



Bronx Innovation Factory

Vision Document

A project of the **Bronx Cooperative Development Initiative**

**Positioning the Bronx as
a leader in the advanced
manufacturing sector is both
possible and necessary.**

EXECUTIVE SUMMARY

When the Bronx Cooperative Development Initiative (BCDI), a grassroots-led economic development organization, first developed our strategy for a more equitable, sustainable, and democratic Bronx economy, we chose advanced manufacturing as an important area of investment. There were several reasons for this. Historically, the Bronx has been a manufacturing hub and is still home to many of New York City's remaining industrial uses. Additionally, innovation is how economies evolve and grow over time, and new advanced manufacturing and hardware technologies, like 3D printers and programmable microcontrollers, are lowering the barriers to entry and democratizing innovation.

Bronxites have shown again and again our endless creativity—maintaining and rebuilding our communities despite decades of disinvestment, and constantly pushing the limits of art and pop culture. In a world where conventional markets are not addressing many of the challenges that low-income people face, we can use these new tools to address long-standing challenges and secure our rightful place as leaders in innovation both locally and beyond.

At the same time, we know that democratizing access alone is not enough to build a more equitable future. We must also shift patterns of investment and how wealth accumulates.

Positioning the Bronx as a leader in the advanced manufacturing sector is both possible and necessary. We have an opportunity now, as advanced manufacturing emerges at the intersection of the technology sector and traditional manufacturing, to ensure the Bronx and other low-income communities can share in the prosperity it brings, and to shape the sector to be more equitable and democratic than its forerunners. Moreover, we must act quickly to secure jobs and wealth for Bronxites, as the racial wealth gap continues to grow and gentrification threatens to displace long-time residents, especially immigrants and people of color.

Far from suggesting that the Bronx catch up to other geographies through mere skill development, we are proposing wholesale economic transformation by leveraging the Bronx's creativity, industrial strength, and unique insights to create new products and businesses that generate shared wealth. By supporting entrepreneurship and innovation, even as technology and job skills changes in the future, the Bronx can evolve and adapt to retain its competitive edge.

To accomplish this, BCDI envisions a center for advanced manufacturing that is led by women and people of color and focused on shared wealth creation. We believe this can be an educational, workforce, entrepreneurial, and community space to inspire and generate innovations that matter to Bronx residents. We call the center we envision the Bronx Innovation Factory (BXIF).

We additionally believe that such a center can anchor a larger ecosystem of innovation and entrepreneurship that grows the local advanced manufacturing sector in ways that support collective prosperity. We want to work with education partners, workforce development providers, business technical assistance providers, grassroots organizations, labor unions, and government officials to collectively build a system where Bronxites learn about advanced manufacturing and hardware technologies from a young age, have ample opportunities to pursue career and entrepreneurial paths within the field, and understand the important role of cooperation, co-governance, and shared wealth creation in building a better future for the Bronx.

The current moment is full of energy and disruption. Will New York City remain a place where immigrants from around the world come to build a better future for their families, or will it become, as so many places have, simply a playground for the rich? Can we use technology to solve our challenges, or will it deepen existing inequities? The Bronx can and must seize the present moment to build a more equitable future, and this document paints our vision for doing so.

This vision document is meant to be shared with existing and future partners of BCDI. By outlining our goals and highlighting our sources of inspiration, we hope to spark new collaboration, programming, and participation from a variety of actors. The following pages begin with an introduction of BCDI and why we see advanced manufacturing as a critical pathway for the Bronx's economic vibrancy. In the second section, we present our partners in Spain's Basque region, the Mondragón Cooperatives, and underscore lessons from four entities within the Mondragón ecosystem. Additionally, we highlight other economic development entities in the United States and Latin America from whom we have drawn inspiration.

In the third section, we explore the current Bronx context that grounds our vision. Here, we discuss the existing workforce and manufacturing landscape within the borough and New York City at large. Specifically, we emphasize the many sectors we believe we can learn

from and collaborate with—not only to realize our vision, but also to bolster and expand partner operations. Finally, we present our vision for the Bronx Innovation Factory's physical space and the larger ecosystem. With the aid of an architectural rendering, we delineate where future operations could occur, as well as demonstrate how and where the synergy between students, entrepreneurs, partners, and BCDI could come together within the center and well beyond its walls.

By the end of this document, we hope you are just as excited as we are by the possibility of an equitable, innovative, and thriving advanced manufacturing sector in the Bronx. Equally as important, we hope this document helps you visualize your own role in working with us in our vision for a more just and prosperous Bronx economy. **This vision is for all of us.**

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Innovation is how economies evolve and grow over time. New technologies are lowering the barriers to entry and democratizing innovation.

BACKGROUND

WHO IS BCDI?

The Bronx Cooperative Development Initiative (BCDI) is a community-led effort to build an equitable, sustainable, and democratic local economy that creates wealth and ownership for low-income people of color. We call this framework *economic democracy*. Community-based organizations—including the Northwest Bronx Community and Clergy Coalition, Mothers on the Move, The Point CDC, and Northern Manhattan Coalition for Immigrant Rights—founded BCDI in 2011 because we saw that, despite persistent and powerful community organizing campaigns, our members continued to get poorer over the preceding decades. We realized we needed new tools to shape the economic trajectory of the Bronx and a strategy to fight *forward* for a just and prosperous Bronx, while we continued to fight *back* against injustice.

We invited MIT Community Innovators Lab to support this work as well as several key business advisors and institutional leaders. We have been working together over the past eight years to realize our vision of an equitable, sustainable, and democratic Bronx economy through the design and implementation of six interdependent projects, of which the Bronx Innovation Factory is one.

In developing our vision for the Bronx Innovation Factory in particular, we have convened and collaborated with the following key stakeholders and advisors:

- Northwest Bronx Community and Clergy Coalition*
- The POINT Community Development Corporation*
- Mothers on the Move*
- Northern Manhattan Coalition for Immigrant Rights*
- The Knowledge House
- MetaBronx
- CUNY School of Labor and Urban Studies
- Consortium for Worker Education
- Tomorrow Lab

* Indicates BCDI board member





Top: CC Signs, an existing Bronx manufacturer, fabricates store signs using a variety of methods. They are one of the many businesses that could take advantage of new digital fabrication technologies. Bottom: Participants in BCDI's youth innovation program visited MIT to see how technology was being used by researchers there.

WHY A BRONX INNOVATION FACTORY?

In order to remain competitive, local economies must be able to adapt and innovate. At BCDI, we believe all Bronxites have the capacity to innovate and, in fact, are better positioned than traditional centers of innovation to design effective solutions to community challenges because of their lived experiences. We want to nurture innovation from the ground up, support the entrepreneurial capacity of Bronxites of color, and position entrepreneurship and innovation as avenues to build shared wealth, fortify economic security, and solve some of the borough's toughest challenges. By connecting Bronx residents to digital fabrication technology, training, resources, and a community of entrepreneurial-minded individuals, we believe we can strengthen the Bronx economy and fight systemic challenges of both high unemployment and unprecedented gentrification. To be clear, technology alone will not solve inequality or oppression. It can, however, immediately improve community health and wellbeing, while creating shared local wealth and posing alternative narratives that do address the root causes of these challenges.

