

Project Narrative

Executive Summary

Project title. Reinvigorating Inclusive, Equitable Innovation and Entrepreneurship (IE²) in New England

Project summary. Providence (RI), Boston (MA) and Portland (ME) corridor was hit hard by COVID-19. The pandemic placed an enormous burden on businesses, such as minority- and women-owned small businesses (MWSBs), in the corridor. For instance, the greater Boston area became the third-worst metropolitan area in terms of small businesses' lost revenue due to COVID-19. To address this issue, the proposed project aims to alleviate the negative impacts of COVID-19 on businesses and promote technological innovation and entrepreneurship by offering in-depth technical and managerial assistance through the establishment of a Northeastern Lab for Inclusive Entrepreneurship (NL4IE) and initiating the Inclusive, Equitable Innovation and Entrepreneurship (IE²) Fellowship. Taking advantage of Northeastern University's world-renowned innovative approach to hands-on learning through co-ops and internships, faculty and student teams will work collaboratively to solve various challenges faced by vulnerable businesses through its unique experiential learning (XN) framework. This framework allows teams of students and faculty to solve unprecedented problems through in-depth research and transdisciplinary approaches. In this regard, NL4IE seeks to provide underrepresented entrepreneurial students and/or impacted business owners with the IE² Fellowships to experience coaching/mentoring services and IE²-related digital badges, which are micro-credential courses focused on specific skill sets. This project leverages the extensive Northeastern University's entrepreneurial ecosystem (e.g., the Women's Entrepreneurship Initiative and the McCarthy(s) Venture Mentoring Network), centers/institutes (e.g., the Global Resilience Institute and the Center for Entrepreneurship Education) and other campuses in the region (e.g., Innovation Campus in Burlington, MA and the Roux Institute in Portland, ME).

Location and Region of the Project

Primary service area. While the flagship campus of Northeastern University is located in downtown Boston, the university serves the community through other campuses in the region, including Burlington, MA and Portland, ME. The project team plans to serve small businesses including but not limited to ones owned by minorities and women and promote technological innovation and entrepreneurship in Providence (RI), Boston (MA) and Portland (ME) corridor. In terms of congressional districts, the region covers MA 4 - 8th districts, ME 1st district, and RI 1st district. The service area corresponds to the following counties and their 5-digit FIPS codes: Cumberland (23005), York (23031), Bristol (25005), Essex (25009), Middlesex (25017), Suffolk (25025), Norfolk (25021), and Providence (44007).

Region's needs and opportunities. Providence (RI), Boston (MA) and Portland (ME) corridor needs to reinvigorate inclusive, equitable innovation and entrepreneurship (IE²) to support resiliency. The corridor has been seriously hit by COVID-19. As of Nov. 14, 2020, most counties in the corridor have more than 10 cases per thousand populations. This is the worst out of New England states (Fig. 1). Meanwhile, the

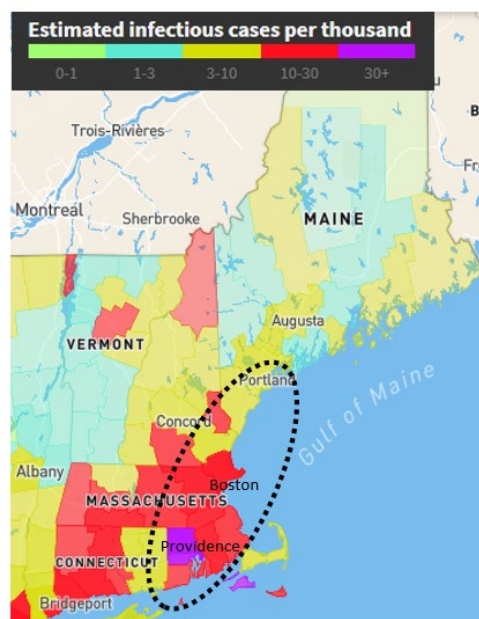


Figure 1. COVID-19 cases in New England (as of 11/14/2020)

impacts have been discriminatorily placed on people of color and women, small and young businesses, and socioeconomically marginalized communities. According to the Boston Globe (Aug. 27, 2020), a 10-percentage point increase in the Black and Latino population is associated with 312 and 258 more cases per 100,000 people, respectively. According to patch.com (May 12, 2020), the greater Boston area was the third-worst metropolitan area in terms of small businesses' lost revenue due to COVID-19. It lost 75 percent of revenue during the COVID-19 shutdown, which was nearly twice as much as the national average of 40 percent.

