



CITY OF CHICAGO

Manufacturing Incubator Feasibility

FINAL REPORT: July 17, 2014



VISION | ECONOMICS | STRATEGY | FINANCE | IMPLEMENTATION

POLICY PLANNING PARTNERS

Applied Real Estate Analysis (AREA), Inc. Georgia Tech Enterprise Innovation Institute (EI²)

July 17, 2014

Ms. Kathleen Dickhut,
Deputy Commissioner
Department of Housing and Economic Development
Bureau of Planning and Zoning
City Hall, Room 1101, 121 N. LaSalle Street
Chicago, IL 60602

Dear Ms. Dickhut:

Pursuant to our agreement, *SB Friedman Development Advisors* is pleased to present this report outlining the findings and recommendations of the Manufacturing Incubator Feasibility Task Order #1.

The scope of our engagement included an assessment of:

- The degree of support for a manufacturing incubator among key stakeholders and entrepreneurs in Chicago's manufacturing community,
- The need and potential role of an incubator in Chicago's manufacturing start-up ecosystem,
- The services that a potential incubator could provide, and
- The potential location for a manufacturing incubator within the City.

Based on the analysis summarized in this report we outline several key steps to establishing an effective manufacturing incubator. Our report is intended to provide a framework for the City of Chicago as it considers facilitating the creation of a manufacturing incubator.

We appreciate the opportunity to have been of service to the City of Chicago, and look forward to continuing to work with you.

Sincerely,

SB Friedman & Company



Stephen B. Friedman, AICP, CRE
President



Ranadip Bose, AICP
Senior Project Manager

Acknowledgments

Project Management

U.S. Economic Development Administration (Major Funding Provider)

City of Chicago Department of Planning and Development

Consultant Team

SB Friedman & Company
(Prime Consultant)
221 N. LaSalle Street, Suite 820
Chicago, Illinois 60601

Stephen Friedman, President
Ranadip Bose, Senior Project Manager
Max Eisenburger, Associate

Policy Planning Partners
1478-I South Prairie
Chicago, IL 60605

Judith Kossy, Principal

Applied Real Estate Analysis, Inc.
53 W Jackson Blvd,
Chicago, IL 60604

Maxine V. Mitchell, President
Robert E. Miller, Senior Vice President

Georgia Tech Enterprise Innovation
Institute
75 5th Street,
Atlanta, GA 30308

Lynne Henkiel, Director
Juli Golemi, Senior Project Manager

Table of Contents

1 Introduction	1
2 Chicago’s Manufacturing Ecosystem	3
3 Models for a Manufacturing Incubator.....	14
4 Opportunities for a Chicago Manufacturing Incubator	18
5 Implementation Steps.....	23
Appendix A: Limitations of Our Engagement.....	25
Appendix B: List of Stakeholders Interviewed	27
Appendix C: Manufacturing Incubator National Case Studies.....	28

S. B. FRIEDMAN & COMPANY

221 N. LaSalle St. Suite 820 Chicago IL 60601

T: 312.424.4250 F: 312.424.4262 E: sbf@sbfriedman.com

www.sbfriedman.com

1 Introduction

Manufacturing is in the midst of a transformation: material changes are taking place in technology and distribution channels that are making it cheaper and easier to start a manufacturing business. Whereas CNC machines (computer-operated cutting machines) cost well over \$100,000 a couple decades ago, they can now be purchased for less than \$20,000, and hobbyist kits are available for several hundred dollars. At the same time, 3D printers and new crowdfunding models (such as Kickstarter) have made it relatively easy to build a prototype and test the market for new products. The convergence of information technology and manufacturing processes is reshaping the supply chain.



White House initiatives focused on manufacturing include the Advanced Manufacturing Partnership (AMP) and National Network for Manufacturing Innovation (NNMI).

These developments and examples of “reshoring,” or manufacturing plants returning from overseas, have raised the prospect of an advanced manufacturing renaissance in the U.S. To nurture the trend, the Obama administration has already opened or announced the planned opening of several innovation hubs as part of the proposed National Network of Institutes for Manufacturing Innovation, including the still-new Digital Manufacturing and Design Institute (“DMDI”) in Chicago.