We envision the Bronx Innovation Factory as a center for advanced manufacturing, led by women and people of color, focused on shared wealth creation and innovations that matter to Bronx residents. To build this, BCDI has begun offering regular trainings for both adults and youth on advanced manufacturing skills, innovation, and economic democracy. We have also begun working with Bronx-based businesses to prototype and test new products that address community challenges. As we build our programs, we hope to nourish and support Bronxites' creativity and to work with partner organizations to integrate new technologies and economic democracy seamlessly into their existing programming.



Participants in a BCDI workshop learn to make molds and casts by replicating a 3D-printed object in a new material. Traditional making techniques like moldmaking and casting can be combined with computer-driven techniques to create a wide range of designs in different materials.

WHY ADVANCED MANUFACTURING?

Advanced manufacturing is the process of people using computer technology to design and make products.

Advanced manufacturing incorporates both digital fabrication and electronics, and allows people to prototype, test, and redesign products quickly and inexpensively. It also allows for custom products to be made on demand, with minimal equipment and within a small, urban footprint. As a rapidly growing sector, advanced manufacturing is in its early stages but draws on both the traditional manufacturing and tech sectors.

Advanced manufacturing can democratize innovation by reducing the training, investment, and space needed to make products. However, expanded access alone will not ensure a more equitable future. We must also democratize the way wealth accumulates from technological innovation if we are to use these tools to their full, transformative potential.

The advent of advanced manufacturing represents not only an unprecedented opportunity, but an imperative. As the technology sector has grown, it has become very male (despite a stronger gender balance when the field of computer science first emerged¹), very white, and very unequal. As a result:

- “disrupting markets” has primarily meant further destabilizing labor and employment, while the resultant wealth accumulates to the very few
- technology does not currently work optimally for women and people of color (e.g. facial recognition technology performs poorly for dark-skinned people, in particular, for dark-skinned women², and similarly, self-driving cars are less likely to detect dark-skinned pedestrians³)
- the range of questions the tech sector has sought to answer has been limited (seeking primarily to solve lifestyle issues for the wealthy, white men who design and invest in technology—offering rides, meal delivery, cleaning services, etc.)



Above: Joy Buolamwini puts on a white mask after facial recognition software failed to detect her face without it. Her research has shown how bias can be encoded in the technology we use every day. Right: Bronx resident Kasan Humphries builds and codes an electronic circuit. His cooperative, Skedaddle Pest Management, is using advancing manufacturing tools to build a mouse trap optimized for crowded urban environments.

Historically, many of the technological innovations brought to market have deepened inequalities, and many regions investing in “innovation ecosystems” have done so in ways that further disenfranchise marginalized groups. As a result, many understandably fear the growth of technology and its merger with manufacturing. But we should not assume these results are inevitable. Rather, they are the result of policies that seek narrow outcomes, benefiting those with privilege and formally understood expertise. We have an opportunity to forge a different path and to shape advanced manufacturing from its early stages to democratize innovation, production, and wealth creation.

At BCDI, we believe that we can:

- **promote worker ownership and shared intellectual property in this sector**, allowing innovation and gains in production efficiency to benefit a broad range of people rather than resulting in layoffs and more unequal wealth distribution

- **address the challenges faced by communities of color, immigrants, and low-income communities**—including air quality, mobility, and fresh food access—markets not currently being met by traditional industry and in which Bronxites have a competitive edge due to their lived experiences
- **focus on innovations that do not seek to minimize labor but instead take advantage of the new production possibilities facilitated by digital fabrication technology**—including on-demand and on-site production, exact replication of existing objects, virtually unlimited complexity, and a high degree of customizability.

Drawing upon the knowledge and experiences of our communities, local partners, and city-wide institutions, we believe we can build a Bronx Innovation Factory and supportive borough-wide ecosystem that works for all Bronxites.



¹ Thompson, Clive. “The Secret History of Women in Coding.” *New York Times Magazine*. Feb 13, 2017.

² Buolamwini, J and Gebru, T. “Gender Shades: Intersectional Accuracy Disparities in Commercial Gender Classification.” *Proceedings of Machine Learning Research* 81:1–15, 2018.

³ Samuel, Sigal. “A new study finds a potential risk with self-driving cars.” *Vox*. Mar 6, 2019.

“Transformation is not accomplished only with our manual work but first with ideas and action plans.”

– José María Arizmendiarieta

BEST PRACTICES



BCDI staff and partners visited Mondragón, Spain, in October 2018 to kick off our partnership and learn more about their ecosystem.

LESSONS FROM MONDRAGÓN

At BCDI, one of our goals is to demonstrate an alternative economic development model that others can learn from. Along those lines, we are also committed to learning from other models with similar values of democratic participation, shared wealth creation, and equitable economic development. The Mondragón Cooperatives in Spain represent one such model that has a longstanding, financially successful ecosystem made up of diverse businesses.

Located in the Basque Region of Spain, Mondragón Corporation is the largest network of worker-owned cooperatives in the world with 98 industrial cooperatives, 143 subsidiary cooperatives, 7 foundations, and nearly 81,000 jobs. Mondragón began in 1956 with a single, worker-owned, industrial cooperative, and has since grown to become the tenth largest business group in Spain. Today, the network spans multiple sectors, including industry, finance, retail, and knowledge.

Mondragón emerged in response to a very specific set of contextual conditions. Faced with low levels of worker training, high levels of unemployment, and persecution from the Spanish government, Mondragón sought to improve local access to financial support and security. Critically, they invested in vocational training for their first workers and saw technology as a potential driver of economic growth. As the organization and initiatives grew, Mondragón positioned economic activity as a means to boost employment and build regional capacity for production, research, and development. As a for-profit entity competing in international markets, Mondragón is guided by principles of democratic participation, job creation, human and professional development, and contextually appropriate development. Their use of technology and their focus on innovation continue to be major factors in their success.

Over the past several years, BCDI has had the privilege to partner with the Mondragón Cooperatives, learning about their experiences and leading trips to Spain with several of our Bronx-based partners

to better understand Mondragón's operations. In 2019, BCDI commissioned a report from Mondragón's management and strategy consultancy, LKS Next, in order to provide a comprehensive overview of four pillars of their innovation and entrepreneurship ecosystem:

- **Saiolan:** A technology consultancy and incubator founded in the 1980s by professors from Mondragón University as one of the first entrepreneurship initiatives in Spain
- **Bilbao Innovation Factory:** An innovation and entrepreneurship initiative, housed within a single building, that includes several degree-bearing, team-based educational programs; incubation and acceleration support for early-stage businesses; and low-cost, coworking space for high-growth small and medium-sized enterprises (SMEs)
- **Gaztenpresa:** A startup business coaching program that pairs entrepreneurs with a network of trained mentors and prepares them to access credit from Mondragón's cooperative bank
- **Elkar-lan:** A cooperative technical assistance provider created by the Basque government to help companies form as, and convert to, cooperative ownership

The report offers critical learning points to consider as we build the Bronx Innovation Factory and the broader ecosystem. While the Bronx and the Basque Country are two distinct regions with their own sets of strengths and challenges, the lessons from Mondragón provide examples of how BCDI can structure, scale, and lead the entrepreneurial and innovation ecosystem in the Bronx. To gain a more detailed understanding of Mondragón's efforts, the histories, activities, and lessons from the four entities we studied are outlined on the following pages.