As mentioned in the Milken Institute's State Technology and Science Index, the competitiveness of the corridor, particularly Massachusetts, stems from technological innovations and entrepreneurship based on the biotech industry, academic institutions, and tech-based small businesses. According to the Office of Advocacy, and specifically the U.S. Small Business Administration's 2020 Small Business Profile, approximately 700 thousand small businesses in Massachusetts employ 1.5 million workers, accounting for 99.5% of Massachusetts businesses and almost half of Massachusetts employees. Adverse impacts on small businesses can lead to the disruption of the Massachusetts economy. To address those issues, the Global Resilience Institute at Northeastern University conducted a series of studies in 2020 with support from the Federal Emergency Management Agency (FEMA). One of the studies concerned local business recovery and resilience in New England and identified some major challenges such as (1) urgent need for skills in digitization, digital literacy, and e-commerce, (2) difficulties in navigating and creating changes to existing business models, and (3) issues in workforce retention and regeneration. While the research developed a list of specific recommendations, there is a paucity of actual implementations and there is room for Northeastern University, an anchor institution connecting Boston, Portland, and Providence, to contribute to the economic recovery from the COVID-19 crisis. Northeastern University's position along the corridor and its solid entrepreneurship ecosystem are incredible opportunities to promote entrepreneurship and assist tech-based small businesses, particularly ones owned or initiated by minorities and women.

Overview of Scope of Work

Economic ecosystem gaps. While there are many technology-based small businesses in the Providence-Boston-Portland corridor, the existing SBA efforts sometimes failed to meet clients' needs and expectations. As problems faced by technology-based small businesses become more complex and complicated, traditional approaches (e.g., short-duration 1-on-1 consultation) may not suffice. As Northeastern's Global Resilience Institute study suggested, the New England region needs more creative approaches for small businesses to transform their business model, to learn how to design and execute an e- or m-commerce strategy, and to develop skills in workforce management and digital transformation. While the issue is pervasive in overall small businesses, it may be particularly true for minority- and women-owned ones that are often dwarfed by their counterparts. Of thousands of small businesses in Massachusetts, for instance, we found only 276 Small Business Innovation Research/Small Business Technology Transfer (SBIR/STTR) awardees owned by minorities and women or located in the HUBZone (Historically Underutilized Business Zones). Since COVID-19 placed a disproportionate impact on socioeconomically disadvantaged businesses, small business assistance (SBA) targeting such vulnerable businesses is needed for their survival and sustainable growth.

Proposed activities. To address the aforementioned economic ecosystem gaps, the project team proposes two primary activities: 1) establishing a Northeastern Lab for Inclusive Entrepreneurship (NL4IE) that offers in-depth technical and managerial assistance to small businesses including but not limited to ones owned by socially and economically disadvantaged people or located in HUBZone, and 2) initiating the inclusive, equitable innovation and entrepreneurship (IE²) fellowship for the underrepresented students

who want to start their own businesses and/or impacted business owners and offer them digital badges/micro-credentials in entrepreneurship and innovation. Each task will be independently carried out by the principal investigator (PI) and co-PIs, but the two tasks are organically intertwined with each other. For instance, NL4IE can accelerate businesses started by IE² fellows by offering innovation and entrepreneurship-related digital badges and coaching/mentoring services. On the other hand, the fellowship can enrich NL4IE's resources and networks by scaling up their businesses. In this regard, it is important to create a virtuous cycle among the two tasks and also among participants and the wider stakeholders to sustain the proposed activities in the future. Particularly, strong collaborations between Northeastern's Boston campus, innovation campus in Burlington, and the Roux Institute in Portland are critical for creating synergic effects and engaging key stakeholders in the corridor. By completing the proposed two tasks, the project team seeks to contribute to the reinvigoration of the Providence-Boston-Portland corridor's innovation and entrepreneurship ecosystem in an equitable, inclusive, and diverse manner.