Chicago Context

The DMDI is an important win for Chicago that is already energizing and coalescing myriad activities and plans that identify manufacturing as a priority focus for local and regional economic development efforts. World Business Chicago’s Plan for Economic Growth and Jobs, released in 2012, set as its first transformative strategy to “become a leading hub for Advanced Manufacturing.” Meanwhile, Cook County’s strategic economic growth plan¹ recognizes the production (manufacturing) sectors of the economy as the primary drivers of growth, and identifies increasing manufacturing productivity and supplier competitiveness as key strategic goals. The City of Chicago’s Chicago Sustainable Industries initiative (“CSI”) similarly recognizes the economic importance of manufacturing and outlines multiple strategies to streamline regulations, enhance infrastructure, and improve workforce training for the City’s manufacturing sectors.

A Manufacturing Incubator for Chicago

In the context of the initiatives described above, the City of Chicago has engaged a consultant team (“Team”) led by *SB Friedman Development Advisors* (“*SB Friedman*”) that includes Applied Real Estate Analysis, Policy Planning Partners, and the Georgia Institute of Technology’s Enterprise Innovation Institute (EI²), to assess the feasibility of establishing one or more new business incubators that would foster and support new manufacturing start-ups. A business incubator is a facility that provides a range of services to start-ups to help them minimize the pitfalls of starting a new manufacturing business that

¹ *Partnering for Prosperity: An Economic Growth Action Agenda for Cook County*, April 2013. <http://blog.cookcountyil.gov/economicdevelopment/wp-content/uploads/2013/04/FINALPFPRReport.pdf>.

arise from fragmented or incomplete systems, to grow more quickly, and increase their odds of success. These services typically help with a business plan and financing, mentoring, administrative support, and physical space. There are many business incubators in the Chicago region, but only a few focus on the needs of manufacturers.

This report assesses the degree of support for a manufacturing incubator among key stakeholders and entrepreneurs in Chicago's manufacturing community, discusses the need and potential role of an incubator in Chicago's manufacturing start-up ecosystem, identifies the services that the incubator could provide, and outlines several key steps to establishing an effective manufacturing incubator. The conclusions and recommendations in this report are based on the Team's findings from:

- Sixteen in-person and three phone interviews with stakeholders (see Appendix B for a full list);
- An online survey of local entrepreneurs (over 90% were manufacturers) that resulted in up to 141 responses;
- Case study analysis of incubators in the Chicago region and around the nation (Appendix C); and
- Primary and secondary data research on demand indicators for an incubator.

Structure of the Report

The remaining sections of the report are structured as follows:

- The second section of the report provides an overview of the key entities, relationships and emergent trends in Chicago's manufacturing ecosystem. It also identifies gaps in the ecosystem where a set of entities or relationships is missing or could otherwise be more effective.
- The third section divides manufacturing incubators into three primary categories, based on a review of local incubators as well as national case studies. It also identifies the primary advantages that business incubators can provide to manufacturing firms based on the services that they offer.
- The fourth section draws on the case studies, interviews with key stakeholders, a survey of over 140 local entrepreneurs, and data on the local economy to identify the primary attributes of a business incubator for manufacturing start-ups in Chicago.
- The fifth and final section lists key implementation steps to establish a manufacturing incubator.

2 Chicago's Manufacturing Ecosystem

Nurturing entrepreneurship in manufacturing requires a supportive ecosystem developed around the core manufacturing base of the city, with strong partnerships and linkages between academia, workforce organizations, venture capitalists and angel investors, trade associations, and other private and public sector representatives. The term “ecosystem” is a biological term, but it is used in business to describe the web of relationships between the entities that can play a decisive role in the success of new products and ventures. A business incubation program that relies on an incomplete ecosystem will have a hard time successfully growing businesses no matter how ambitious its programs may be.

This section provides an assessment of the Chicago region's manufacturing ecosystem. It starts with a broad overview of entities supporting manufacturing and entrepreneurship, and then highlights specific entities and linkages that are significant to manufacturers. Based on this assessment, it identifies strategic gaps in the ecosystem and opportunities for a manufacturing incubator to address those gaps.