SAIOLAN

Purpose	<ul style="list-style-type: none"> • Create new enterprises in the technology sector
Started in	<ul style="list-style-type: none"> • 1985
Started by	<ul style="list-style-type: none"> • Professors at Mondragón University, within industrial group of Mondragón
Context	<ul style="list-style-type: none"> • Founded to expand entrepreneurship opportunities as a means of job creation in response to high unemployment
Structure	<ul style="list-style-type: none"> • Nonprofit, public entity; 8 employees (7 FTE)
Funding	<ul style="list-style-type: none"> • Regional government; Mondragón Foundation; Fee-based services
Activities	<ul style="list-style-type: none"> • Provides free business training to entrepreneurs linked to the industrial sector • Provides fee-based, intrapreneurship training to companies • Advises public entities on how to support technology entrepreneurship • Develops public policy, particularly around entrepreneurship • Provides physical space for incubation and prototyping • Connects entrepreneurs and companies to funding sources
Key features of the model	<ul style="list-style-type: none"> • Saiolan was the first entity focused on entrepreneurship and innovation in the Basque Region. • Assigning “tutors” to entrepreneurs is a critical way to provide continuous support and knowledge around market trends. • Saiolan has deliberately implemented a relatively horizontal internal structure. • Saiolan’s business model has been able to adapt to broader societal changes. • Proximity to other institutions allows Saiolan to be a central node in a wide network of private and public entities.
Key learnings	<ul style="list-style-type: none"> • Being the first to provide this service in the region was a key element of garnering public support. • Innovation in existing businesses (“intrapreneurship”) can be just as important as creating new businesses. • It is critical to teach management skills specific to entrepreneurship and new products. • It is essential to have people involved who understand markets and trends. • Collaboration across Saiolan’s network is critical to the continued success and evolution of entrepreneurship, particularly industrial entrepreneurship. • Profitability can be difficult for business incubation entities like Saiolan, but this is even more reason for adaptation and collaboration.

BILBAO INNOVATION FACTORY (BBF)

Purpose	<ul style="list-style-type: none">• Create the next generation of innovative businesses, especially in IT
Started in	<ul style="list-style-type: none">• 2012
Started by	<ul style="list-style-type: none">• Mondragón University and City of Bilbao
Context	<ul style="list-style-type: none">• Founded to help Mondragón remain competitive in the future, especially as technology evolves
Structure	<ul style="list-style-type: none">• Partnership between Mondragón University and Bilbao City Council
Funding	<ul style="list-style-type: none">• Mondragón University; Bilbao City Council; user fees
Activities	<ul style="list-style-type: none">• Delivers education and training from Mondragón University instructors, in the form of degree programs, lifelong learning, and skill-building activities• Incubates businesses and connects entrepreneurs to one another• Accelerates slightly more mature companies, particularly in strategic sectors• Provides community gathering space for events
Key features of the model	<ul style="list-style-type: none">• Services are focused towards four different user types: individual entrepreneurs, unemployed individuals, local businesses, and entrepreneurship communities.• The physical space is organized in a way that reflects their goals. For example, the first floor serves as a connection space for community innovation, and higher floors are reserved for more business-specific activities.• BBF represents an intentional relationship between Mondragón University and the Bilbao City Council. City Council owns the building and provides oversight, while Mondragón University manages the space.
Key learnings	<ul style="list-style-type: none">• Physical space is critical and should act as a community hub.• As a community hub, it is crucial to have individuals from a range of projects and sectors under one roof.• Training for different groups (individuals, startups, and high-growth SMEs) should be linked.• Successful execution of activities can garner attention from private businesses looking to use the space for research and development activities.

GAZTENPRESA

Purpose	<ul style="list-style-type: none"> • Support new, small business development
Started in	<ul style="list-style-type: none"> • 1994
Started by	<ul style="list-style-type: none"> • Laboral Kutxa (Mondragón's cooperative bank)
Context	<ul style="list-style-type: none"> • Founded to diversify Mondragón's businesses and support young, unemployed entrepreneurs during an economic crisis
Structure	<ul style="list-style-type: none"> • Nonprofit; one FT manager, one part-time employee, and 8 consultants
Funding	<ul style="list-style-type: none"> • Laboral Kutxa; Mondragón Corporation; regional government
Activities	<ul style="list-style-type: none"> • Fully supports entrepreneurs during the initial phase and in the first year after start up • Provides business development services including feasibility studies, finance structure design, loan concession, and start-up paperwork • Connects entrepreneurs to volunteer mentors with management and entrepreneurial experience
Key features of the model	<ul style="list-style-type: none"> • The number of staff is kept small to focus activity and finances on key activities. • Many functions are carried out by an expansive volunteer network. • Participants are able to access particular institutional financing sources. • Training activities include a creation workshop series meant to guide entrepreneurs from ideation to launch. • Services specifically focus on business survival during the first years of operation, including consultations, skills workshops, networking and communication. • Gaztenpresa intentionally works with entrepreneurs with low levels of formal training and have come to entrepreneurship through necessity.
Key learnings	<ul style="list-style-type: none"> • Entrepreneurs ages 35-40 often perform better and have higher success rates than younger entrepreneurs. • The role of volunteers as mentors is very critical, and securing their participation requires adequate visibility and ability to inspire them. • Gaztenpresa's cooperative model has enhanced the overall project, as cooperative members tend to be more collaborative and invested. • Building management skills is a critical piece to focus on in entrepreneurship training.

ELKAR-LAN

Purpose	<ul style="list-style-type: none">• Educate and assist businesses to become cooperative
Started in	<ul style="list-style-type: none">• 2003
Started by	<ul style="list-style-type: none">• Three regional organizations focused on cooperatives
Context	<ul style="list-style-type: none">• Founded to build knowledge around the cooperative model after a government-commissioned report found this was a primary reason businesses were not forming as cooperatives
Structure	<ul style="list-style-type: none">• Second-level cooperative; three FT technicians and one part-time marketing staff
Funding	<ul style="list-style-type: none">• Three founding regional entities; public subsidies; voluntary cooperative funding
Activities	<ul style="list-style-type: none">• Supports entrepreneur to create cooperatives, lasting up to one year after start-up• Provides specific technical assistance include business development advice, feasibility analysis, cooperative training, grant and subsidy support, one-year tutoring• Promotes awareness of the cooperative model through advisers
Key features of the model	<ul style="list-style-type: none">• All services are free of charge to entrepreneurs.• Services are meant to be complementary to the work of external consultancy firms.• Entrepreneurs receive access to Elkar-lan's feasibility planning software.• All services are personalized according to each individual project.• Elkar-lan shares information on public and private funding programs that businesses can access.
Key learnings	<ul style="list-style-type: none">• It's easier to form businesses in flexible legal structures and then convert them to cooperatives as they became more established.• Many cooperatives emerge from conversions of smaller startup companies (versus businesses that immediately become a cooperative).• Entrepreneurs and entities focused on entrepreneurial support must be capable of adapting with society, technology, and employment trends.• In advanced manufacturing entrepreneurial projects, it is essential to value different forms of knowledge from various stakeholders.