Project fit with EDA investment priorities. The proposed activities are closely related to two of the five EDA investment priorities: (a) recovery and resilience, and (b) workforce development and manufacturing. Specifically, the first activity seeks to enhance recovery and resilience of small businesses in the corridor through in-depth technical and managerial assistance. The second activity seeks to promote workforce development and manufacturing through digital badge/micro-credential courses for entrepreneurial students or business owners.

Program focus. Out of six program focus areas of the EDA-supported University Center, the proposed project seeks to emphasize the following three areas: Advancing high-growth entrepreneurship (30% of commitment), Developing a high-skilled regional workforce (40% of commitment), and Increasing the resiliency of a region (30% of commitment).

Specific Activities

The project team at Northeastern University believes that assisting small businesses including but not limited to ones owned by minorities or women and/or located in economically distressed areas and promoting entrepreneurship of overall populations including but not limited to socioeconomically disadvantaged populations can be an effective way to address the economic resilience issues of the corridor. The grant will therefore support Northeastern University President Aoun's call to action: Northeastern needs to "*deepen community service and expand service learning in the neighborhoods surrounding all of our campuses. In doing so, we will strengthen the ties between our community engagement programs and our academic programs.*"

To that end, the project team proposes the following two pivotal activities over the 5-year operation period:

Task 1: Operationalizing a Northeastern Lab for Inclusive Entrepreneurship that assists vulnerable small businesses with in-depth research, data-driven analysis, and evidence-based practices.

The project team intends to assist tech-based small businesses impacted by COVID-19, including but not limited to ones owned by socioeconomically disadvantaged people. Out of about 700 thousand small businesses located in Massachusetts, for instance, we identified 276 companies that meet two criteria: (a) are oriented toward technological innovations (as having a high potential for scaling- and growing-up) and (b) are owned by minorities or women or are located in HUBZones. We determined these businesses with the aid of the Small Business Innovation Research (SBIR) / Small Business Technology Transfer (STTR) database. The SBIR/STTR awards indicate tech-based small businesses. The database also provides information on small businesses owned by socioeconomically disadvantaged people.

Furthermore, we mapped the 276 companies and found that most of them are situated in the corridor of Providence-Boston-Portland (Fig. 2). The top, middle, and bottom maps indicate minority-owned (orange dots), women-owned (pink dots), and HUBZone-located small businesses (yellow dots) relative to counterparts (blue dots). It is worth noting that the 276 companies are on the list of candidates for our in-depth technical assistance but an open and fair client selection policy will be employed to include diverse clients although they do not meet the aforementioned criteria.

Once the list of clients is finalized through an open and fair solicitation process, the project team, in conjunction with Northeastern’s Employer Engagement and Career Design team that is responsible for the experiential learning (XN) operation, plans to reach out to small businesses that Northeastern faculty and student teams (XN teams) will serve. The project team plans to select about 100 small businesses in total over five years (or about 20 small businesses each year). The XN teams, each of which is composed of one faculty member and 3-4 students, will work with the selected companies to address various challenges faced by them over a 12-week period. The challenges may include, among others: transitioning business models from brick-and-mortar to brick-and-click or click-and-order platforms; analyzing the dynamic market and relevant data; forecasting financial performance and balancing with strategic performance; retaining and regenerating the existing and new employees; and managing organizations in a resilient and sustainable manner. To offer technical and managerial assistance to vulnerable small businesses, each XN team will be funded approximately \$1,000 that can be used for purchasing data and digital tools, developing web- or mobile-sites for e-commerce or m-commerce, securing host servers and cloud services, prototyping new products/services, and so forth. While NL4IE will be physically located in downtown Boston, half way between Providence and Portland, it will also incorporate a digital component and will be accessed digitally by those business owners across the corridor who cannot easily reach Boston. This will be easily attainable since the XN framework is optimized for digital and virtual collaboration.