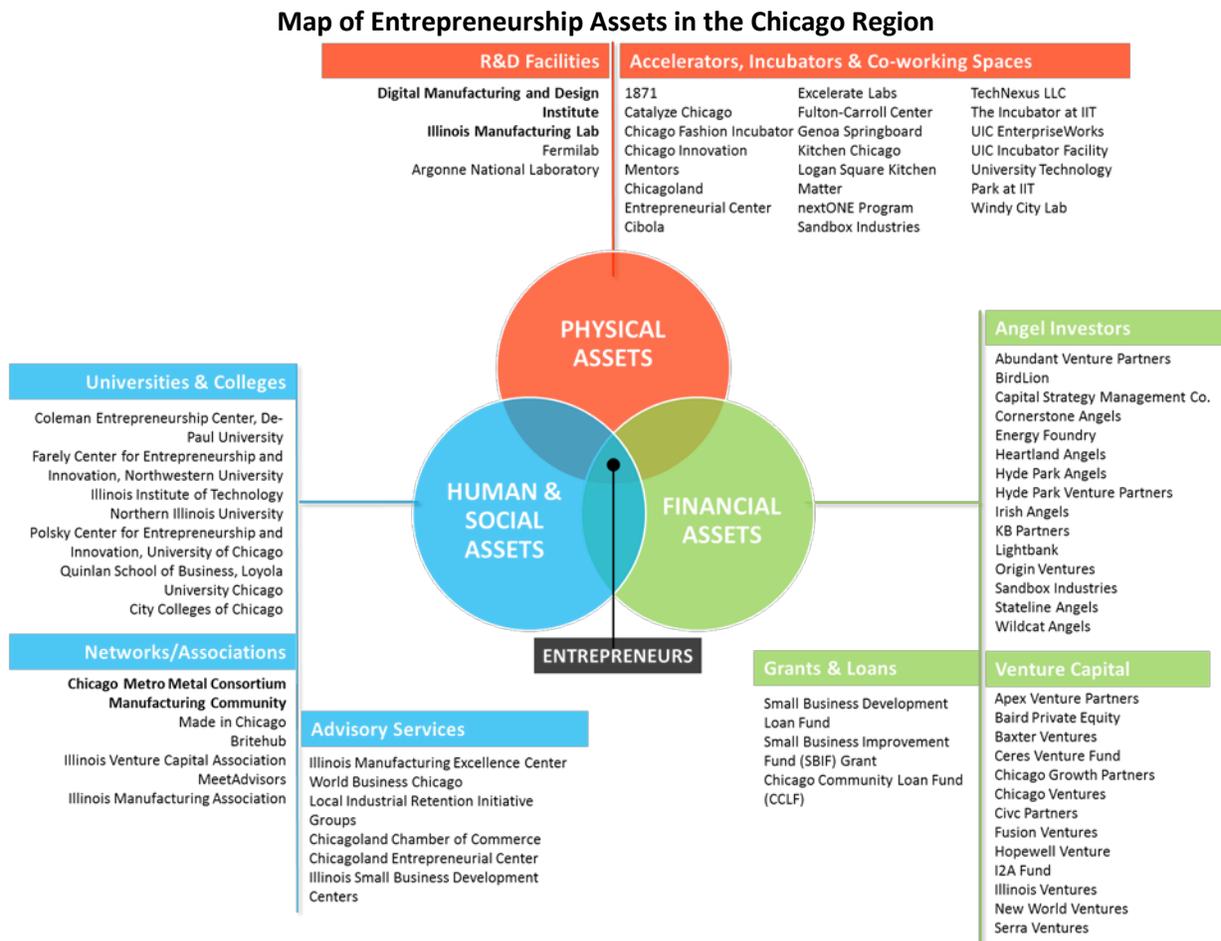
Overview of Ecosystem Assets

Chicago's ecosystem for manufacturing entrepreneurs is large, diverse and robust. It has world class assets that can be leveraged to assist or support start-up businesses and manufacturers in the Chicago region including the following major “players:”

- Tier I research universities and technical colleges that train engineers, scientists and production workers, conduct basic and applied research, and commercialize technologies.
- World-renowned R&D facilities and labs, such as Argonne National Labs, that conduct cutting-edge research on applied sciences and use advanced technologies such as nanotechnology. The Digital Manufacturing and Design Institute (“DMDI”), discussed in greater detail on the next page, is a newly developing research institute that has the potential to be a “game-changing” asset that transforms manufacturing and fosters innovation in Chicago.
- A support system for local manufacturers, including the Illinois Manufacturing Excellence Center, Local Industrial Retention Initiative groups, and Small Business Development Centers and International Trade Centers that assist in manufacturing process improvements, workforce development, development of business plans, financial packaging and lending assistance, exporting and importing support, and other business services.
- Existing incubators, such as the Incubator at the Illinois Institute of Technology (IIT), Catalyze Chicago, and Fulton-Carroll Center that have or are developing a greater focus on manufacturing start-ups.
- A growing venture capital and angel investment community that has made significant investments to build the information technology sector in Chicago but needs to develop interest and capacity in manufacturing as a crucible for innovation.