Reflecting on these four entities and given what we know about the context of the Bronx, the following lessons stand out as critical guides for our next steps:

- **Focus on entrepreneurship broadly, not just cooperatives.** An exclusive focus on starting cooperatives isn't necessary to create the infrastructure that can support them. Increased awareness about cooperatives allows people to learn about the structure and its benefits, but many entrepreneurs initially form in more traditional legal structures and later convert to cooperatives as they grow. This conversion requires specialized technical assistance.
- **Connect with universities.** In forming an entrepreneurship and innovation hub, the link to a university with a similar goal is critical. For example, the mutually beneficial connection with Mondragón University has provided access to instructors, equipment, and physical space. As BCDI continues to build relationships with future partners, it will be important to work with institutions that share our mission and want to contribute ideas.
- **Partner with the public sector.** Thinking about the four Mondragón initiatives, the public sector has been a major enabling force. With strong public sector relationships across the Bronx and New York City, BCDI can continue to strengthen and expand upon these relationships towards shared goals.
- **Secure physical space and design it to maximize synergies.** Access to real estate was especially critical to achieving the goals of the Bilbao Innovation Factory. In New York City, partnerships that allow this access will likely be even more essential, given the tight real estate market. Designing the physical BXIF space to boost synergy between these groups and foster the exchange of ideas and resources will be important.
- **Be open to all kinds of potential entrepreneurs.** Entrepreneurship activities should focus on a range of entrepreneurs, particularly from an age

perspective. Older entrepreneurs have gained real benefits and seen notable success from entrepreneurship activities in Spain, in part because they are able to use their previous workforce experiences and in part because they undertake entrepreneurship as a life project. In order to boost visibility among a diverse cohort of entrepreneurs, the BXIF will need to recruit from all corners of the borough.

- **Intrapreneurship can be just as important as new business creation.** Working with existing businesses and fostering innovation within these companies can be just as important as helping young startups.
- **Secure committed mentors.** Committed mentors who integrate themselves into projects provide invaluable guidance for entrepreneurs, particularly for first-time entrepreneurs. The BXIF should strategically plan for mentor outreach to find individuals willing to volunteer their time and share their experiences, particularly those based in entrepreneurial leadership and management.
- **Stay flexible and adapt to changing economic and social conditions.** Mondragón's initiatives emerged out of periods of financial crisis and have adapted to meet economic needs as they occur. The BXIF will need to be flexible to macro-scale changes in the economy, including downturns.
- **Provide long-term support to entrepreneurs.** Entrepreneurial needs do not end after the first year of operation. Many entrepreneurs will continue to need guidance, support, and resources beyond the first year in order to sustain and accelerate their business plans.

ADDITIONAL LEARNINGS FROM OTHER MODELS

Mondragón represents a critical and admirable example to follow, however, they are not the only model creating and achieving alternative economic development strategies. BCDI has drawn inspiration from groups in

other corners of the United States and the Americas. The following map and table highlight some of the programmatic and operational elements of these programs that BCDI continues to learn from.



The map above highlights some of the other examples BCDI has studied in the US and Colombia.

ADDITIONAL LEARNINGS FROM OTHER MODELS

	Location	Founding	Features	Impact
Incite Focus	Detroit, MI	2012	<ul style="list-style-type: none"> Digital fabrication lab with maker training, youth summer camp, and a registered apprenticeship program. Maintains a strong focus on economic justice, community building, and environmental sustainability. 	<ul style="list-style-type: none"> Trains individuals across ages to learn hardware and software skills to make, understand new economy concepts, and ultimately build stronger capacity to take control of one's life, time, and production. Launched first cohort of Maker Professional Registered Apprenticeship Program in Fall 2017.
Cooperation Jackson	Jackson, MS	2014	<ul style="list-style-type: none"> Newly built makerspace that is rooted in economic justice, community wealth, and sustainable production. Partners with local schools and universities to deliver training. 	<ul style="list-style-type: none"> As of 2019, launched 3 cooperatives and established a community land trust with 30 properties. Fab Lab established in late 2018 with planned launch of Fab Academy in January 2019 with 2 participants.

	Location	Founding	Features	Impact
Manufacturing Renaissance	Chicago, IL	1982	<ul style="list-style-type: none"> • Nonprofit organization that supports education and training programs for youth and adults. The organization partners with local labor, industry, and the public sector. • Provides internships, on the job training, and industry-recognized curricula, as well as builds and advocates for policy strategies. 	<ul style="list-style-type: none"> • Facilitated 514 work-experiences for youth and young adults, raised \$6 million for local advanced manufacturing education, and partnered with 128 manufacturing companies.
Ruta N	Medellín, Colombia	2009	<ul style="list-style-type: none"> • Business incubation space and digital fabrication lab for business innovation with a positive public impact. The lab works with three primary populations: business/industry, education, and government. • Offers training through established courses and modules; provides business incubation; offers equipment access to industry; collaborates with government to innovate for public sector solutions. 	<ul style="list-style-type: none"> • Between 2012 – 2018, created more than 6,551 jobs in Medellín’s Innovation District across 270 companies. • In 2018, had 105 companies and startups in the Innovation Lab; 5,128 students impacted through teaching; 100 government officials trained in innovation; 17 solutions formed for city challenges.
Brooklyn Navy Yard – STEAM Center	Brooklyn, NY	2019	<ul style="list-style-type: none"> • Technical education center for high school students to gain training and hands-on experience with local businesses. • Partners with the public and business sectors to develop effective curricula for youth across five tracks. 	<ul style="list-style-type: none"> • With the opening of the new 30,000 square foot facility in 2019, plans to train 300 high school juniors and seniors

We are proposing wholesale economic transformation by leveraging the Bronx's creativity, industrial strength, and unique insights to create new shared-wealth businesses.

THE BRONX CONTEXT



Above: A young woman participating in a program at the POINT CDC learns the fundamentals of building and coding circuits with BCI. Right: A group of pest management professionals learn how to 3D model a new mouse trap.

THE BRONX CONTEXT

While the Bronx remains the poorest urban county in the US, it is not for lack of creativity or drive. The Bronx has birthed countless cultural innovations (hip hop, salsa, and boogaloo, to name a few), which have in turn generated immense wealth. While the popular image of the Bronx often conjures danger and decrepitude, this exists alongside the reality that it has been home to generations of hustlers and dreamers, who have not only survived but triumphantly rebuilt our communities despite decades of disinvestment.

The challenge is not, then, that there are few resources to draw from in the Bronx. It is, rather, that little of the wealth generated from the hard work and natural talents of our people have stayed here in the borough. Hip hop started at a house party on Sedgwick Ave. Today, it's a multibillion-dollar, global industry. Yet, walking the streets of the Bronx, one might wonder where all that money went. **As technology opens the door to new forms of innovation, this is our chance to chart a different course.**

Moreover, the wider world, which is interested in using technology to solve pressing challenges, should want the Bronx to lead. While the rest of the world is waking up to environmental issues like poor air quality and lack of access to fresh food, the Bronx has been creating solutions for two generations now.