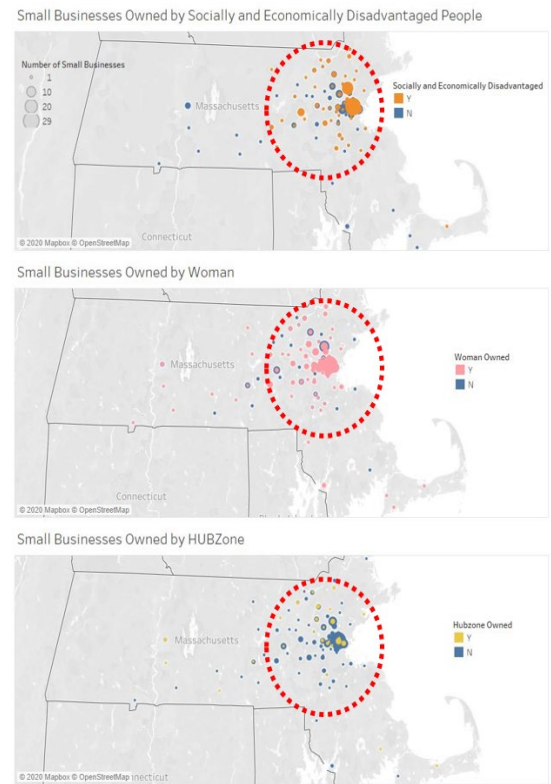


Figure 2. Location of tech-based small businesses owned by minorities, women, and HUBZone

Task 2: Initiating inclusive, equitable innovation and entrepreneurship (IE²) fellowships.

The proposed fellowships will offer a unique opportunity for vulnerable students and/or impacted founders to learn innovation and entrepreneurship through digital badges/micro-credential courses, conduct a feasibility study of their new technical concepts, and commercialize Northeastern-developed technologies. The primary role of the fellowships is to deliver innovation and entrepreneurship-related digital badges/micro-credentials that are short-duration, non-credit education/training modules focusing on specific skill sets and their practical applications. They will include not only level-1 (short courses, free of charge) but also level-2 (medium-length courses, covered by IE² fellowships) and level-3 badges (long courses, credit-aligned learning experiences). Generally, level-2 and -3 badges will be given to 12-week-long courses. Annually, five fellows will be selected and they will be able to take four level-2 badges over

12 weeks. It is also worth noting that the badges will be stackable into degree programs and provide access to additional educational opportunities for fellows to receive an academic degree in the future. Topics will be related to technological innovation and entrepreneurship, such as e-commerce and entrepreneurial mindset. Particularly, one of the modules will be oriented toward the procurement process for minority/women-owned small businesses, which is aligned with Northeastern University President Aoun's call to action to double the total value of contracts involving minority/women-operated suppliers in the next five years. Northeastern will cover costs associated with the development of digital badges/micro-credentials.

This fellowship program will also support connections among students, faculty, and mentors working closely with the McCarthy(s) Venture Mentoring Network, which features more than 400 mentors supporting more than 100 ventures.

As we build the fellowship program, we will leverage success stories such as the Women Who Empower's Innovators Awards, a partnership with the Cartier Women's Initiative to support members of the Northeastern universe who are passionate about innovation and community, and would benefit from financial support to develop and advance their entrepreneurial endeavors.

Another important partner in this fellowship will be the Northeastern's Center for Research Innovation (CRI), which has been successful in transferring technologies created in house and offering relevant training materials (e.g., intellectual property rights and venture capitals) to Northeastern communities. Of many technologies available by CRI, COVID-19 related technologies need to be rapidly commercialized, which include: Oligonucleotide-based Therapeutics Targeting COVID-19; Rapid, Ultrasensitive Proximity Ligation Assay Potent SARS-CoV-2; and AI-based COVID-19 Drug Discovery. Drawing on those technologies, entrepreneurship and innovation fellows can design technology transfer/commercialization plans.

Additionally, the fellowship can be a vehicle for students to participate in local, national, and international entrepreneurship competitions, particularly for wrestling with the COVID-19 issues. The fellowship will have positive effects on Northeastern's active and inclusive entrepreneurship ecosystem, with approximately 2,000 students taking one of 35 entrepreneurship-focused courses. The university's academic plan (Northeastern 2025) seeks to elevate this coursework and our emphasis on lifelong learning into a global network of experiences, creating a diverse, inclusive ecosystem of entrepreneurial learners. The variety of roles available to our students are impressive, ranging from software to biotechnology, from web-service startups to health-focused food and drink companies, from medical devices to the next hot life-hacking apps. Most nascent ventures are led by undergraduates or recent alumni—individuals steeped in Northeastern's entrepreneurial ethos. Recently, Northeastern's Center for Entrepreneurship Education has been recognized with the 2020 Outstanding Contributions to Venture Creation Award by the Global Consortium of Entrepreneurship Centers.