- World Business Chicago (“WBC”), the economic development arm of the City, whose top transformative strategy is to make Chicago a hub for advanced manufacturing. WBC was heavily involved in assembling the coalition of businesses and universities that ultimately won federal support for DMDI. WBC is also organizing an “advanced manufacturing hub” that will bring together manufacturers and other stakeholders to serve as an advisory body for policy decisions that impact manufacturing, as well as Chicago’s first venture capital summit (scheduled to occur in the fall of 2014).

The asset map below provides a broad overview of a larger range of entities involved in assisting or supporting start-up businesses and manufacturers in the Chicago region.



Sources: *E²*; SB Friedman

Potential New “Game-Changing” Assets

The map above reflects the scale and complexity of the Chicago region’s start-up/manufacturing ecosystem, with multiple entities fitting into each supportive role. Highlighted below are those entities that are currently in the process of development and have the potential to dramatically impact innovation in the manufacturing sector, as well as be strategically important to start-up manufacturers.

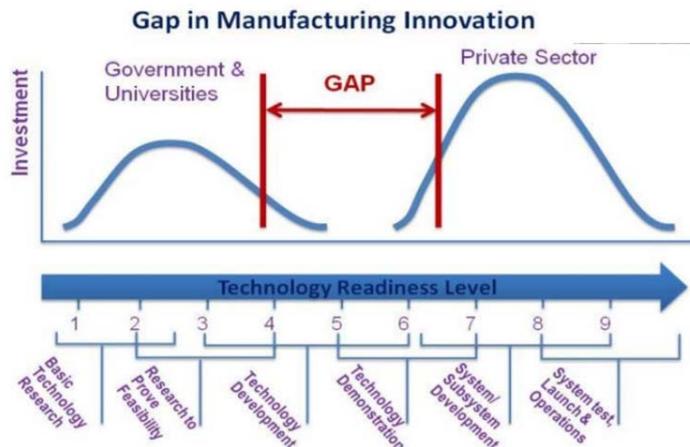
- **The Digital Manufacturing and Design Institute (“DMDI”):**

Chicago-based UI LABS won a competitive bid for a five-year \$70 million grant from the U.S. Department of Defense



