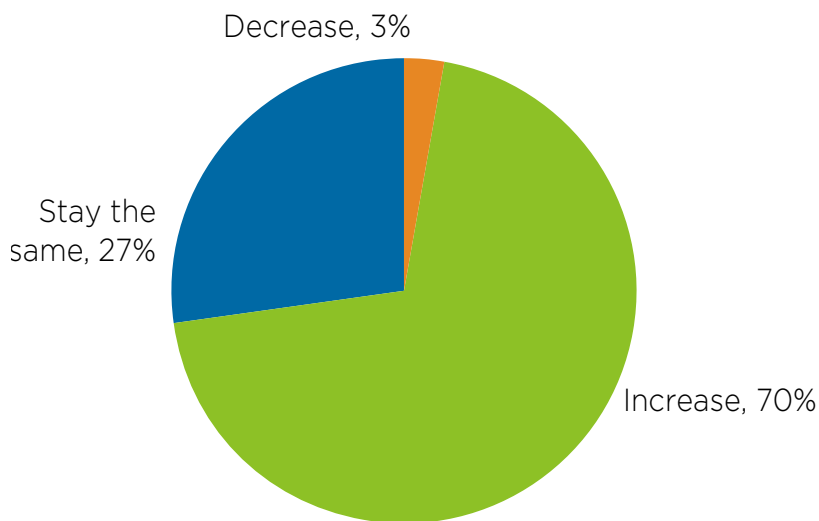
Those who expect employment growth cite organic growth as the most likely reason for increasing their workforce (50%). Bringing new employees to aid in the development of new products or services (32%) and

replacing departures (17%) are also reasons why employers expect employment growth in the near term.

“It’s great to see the optimism among the tech leaders of Massachusetts,” remarked Levins. “They see a bright future for their businesses, and that bodes well for Massachusetts.”

“I share the confidence that many tech sector leaders have in their potential for expansion in the next twelve months,” remarked Conine. “Our ability to hire the best and the brightest in the STEM fields will continue to be key to our success and will continue to help us grow and expand and employ more and more people in the state of Massachusetts.”

**Figure 11.** Massachusetts Employment Outlook, Next Six Months



Source: Public Policy Center at UMass Dartmouth

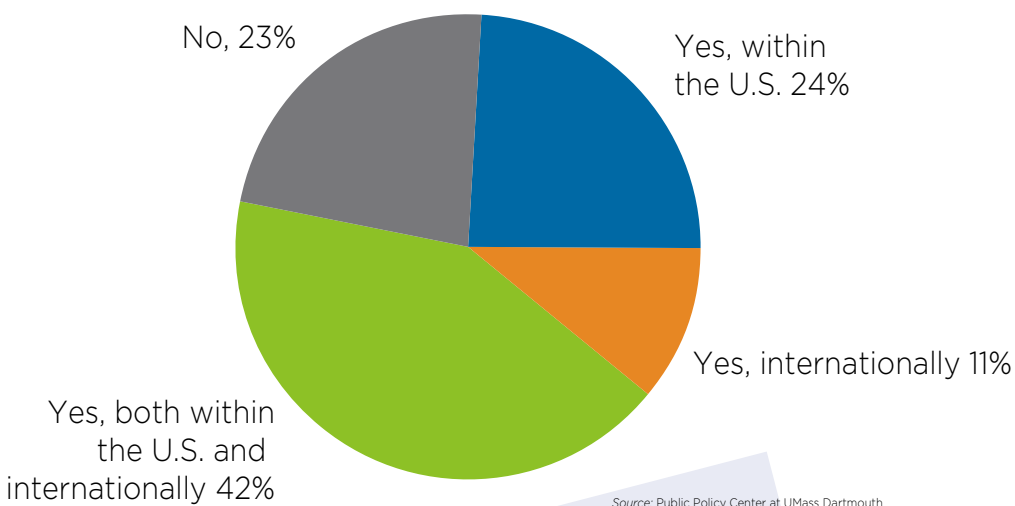
## Expanding Beyond MA

Overall, there is less confidence among respondents that their firm will expand outside of Massachusetts (see Figure 12).

Nearly one-quarter of respondents (23%) indicate that their company does not plan to expand outside of the state. Among those who report plans for growing their business outside of the Commonwealth, most (42%) say their organization is seeking to expand both within the U.S. and internationally.

As to why they plan to expand outside of Massachusetts, half of respondents (50%) specify access to talent as the reason and 47% report they plan to expand in order to access emerging markets and new customers. As Figure 13 illustrates, respondents cite Europe as the most common location for expansion (9%), followed by India (7%), California (6%), and Asia in general (5%).

**Figure 12.** Plans to Expand Outside of Massachusetts in the Next Twelve Months



**Figure 13.** Open Response — Where is Your Company Likely to Expand?



### The Road Ahead

Mohamad Ali believes that “Massachusetts must invest further in K-12 and public higher education in order to produce the volume of skilled college grads our knowledge-based economy needs to continue its growth.”

According to the Massachusetts Department of Higher Education’s 2014 Vision Project,<sup>2</sup> we are two to three years into a decade-long demographic decline in the number of students graduating from high school and with fewer than half of these completing college within six years of graduation, there is a significant local talent opportunity that should be tapped.

The quantitative survey data and qualitative insights from a representative group of industry leaders that make up the MassTLC Tech Pulse Index make clear that availability of talent is both our greatest asset and greatest challenge to the region’s continued growth and competitiveness. If companies cannot find the talent they need in Massachusetts, they will expand their presence and hire the talent in locations outside of

Massachusetts, across the U.S., and around the world. If these firms are forced to expand elsewhere, it will come at a significant cost for the firms themselves and the Massachusetts economy.

Tech executives are clear that the Commonwealth must invest in developing and attracting a more robust talent pool. This means investing in education, particularly in STEM and computer science education in K-12 and public higher education. Maintaining a competitive edge will also require a substantial investment in upgrading the transportation infrastructure. By providing a manageable commute that will open every region of the Commonwealth, housing costs will see some much needed relief.

With better access to the opportunities presented by the Innovation Economy, increased marketing of Massachusetts as the place to grow businesses and careers will be crucial in growing the technology sector.

Advocating for improved immigration policies will encourage talented immigrant workers to not only benefit from Massachusetts’ technology economy but to make significant contributions as they are welcomed to the state.

2. “Degrees of Urgency: Why Massachusetts Needs More College Graduates Now,” Massachusetts Department of Higher Education, October 2014.





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