Other than the two-pillar activities, the project team will commit to (a) the direct use of research to address a specific challenge, meet a specific need, or solve a specific problem experienced by innovators, entrepreneurs, economic planners, and cluster-based industries; and (b) the dissemination of information about the activities of the NL4IE to inform target clients of available assistance, publicize research findings and best practices, and demonstrate to EDA how measurable economic development outcomes will be realized during the period of performance.

Project Timeline

The work plan and timeline are described in Table 1, which indicates not only project and reporting activities but also milestones. While it shows a 12-month timeline, it will take place repetitively on a yearly basis over the five years. Dr. Grippa will serve as the PI for the proposed project and supervise overall progress given her expertise in corporate strategy and women’s entrepreneurship. She will be also responsible for the establishment and operationalization of NL4IE. All other senior personnel act as a co-PI. Drs. Oet, Ryu, and Zangerl will be in charge of developing entrepreneurship digital badges/micro-credentials, managing XN projects, outreaching and communicating with stakeholders. In carrying out those tasks, they will capitalize on their professional experience in financial risk and forecasting, entrepreneurial innovation, and organizational communication, respectively. Particularly, Dr. Oet served the Federal Reserve System as an examiner-in-charge where he worked on the resilience of financial service organizations. Dr. Ryu led small business assistance projects in New Mexico. Dr. Zangerl was responsible for organizational communications. See the staffing plan in the budget justification for a more detailed description of key personnel’s qualifications.

A student assistant will primarily support the PI and co-PIs. The PI and co-PIs will act as coordinators for all project activities while working closely with the student assistant. The PI and co-PIs will meet once a month and discuss project progress with the student on a regular basis. The project team will have a kick-off meeting at the beginning (Month 1) and the concluding meetings at the end (Month 60) with the funding organization. In the meantime, there will be regular meetings every four months to report project progress to the funding organization. Most reporting activities will be carried out by virtual meetings or conference calls. According to the mutual agreement, the reporting activities may be replaced by the submission of progress reports. The team will periodically share and discuss interim project results with external stakeholders and with Northeastern collaborators and the larger Northeastern entrepreneurship ecosystem.

Table 1. Work Plan and Timeline

Date	Project Activity	Reporting Activity	Milestone
Month 1	Sign grant documents and finalize the scope of work Design NL4IE	Kick-off meeting	Post-grant administration and scope of work
Month 2	Open the first-round solicitations for small business assistance Remodel space and develop content for NL4IE		
Month 3	Close the first-round solicitations and select assistance recipients Remodel space and develop content for NL4IE		
Month 4	Start the first round of assistance projects and entrepreneurship digital badges/micro-credentials Remodel space and develop content for NL4IE	Regular meeting	Progress report
Month 5	Work on the first-round assistance projects Open NL4IE		

Month 6	Finish the first-round assistance projects Open the second-round solicitations for small business assistance and IE^2 fellowship		10 in-depth assistance projects
Month 7	Close the second-round solicitations and select assistance recipients and IE^2 fellows		
Month 8	Start the second-round assistance projects and IE^2 fellowship	Regular meeting	Progress report
Month 9	Work on the second-round assistance projects and IE^2 fellowship		
Month 10	Finish the second-round assistance projects and IE^2 fellowship		10 in-depth assistance projects 5 IE^2 fellows
Month 11	First draft and revision of annual report		
Month 12	Final draft of annual report	Regular meeting	Annual project report

Anticipated Economic Impacts and Benefits

The project team strongly believes that the proposed project will address many issues faced by impacted businesses, such as minority- and women-owned businesses, and lead to the sustainable development of the Providence-Boston-Portland corridor by promoting technological innovation and entrepreneurship, based on the following evidence.