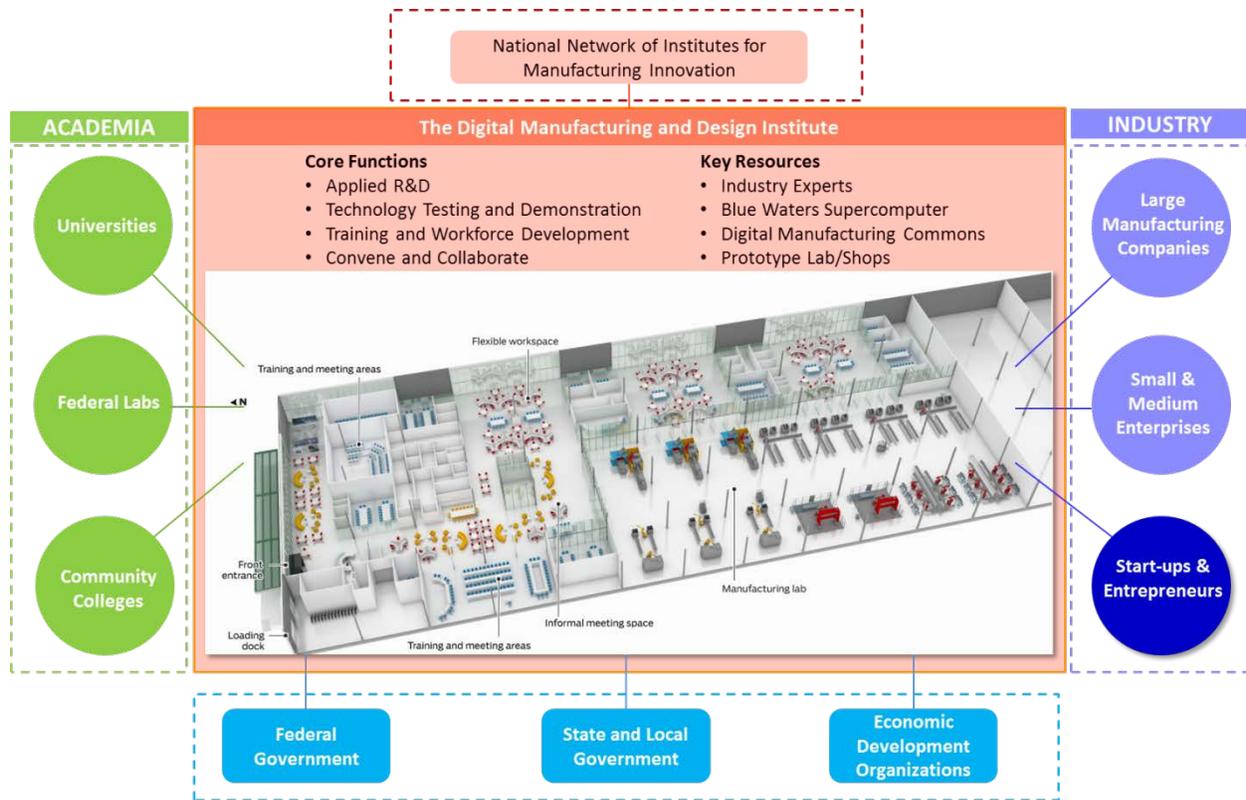
**DIGITAL LAB FOR
MANUFACTURING**

(DoD) to fund an advanced manufacturing research hub that will focus on applications of digital technology to manufacturing processes. This award is leveraged by commitments of \$250 million from industry, academia, government and community partners, bringing the total amount of funding for the DMDI’s first five years to \$320 million. The goal for DMDI is to bridge the gap between basic research conducted by academia/national labs and private sector product development to foster innovation and technology commercialization.



Source: Advanced Manufacturing National Program Office

The headquarters for DMDI is expected to open in early 2015 in a 94,000-square-foot space at the former Republic Windows and Doors facility on Goose Island in Chicago. Once open, it will focus on four core functions: (1) applying University research to solve manufacturing challenges revolving around digital technology, (2) testing and demonstration of new applied technologies for manufacturers, (3) workforce development and training in new digital manufacturing technologies, and (4) convening OEMs, suppliers and SMEs to develop the supply chain and create new opportunities for both suppliers and OEMs. The facility as shown in the diagram below will have flexible work areas, training and meeting space, access to the Blue Waters Supercomputing capabilities to digitally simulate products and process, and a fully functioning manufacturing shop floor where companies can test designs and work on new technologies.



Source: Chicago Tribune; Advanced Manufacturing National Program Office; SB Friedman

DMDI will also launch the “digital manufacturing commons,” an open-source application to help customers and suppliers find one another and coordinate production and design through the selective sharing of blueprints. While it is likely that larger OEMs (original equipment manufacturers) and Tier 1 suppliers will initially be its primary clients, DMDI’s core interest in commercializing technology could provide opportunities for the formation of new start-up firms housed in a nearby incubator facility.

- The Illinois Manufacturing Lab (“IML”):** Conceived by the state, the IML is designed to help small and mid-sized enterprises (SMEs) learn how to apply new technologies coming out of the DMDI and other research labs through technology demonstrations and consulting engagements. The IML will be collocated with the DMDI, and it is expected that the two organizations will work together to provide a continuum of technology services to the manufacturing community.
- UI LABS:** UI LABS is a collaborative effort between the University of Illinois and Chicago businesses to provide companies with access to university research and development capabilities. It is currently the coordinating entity for both DMDI and IML.


- Chicago Metro Metal Consortium Manufacturing Community:** The U.S. Secretary of Commerce announced in May 2014 that the Chicago area was selected to be among the first 12 communities to be designated Manufacturing Communities, as part of the federal initiative: Investing in Manufacturing Communities Partnership (IMCP). The program is designed to accelerate manufacturing in communities nationwide by supporting the development of long-

term economic development strategies that help communities attract and expand private investment in the manufacturing sector and increase international trade and exports.