Building on the Bronx's legacy of manufacturing and innovation, and leveraging our unique insights into the ways that products and systems so often do *not* work for low-income communities, people of color, women, immigrants, and LGBTQ people, we can focus new technologies on solving issues faced specifically by historically marginalized groups. These are precisely the challenges that Silicon Valley has deemed unprofitable or unsolvable, yet we know that this market comprises the majority of people in the world, and even in the US, and that when you design for people at the margins, you typically wind up with a product that works better for everyone.¹

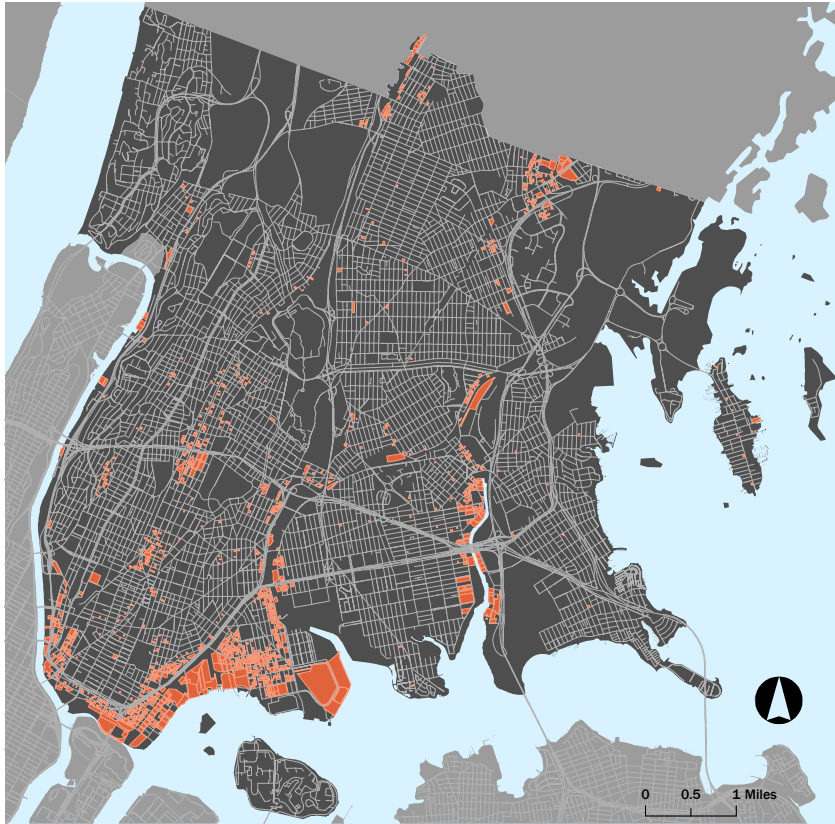


¹ Roy, Elise. "When we design for disability, we all benefit." TEDxMidAtlantic.

EXISTING STRENGTHS

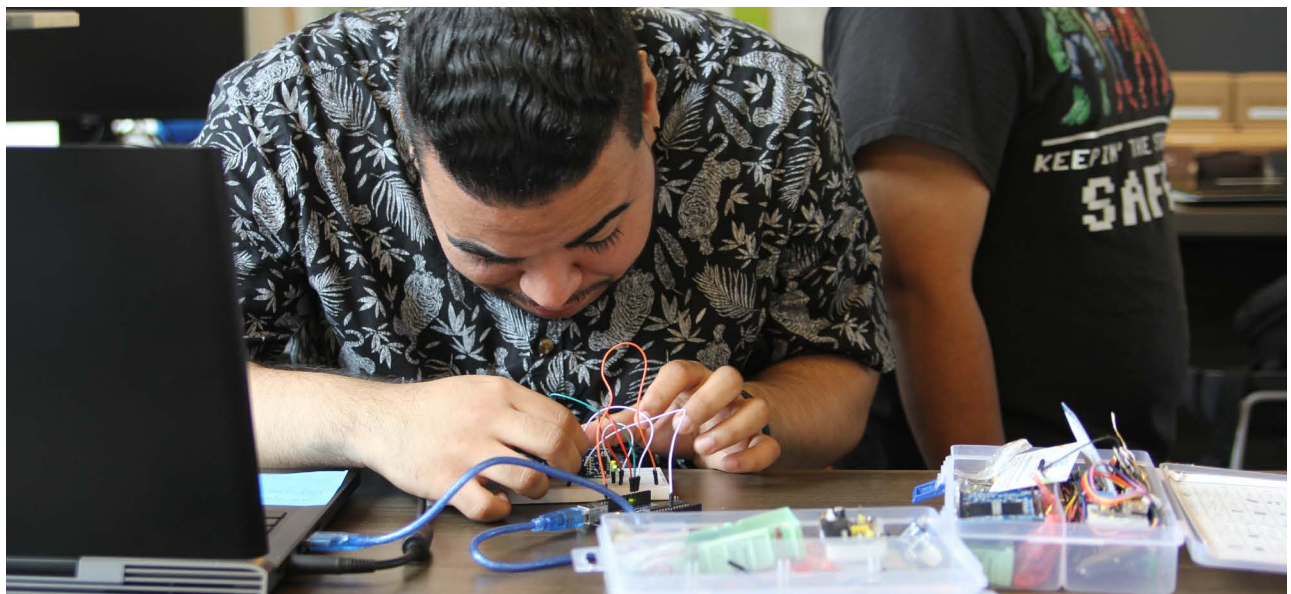
The Bronx presents a unique setting, very different than Spain's Basque Country or other places we have studied. While we can draw inspiration from Mondragón and others, we must also consider the Bronx's own key players, core strengths, and existing gaps in order to define more clearly the partnerships and programs the Bronx Innovation Factory will need. The following represent existing strengths that BCDI hopes to nurture, learn from, and build upon.

- **Bronxites' creativity and skills.** One of the Bronx's greatest assets is its people. Whether through business endeavors, new product ideas, or art, the Bronx is filled with people who routinely harness their creativity and resourcefulness as well as advanced technical skills and international networks to innovate. Whether it's rebuilding after the arson of the 1970s, improving air and water quality through environmental justice initiatives, or securing tenant protections, we have also seen countless examples of Bronxites organizing to address challenges and strengthen our communities. It's because of our people—including those who were born and raised here and those migrating from other countries to adopt the Bronx as home—that we believe the Bronx Innovation Factory can be home to practical and profitable ideas that the world hasn't yet seen anywhere else.
- **Manufacturing base and historical legacy.** The Bronx has historically had a very strong manufacturing sector, evidenced in the largely industrial buildings and infrastructure of the South Bronx, and continues to house many active industrial uses, especially relative to other parts of New York City. This industry represents a highly unionized sector with a legacy of family-supporting wages that have lifted many communities out of poverty, despite also having its own racial tension.
- **Budding Bronx tech community and service providers.** Located primarily in the South Bronx, a growing community of tech training programs and businesses is reaching and guiding Bronxites through the software and hardware sectors. In collaboration with organizations like The Knowledge House, DURO, and MetaBronx, the Bronx Innovation Factory can provide in-depth hardware support as well as entrepreneurial skills and political analysis.
- **Strong community colleges and universities.** The Bronx has a well-established system of community and four-year colleges that reach thousands of Bronxites each year. The Bronx Innovation Factory has the opportunity to grow with these institutions by creating referral systems and shared programming.
- **Powerful CBOs that engage residents, especially young people and immigrants.** Across the Bronx, there is a multitude of community-based organizations committed to working with youth and young adults, recently arrived immigrants, women, and people with experience in the criminal justice system. Much of the work done by these organizations supports and sustains Bronxites' civic engagement, contributing to the borough's dynamism and strength.
- **Notoriety and "brand name" for the Bronx.** The Bronx is well known across the country and the world. While the reasons for this notoriety have not always been positive, the name offers a branding strategy that Bronxites can capitalize on and command. As production and business ideas begin to grow, "Made in the Bronx" may soon take on an entirely new meaning.
- **Business development resources.** The Bronx benefits from several well-established entrepreneurial support programs, as well as values-aligned capital providers. Bronx entrepreneurs are able to take advantage of these resources when launching a new venture.