[Brooking Institute's 2015 report written by Michael S. Barr](#) overviewed entrepreneurship in the U.S.. Specifically, the study diagnosed a list of challenges faced by small, young businesses and recommended some policy alternatives. The challenges include: lack of access to capital; insufficient business networks for peer support, investment, and business opportunities; and the absence of the full range of essential skills necessary to lead a business to survive and grow. Furthermore, the study pointed out that the challenges are particularly true for minority and women entrepreneurs. To address this inequality issue, the study suggested new federal support for local business networks and local skills acquisition initiatives.

In this regard, the project team at Northeastern, with support from the EDA grant, seeks to utilize NL4IE to lift significant obstacles placed on the impacted business owners including but not limited to minority and women entrepreneurs by offering:

- Access to Business Networks – Enhance small business owners and aspiring entrepreneurs' networks, connect them with established business leaders and university faculty members, and provide opportunities for exchange of knowledge and information about new business opportunities;
- Access to Skill Development – Offer skills-building programs and training initiatives designed with a focus on the needs and constraints of small business owners and aspiring entrepreneurs.

While there are many skills needed for the success of tech-based entrepreneurs, knowledge and management of intellectual property rights (IPRs) are essential skills to protect technological innovation.

There are important patent gaps across race/ethnicity and gender in the U.S. According to a VentureWell's article (Nov. 10, 2020), African American and Latinx inventors file for patents at one third and one-sixth respectively the rate of white inventors. As of 2019, women inventors accounted for only 22 percent of total patent grants. The article also stressed the importance of IPR education to university students, particularly to underrepresented students.

Northeastern University's proposed activities to offer access to business networks and skill development are harmonized with the MAPC's Comprehensive Economic Development Strategy 2015 to 2020. Since MAPC is one of the major stakeholders in the regional economic development in the greater Boston area, it is pivotal for the Northeastern's project team to develop a congruent project plan with the MAPC's regional strategy. Given the substantial contribution of small businesses to the regional economy and social equity issues (e.g., disparities in household income and educational attainment) in the greater Boston area, the MAPC's strategic plan includes: supporting innovation and the creative economy in regional urban centers (as they face some of the largest disparity gaps); expanding access to appropriate technical assistance, business services, and training; and providing an adequate support network to facilitate the growth and success of immigrant entrepreneurs and entrepreneurs from diverse racial backgrounds. Specifically, the plan recognizes the Northeastern School of Law's Community Business Clinic as a successful and proven program to provide business-related legal services (e.g., IPRs) to start-ups, entrepreneurs, and small businesses.

In terms of technical assistance to small businesses, many states have operated such programs, received positive responses from assistance recipients, and added value to regional economies by enhancing access to capital, creating and retaining new businesses/jobs, and making broader community outcomes. In the case of Massachusetts Commonwealth, MGCC has also implemented a similar program called the Small Business Technical Assistance Grant Program where MGCC has allocated state grants to non-profit organizations specializing in small business development such as community development corporations, community development financial institutions, chambers of commerce, and other community-based organizations. According to the MGCC's 2018 evaluation of the program, 92% of business clients were very or somewhat satisfied with business assistance and the number of socioeconomically disadvantaged business clients has increased over time (Fig. 5). The evaluation also mentioned that a large share of minority and immigrant business clients came from the greater Boston area. From the perspective of outputs and outcomes, the evaluation boasted 1,258 new businesses created, 1,642 total business expansions, \$106 million total secured loans, 2,854 new jobs created, and 4,862 jobs retained, and anticipated considerable impacts on Massachusetts and regional innovation and entrepreneurship ecosystems.