Chicago's proposal, which was led by the Cook County Bureau of Economic Development in partnership with more than 20 organizations and municipalities, focused on a Chicago Metro Metal Consortium Manufacturing Community that leverages more than 3,700 firms in the metals cluster. Building on the region's metal base, transportation network, and workforce development partnerships, the consortium proposed integrated investments across six key pillars, including: 1) workforce and training, 2) advanced research, 3) infrastructure and site development, 4) supply chain support, 5) trade and international investment, and 6) operational improvement and capital access. Chicago is now designated as one of 12 preferred regions nationwide that can apply for a share of \$1.3 billion in funding to invest in manufacturing. There is an opportunity herein for sharing of research, technologies and innovation between the Consortium, DMDI and a potential future manufacturing incubator, and jointly applying for federal funds for complementary initiatives.

Chicago Incubators with Manufacturing Start-Ups

As the asset map shows, there are more than two dozen business incubators, accelerators and co-working spaces in the Chicago region. Among these, the Team selected three incubators to profile that appeared to have the clearest focus on assisting businesses with a manufacturing component, each profiled on page 8 and described briefly below.

- **The Incubator at IIT** is focused primarily on commercializing new technology from university labs and has a heavy emphasis on clean-tech, advanced materials and life sciences, with dedicated dry and wet laboratory space. Building to laboratory specifications is expensive, thus construction costs per square foot exceeded \$500 per square foot. The Incubator also holds the "Idea Shop," a 13,000-square-foot maker space that has state-of-the-art equipment including computer visualization tools, a rapid prototyping lab and 3D printing facilities. Companies can leverage student teams to create prototypes needed at various stages of concept development. The Incubator was partially funded by grants from the U.S. Economic Development Administration (EDA) and the State of Illinois, allowing IIT to offer lower rents to tenants. Tenant businesses range from those at the proof of concept stage to others that are producing (by outsourcing to contract manufacturers) and selling to customers at a small scale.
- **Catalyze Chicago ("Catalyze")** is a not-for-profit manufacturing incubator founded by hardware entrepreneurs with an emphasis on refining prototypes of new hardware products and taking them to market. Entrepreneurs are typically using existing technologies to create new products rather than attempting to commercialize a completely new technology. Catalyze uses a membership model where in return for a \$350 monthly fee, entrepreneurs get access to an on-site prototyping shop, educational events, and connections to a network of local manufacturers that can provide contract small-batch production. Catalyze's operators have reached financial stability within two months of operations and currently have 13 members. They have recently doubled in size and moved in to a 6,000-square-foot space, and have plans to eventually expand into a 30,000-square-foot facility.

- **The Fulton-Carroll Center** is a 416,000-square-foot (350,000 square feet rentable) business incubator that opened in the late 1980s after two buildings were acquired with the help of EDA grants. The incubator is managed by Industrial Council of Nearwest Chicago (ICNC), a not-for-profit entity dedicated to economic development by assisting both start-up and existing companies. The Fulton-Carroll Center has a long track record of success as a business incubator. It is currently at about 97% occupancy with nearly 120 tenants and is generating positive cash flow from operations. Approximately 20 tenants are engaged in manufacturing, but ICNC leadership's goal is to increase the share of manufacturing companies at the Center, as existing non-manufacturing tenants graduate out of the incubator, and/or operate a completely new incubator dedicated to manufacturing.

The manufacturers at the incubator are primarily engaged in small-scale production on-site and generally have purchased their own capital equipment. Because the tenants are screened at application for a sustainable business plan, the manufacturing start-ups at the incubator have typically surpassed the prototyping stage and already have a marketable product and a customer base.

ICNC offers a range of business support services and seminars on topics of interest to entrepreneurs. Additionally, ICNC offers flexible lease terms and works closely with start-ups to configure the space to accommodate specialized ventilation, loading or other needs.