Industrial land

The map to the left shows industrial uses in the Bronx. The Bronx, especially the South Bronx, is one of just a few areas of New York City with significant industrial land still remaining, and even this is increasingly threatened by rezoning and redevelopment.



A young man tests out the circuit he has built and coded for a photosensitive LED.

EXISTING GAPS

Amid the Bronx's assets, major gaps persist. In order to alter and regain control of the local economy, we believe the Bronx Innovation Factory needs to focus on the following gaps and use them as opportunities to partner with existing businesses and institutions.

- **Digital fabrication equipment and spaces available to the public.** Currently, BCDI has the only publicly accessible makerspace or digital fab lab in the Bronx. Building awareness around this resource and the need for more such spaces presents an opportunity to gain momentum, reach more Bronxites, and attract funding to continue to scale efforts.
- **STEAM and civics in K–12 education.** Despite the growing awareness and excitement around STEAM (science, tech, engineering, arts, and math) programming, these programs are limited. Furthermore, of those programs that exist, very few, if any, focus on cooperation, innovation, and entrepreneurship. The BXIF seeks to provide this, integrating technical skills with social studies, civics, racial justice, and democracy.
- **Advanced manufacturing and technology hardware workforce programs.** While related programs exist and these should be promoted rather than replicated, there is little being offered for existing workers to skill up with new advanced manufacturing technologies. The BXIF should additionally complement existing programs with political education and resources for entrepreneurship.
- **Innovation– and cooperative–focused entrepreneurship programs.** Within the Bronx, there are several valuable entrepreneurship programs and resources; however, currently none emphasize hardware technologies and shared ownership models. As we build our programming, the focus will need to be on developing entirely new businesses, supporting existing entrepreneurs to develop new product lines, and incorporating a framework of economic democracy.
- **Market access.** While many new and innovative product ideas are currently being developed and will continue to be developed by Bronxites, there are few mechanisms to ensure that these products can reach their base of customers. Innovations in the healthcare and education sectors, for instance, could benefit hospitals and universities in the Bronx and elsewhere; however, ensuring these connections happen requires concerted investment.
- **Resources to keep the whole sector competitive.** Building a Bronx-based entrepreneurial and innovation ecosystem requires continued support of existing businesses and spaces. Here, the BXIF can offer research and development capacity as well as advocate for the preservation of industrial land.

ADDITIONAL CONSIDERATIONS

As the Bronx Innovation Factory expands its programming and network, there are several important factors to keep in mind.

- **Culture of cooperation.** The culture within and around a space has more influence and power than may be immediately obvious. As more participants and partners join the Bronx Innovation Factory and the network of like-minded Bronx organizations grows, it is important to maintain a sense of democracy and cooperation in interactions, development, and product creation.
- **Degree options.** In an effort to democratize education, the Bronx Innovation Factory should think about ways to offer and support 2- and 4-year degree options. As stackable credentials gain traction in the technical education realm, the BXIF can partner with educational institutions to credentialize its training programs.
- **Role of labor.** Labor has a strong history in the Bronx and New York City, and New York City and State have among the highest density and strongest unions remaining in the country. Relationships between labor leaders and the Bronx Innovation Factory can be mutually reinforcing and result in strong workforce options for Bronxites. Investing in advanced manufacturing and technology may also be a strategy for labor to both maintain and increase its role in a changing economy.
- **Investments in equipment.** Advanced manufacturing requires specific equipment to carry out production. As the Bronx Innovation Factory scales its efforts and audience, investments in equipment should also scale appropriately.



A BCDI trainee practices soldering electronic components to a circuit board.

The current moment is full of energy and disruption. We can and must forge a path to a more equitable future.

OUR VISION



The above renderings illustrate what a center for advanced manufacturing in the Bronx could look like. They are meant to be conceptual. A final building would be co-designed with the community and fit into the existing urban fabric as much as possible. The Bronx Innovation Factory is meant to be a hub and resource for existing Bronx residents, especially people of color, immigrants, and low-income people.

A CENTER FOR ADVANCED MANUFACTURING

Our vision for an equitable and innovative advanced manufacturing sector in the Bronx requires collaboration and imagination. Based on our understanding of the Bronx context as well as the lessons we have learned from other models, below are critical roles we believe the Bronx Innovation Factory (BXIF) must play.

- **Technology access:** As the only public center with digital fabrication equipment in the Bronx, we must provide affordable access to technologies and related resources to Bronxites across the borough.
- **Values-driven education and training:** The BXIF can be a central hub for educational institutions and community-based organizations to provide comprehensive education and workforce development. We hope to host educational programs partnering with K-12 schools and CBOs in order to provide Bronxites exposure to advanced manufacturing and economic democracy at an early age. The BXIF can serve a range of labor and workforce needs by partnering with labor leadership and Bronx-based manufacturers to provide workforce training. In addition to enhancing employee skills, the BXIF can also assist in modernizing employers' production practices.

At the same time, teaching skills alone will not be enough to build the next generation of leaders and innovators. We must also teach innovation, entrepreneurship, and—most importantly—the values of cooperation and solidarity. Participants should understand their role in the larger project of building a more equitable Bronx economy.

- **Shared-wealth business development:** Supporting the creation and expansion of Bronx-based businesses requires providing affordable incubation space as well as access to equipment, management training, mentorship, and finance. In order to realize the broadest benefits for the Bronx, entrepreneurs should be encouraged and supported to explore cooperative ownership models, to value community