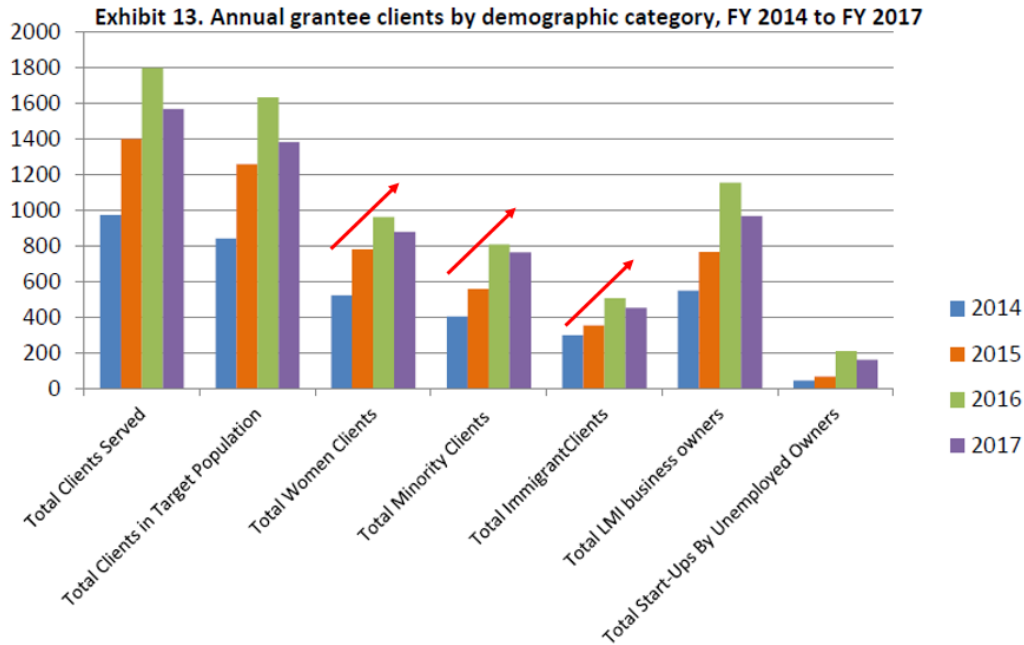


Figure 3. The number of business clients by demographics over time
 Source: MGCC’s 2018 report

Despite the impressive contributions, there is still opportunity for improvement in MGCC-funded small business technical assistance. Because the hours of assistance are relatively short, MGCC-funded non-profits tend to focus on group training, 1:1 counseling, or referral to another organization without in-depth research, data-driven analysis, or actual prototyping. They also tend to have limitations in providing specialized training or business services due to a lack of industrial, managerial, or legal expertise. In the COVID-19 age, particularly, the scope of small business assistance becomes beyond traditional needs. According to the Wall Street Journal (Nov. 15, 2020), for instance, small businesses owners are struggling to manage their employees and operations under the plans (e.g., keeping employees engaged and boosting morale), and to reconfigure jobs and facilities (e.g., reopening the office lunchroom). Those issues cannot be instantly resolved and require more integrative, systematic approaches based on in-depth analysis. Northeastern University is well-positioned to alleviate the educational attainment gaps of minorities, facilitate women-driven technological innovations, and offer in-depth business assistance to the impacted businesses including socioeconomically disadvantaged small businesses. Its transdisciplinary faculty composition also enables integrative, systematic approaches to address various needs raised by small businesses. Because of its extensive entrepreneurship ecosystem, Northeastern University can create synergic effects on providing not only technical and managerial assistance but also legal counseling to tech-based small businesses.

To assess the performance of the proposed activities, the project team will survey (and interview with) small business assistance recipients and IE² fellows on a regular basis and systemically track various metrics for outputs and outcomes. Drawing on the measures described in the MGCC’s 2018 evaluation, the project will collect data not only on the number, business stage, and demographics of small businesses served but also on business status (e.g., the number of businesses created, expanded, and stabilized), capital access (e.g., the amount of new financing), employment (e.g., the number of jobs created and retained), and community impacts (e.g., improved physical condition) in a machine-readable format.

Specifically, the survey (and interview questions) will be designed to capture anticipated benefits, including: economic impacts of projects assisted as measured by direct, indirect, and induced output, jobs, and income; longitudinal economic impacts over a defined period of at least three years after our assistance is provided to the service region; investments of private sector capital; the percentage of our clients initiating action as a result of the technical assistance; the percentage of clients that achieve the anticipated results; activities that result in measurable outcomes leading to increased innovation, entrepreneurship, emerging and growing clusters, sustainable economic development practices, and improved resilience to natural or other disasters; and activities that create or enhance inclusive networks supporting innovation, transfer of knowledge, and entrepreneurship.