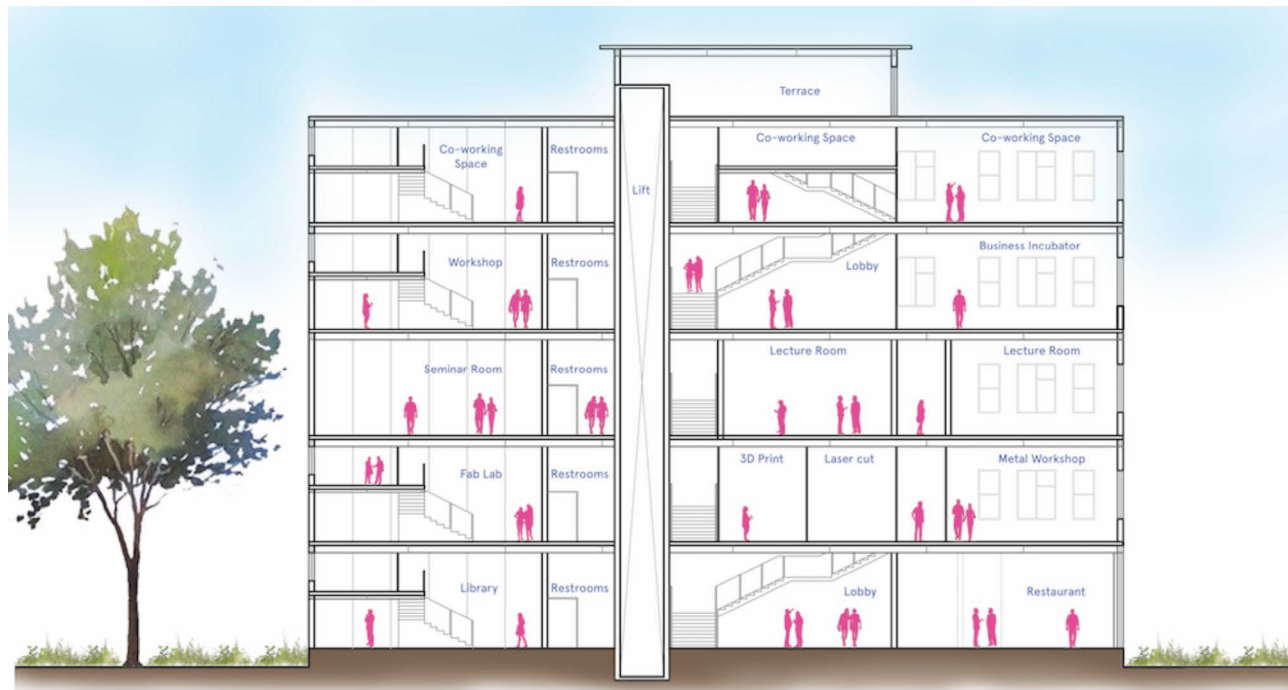
impact alongside profit, and to mitigate any possible social and environmental costs.

- **Collective knowledge creation:** Innovation ecosystems are able to create new ideas and products in large part because of an internal flow of knowledge. New ideas build on old ones. While the modern intellectual property (IP) system incentivizes individuals to develop new inventions, it also prevents the kind of knowledge transfer that could accelerate the pace of innovation overall. By framing the development of the Bronx's advanced manufacturing as a cooperative endeavor, the BXIF could offer research to benefit the entire sector and promote shared IP as a way to position the entire borough as a leader in technological development.
- **Narrative shifting:** The BXIF can position the Bronx as a leader in advanced manufacturing and community innovation. Through intentional, community-guided efforts, we can also shift the public narrative to recognize the Bronx as a place of quality production, deeply embedded community cooperation, and innovation rooted in residents' lived experiences. Shifting narratives can change what people understand as possible, encourage investment, and promote policy and land use decisions that support local manufacturing—a critical factor in the success of the sector overall.

Across all of BXIF's programming and courses, the following core tenets must be embedded:

- **An asset-based framework** that values partners and the existing business community.
- **Economic democracy** interwoven throughout both curricula and operational processes, encouraging a high degree of participation, cooperation, and co-governance from users of the space.
- **Fluid pathways** and an open-door policy so that participants and members can access innovation, workforce, and entrepreneurial tracks.





These renderings of the exterior and section of the interior of a future Bronx Innovation Factory demonstrate how a physical space could integrate the various functions described in this document. This facility would be supplemented by a range of programming embedded throughout the Bronx, including youth programs at schools and community-based organizations, feeder programs from community colleges, and satellite digital fabrication facilities at libraries and other community facilities.

AN INCLUSIVE ECOSYSTEM FOR ENTREPRENEURSHIP & INNOVATION

No single entity or building can change the economic future of a borough of 1.5 million people. Instead, we hope to work with partners of all kinds to embed economic democracy, innovation, and entrepreneurship within existing programs and to coordinate with one another, forming a borough-wide ecosystem that supports Bronxites to explore new technologies, innovate, and create shared wealth.

With these partners, BCDI hopes to build the foundation for a future economy that creates shared wealth for people of color. The Bronx Innovation Factory is just one part of this vision, and just one of six projects we envision for the borough. In addition to a center for advanced manufacturing, we are building infrastructure for comprehensive leadership development, in the form of an [Economic Democracy Learning Center](#), to identify and support the Bronxites who will continue to drive an equitable future. Our [Planning and Policy Lab](#)

helps these leaders formulate projects and platforms grounded in community experience and aligned with economic democracy. We are supporting our local minority-owned business to access the immense riches that already exist in the borough while sharing ownership and governance with their workers through [the BronXchange](#). Finally, we envision a [Civic Action Hub](#) to coordinate and mobilize leaders to achieve transformative change and a [Bronx Fund](#) that provides capital to grassroots organizations, businesses, and real estate projects that embody economic democracy.

[Changing the borough's economic trajectory will take all of us](#), and in the next section, we'll outline specific roles that Bronx stakeholders can play in achieving our shared vision of economic democracy, within the advanced manufacturing sector and well beyond.



A participant in a BCDI training using our laser cutter to cut and etch custom designs in acrylic.



Two Bronxites brainstorm challenges in their community in order to decide which they will address as part of BCDI's InvenTeam, one of 14 teams across the country selected by Lemelson-MIT to build their solution.

**No single entity or building can
change the economic future of a
borough of 1.5 million people.**

HOW TO GET INVOLVED

BUILDING THE BRONX'S FUTURE TOGETHER

Across the borough and New York City at large, many actors are fortifying the Bronx's manufacturing workforce and businesses. Spanning sectors, audiences, and methods for creating change, these organizations offer the knowledge, experience, and access to resources that will enhance BCDI's vision. Together, we can harness our areas of expertise to build an advanced manufacturing sector that works for the diverse body of Bronxites who strive to access opportunity within the Bronx and to realize a more just future.

Each set of partners has a critical role to play in supporting a more robust entrepreneurship and innovation ecosystem. Below we detail the opportunities we see for each of these types of organizations. This is not exhaustive and is intended as the beginning of a conversation to uncover all the ways that the vision outlined in the document may align with their various roles and interests.

COMMUNITY-BASED ORGANIZATIONS

The Bronx benefits from a number of strong grassroots organizations. These organizations represent the majority of Bronxites, and they actively engage residents to identify and meet community needs through various campaigns and programs. These organizations and their member-leaders need to guide the design of the Bronx Innovation Factory and supportive ecosystem in order to ensure that it is fully accountable to and benefits people of color, immigrants, women, formerly incarcerated people, and other traditionally excluded groups. In fact, these organizations are best positioned to identify both community challenges and the future leaders who can innovate their solutions. Many groups already offer skills and opportunities that can connect with the BXIF's focus on digital technology, community innovation, economic democracy, and entrepreneurship.

- Key Partners: Northwest Bronx Community and Clergy Coalition, The POINT CDC, Mothers on the Move, Northern Manhattan Coalition for Immigrant Rights, Youth Ministries for Peace & Justice, DreamYard, and more

BUSINESS DEVELOPMENT ORGANIZATIONS

Several entities offer robust business development resources for entrepreneurs and small businesses in the Bronx. As BCDI builds the BXIF's business development and incubation features, it will be crucial to understand where particular service gaps persist. Where opportunities exist, BCDI is interested in partnering with organizations to expand reach and impact, and to focus entrepreneurial resources on technology hardware and cooperative models.

Technical assistance providers offer advice, guidance, and resources for companies and entrepreneurs looking to expand their operations. As BCDI builds the BXIF's business incubation services, one of the critical offerings will be useful and affordable technical assistance around manufacturing and production. Because there are a small number of local and state players providing manufacturing technical assistance, BCDI invites current technical assistance providers to join us in developing contextually relevant practices.

- Key Partners: MetaBronx, Communitas America, the Working World, Democracy at Work Institute, Business Outreach Center Network, ITAC, and more

ORGANIZED LABOR

Organized labor has been the primary force advancing worker rights and building our worker training infrastructure for the past 150 years. The labor movement effectively created the middle class in the United States, and as advanced manufacturing continues to grow, we must ensure that labor is at the table to forge a more equitable path forward. As a starting point, labor unions can and should invest in training workers for these new technologies, educating business owners and employees about worker ownership models, and fostering intrapreneurship (when employees exercise entrepreneurial skills to support innovation within an existing business). Such investments are especially important within legacy businesses, which are more likely to be unionized; however, by effectively addressing the needs of businesses and workers within the growing advanced manufacturing sector, such investments could also help secure organized labor's role for the future as new businesses emerge. We must work with labor unions to ensure that the new sector we are creating generates wealth for workers, connects to larger political movements, and supports the continued strength of organized labor in NYC.

- Key Partners: Consortium for Worker Education, Central Labor Council, CUNY School of Labor and Urban Studies, 1199SEIU, Teamsters, Machinists, Unite Here, IBEW Local 3, and more



A BCDI volunteer codes an Arduino microcontroller before teaching a workshop on this powerful technology.

WORKFORCE DEVELOPMENT ORGANIZATIONS

Within the Bronx, existing workforce training programs include green or sustainable construction and software coding. Across existing programs, there is an opportunity to enhance current offerings by integrating education on digital fabrication and electronics, as well as entrepreneurship and innovation. BCDI can partner with these organizations to provide existing curricula, help develop new curricula, or deliver supplemental training ourselves.

- Key Partners: The Knowledge House, Per Scholas, HOPE Program, CUNY, and more

HIGH SCHOOLS

High schools can be sites of inspiration, access, and exploration. In the Bronx, several high schools are intentionally partnering with STEAM (science, tech, engineering, arts, and math) and entrepreneurship programs to boost in-school and after-school programs that would not be possible with school funding alone. For Bronx high schools with an intentional curriculum focus on STEAM and/or entrepreneurship, partner support can offer tangible skill building and learning opportunities. Collaborative programming between schools and BCDI has already begun, and BCDI is interested in continuing to strengthen these connections and expand this education network in the Bronx, while capacitating schools to offer technology and economic democracy training themselves.

- Key Partners: Bronx Academy for Software Engineering, Bronx Collaborative High School, Fannie Lou Hamer Freedom High School, Dr. Richard Izquierdo Health and Science Charter School, Bronx Engineering and Technology Academy, DreamYard, and many more

COMMUNITY COLLEGES & UNIVERSITIES

As affordable and flexible sites of higher education and technical skill building, community colleges provide access to courses and training that may otherwise be inaccessible for many. In the Bronx, Bronx Community College, Hostos Community College, and Guttman College (which serves primarily Bronx students, despite being located in Manhattan) offer several credit and non-credit avenues for STEAM and entrepreneurship-based learning. These institutions can integrate cooperative entrepreneurship education into existing technical training programs and provide on-ramps to four-year business education programs.

Similarly, four-year colleges and universities in New York City offer opportunities to build skills, access specialized equipment, and deepen career exploration, including entrepreneurship. For example, City College of New York's (CCNY) Zahn Innovation Center hosts advanced manufacturing equipment and offers CCNY students prototyping access and start-up business development programs. Additionally, Lehman College provides computer science education as part of the Tech Talent Pipeline and CUNY 2X programs, and it launched the Bronx Business Tech Incubator and AR/VR Academy. Lehman College could expand its computer science and continuing education offerings to cover physical computing and digital fabrication—critical skills as the Internet of Things continues to expand as a subset of the tech sector—and expand its academic offerings to provide more team-based, experiential learning connected to its business incubator.

BCDI can support both sets of institutions to implement new course offerings or content and build links with other programs and institutions.

- Key Partners: Hostos Community College, Bronx Community College, Lehman College, Guttman Community College, Zahn Innovation Center at City College

ENTREPRENEURS & ESTABLISHED BUSINESSES

At present, there are over 400 manufacturing businesses located in the Bronx. The borough has a longstanding manufacturing history with a diverse range of products, yet relatively few manufacturers use digital fabrication technologies. The Bronx also has a budding community of new entrepreneurs who are using technology in novel ways. This is in addition to the innumerable would-be entrepreneurs who do not feel they have the support or access necessary to launch their businesses in the Bronx.

The Bronx Innovation Factory could be a node and test site for new entrepreneurs and established businesses alike to use digital fabrication technologies to launch and expand new lines of business. Both groups have something to offer the other: While new entrepreneurs can help solve challenges established Bronx-based businesses face, established businesses of all sizes and sectors can serve as critical advisors to new startups seeking advice and support.

- Key Partners: DURO, Cooperative Home Care Associates, Neture, and many, many more

GOVERNMENT ACTORS

In 2017–2018, MIT Community Innovators Lab worked with a cohort of City and State elected officials from the Bronx and Brooklyn as part of the Mel King Community Fellowship program. As part of the fellowship, elected officials explored ways to advance economic democracy and increase equity through economic development strategies. The Mayor’s Office has also expressed support for increased industrial development. We believe that the BXIF presents an opportunity in line with the economic development goals of local government officials, and we welcome opportunities to explore in more depth how the BXIF could advance overall policy agendas.

- Key Partners: Bronx City Council Members and City Council Speaker, Bronx State Legislators, Bronx Borough President, Bronx Overall Economic Development Corporation, Mayor’s Office, New York City Economic Development Corporation, New York State Empire State Development



A worker at GCS Building Supplies—an established, Bronx-based, minority-owned business that BCDI works with—prepares materials for one of their clients.

THE ROAD AHEAD

Transforming the Bronx economy will take all of us. If you see yourself or your organization reflected in these pages—and we hope that you do—we want to work with you. If you feel inspired by this vision and the impact it could have on the Bronx, we want to work with you. If you have skills, insights, concerns, resources, recommendations or anything else you want to contribute, we want to work with you! Together, we can position the Bronx as a leader in innovation and advanced manufacturing, and we can build shared wealth and ownership for Bronxites of color for generations to come.

Following the release of this vision document, we will be creating a detailed roadmap to realize our vision for a Bronx Innovation Factory and a borough-wide ecosystem for entrepreneurship and innovation. As we do so, **we want to hear from you.** You can follow our progress and get in touch at:

- bcdi.nyc/innovation
- [@bronxinnovation](https://www.instagram.com/bronxinnovation) on Instagram



BCDI worked with team members of the Urban Wild to develop an electronic monitoring system for aquaponics projects, part of their proposed solution to food scarcity in low-income areas of New York City.

**Transforming the Bronx will take
all of us. Together, we can build
shared wealth and ownership
for Bronxites of color for
generations to come.**



*Solving Bronx challenges, advancing
technology, building community wealth.*

Bronx Cooperative Development Initiative