The Incubator at IIT



Catalyze Chicago



Fulton-Carroll Business Center

Size	30,000 SF	3,000 SF with plans to expand to 30,000	350,000 SF with plans to expand
Business Structure	University-led, lease space	Non-profit, membership model	Non-profit, lease space
Mission	R&D Spinoff & Commercialization	Product Development	Business Development
Sector Focus	Cleantech, Life Sciences	Hardware Manufacturing	General business but increasing focus on manufacturing
Key Features	Wet and dry lab space, access to University equipment	Share manufacturing equipment, training workshops, networking with contract manufacturers	Small Business Development Center, International Trade Center, Business Employment Services (placement and training)
Source of Operating Funds	Tenant rents	Monthly membership fees	Tenant rents

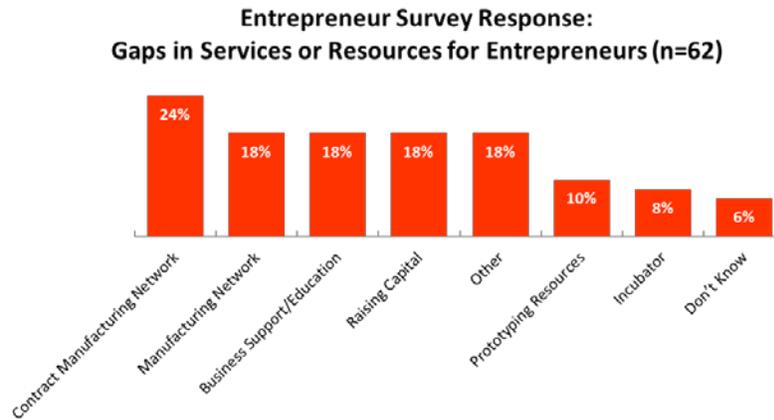
Other Planned Incubators

Several other incubators that may have a manufacturing support component are in the conceptual or planning stages. Information on these potential incubators was mostly gathered from stakeholder interviews; relatively little information is available publicly at the time of this report.

- The Rev3 Innovation Center is a manufacturing incubator that is under development in DuPage County. Sponsored by Choose DuPage, Rev3 will provide shared equipment, business support services, and space for entrepreneurs who are developing and refining prototypes. At the time of this report, a location had not yet been finalized.
- The Health, Technology, Innovation (HTI) at Chicago Technology Park will be a 12,000-square-foot incubator focused on biotechnology. Sponsored by the University of Illinois at Chicago and the Illinois Medical District, the \$3.4 million facility will be funded by a combination of state and university funds.
- An incubator focused on food technology and manufacturing is being contemplated by the Illinois Institute of Technology. The incubator would build off of the existing Institute for Food Safety and Health in Bedford Park, which is a collaboration between IIT, the USDA and the food industry.
- There may be plans to launch an offshoot of 1871 (tentatively called 1872) that would focus on hardware and provide shared equipment for prototyping.

Gaps in Ecosystem

Given the number of entities involved in Chicago's manufacturing ecosystem, it would be unexpected to discover gaps. However, the Team's interviews with key stakeholders and survey of entrepreneurs identified several shortcomings. The survey results are based on responses from a total of 141 entrepreneurs (over 90% manufacturers) who are tenants at existing incubators, including: ICNC's Fulton-Carroll Center, The Incubator at the Illinois Institute of Technology, Catalyze Chicago and Chicago Fashion Incubator. The chart below summarizes the responses received from 62 of the 141 entrepreneurs regarding their perceived lack of services and resources for entrepreneurs. The key gaps identified in the survey responses align with insights obtained from stakeholders and are discussed in greater detail below.

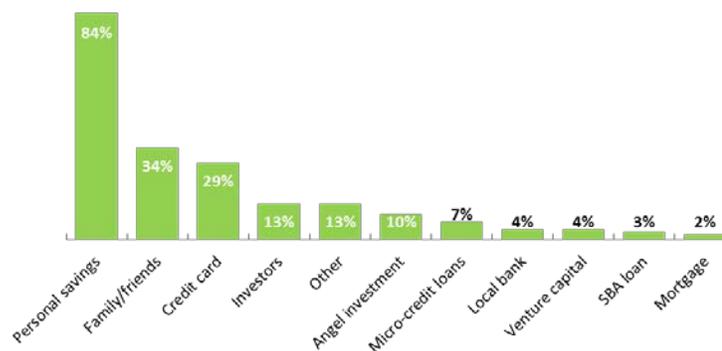


- Fragmentation of the Manufacturing Network:** Several stakeholders mentioned that the scope of the Chicago region’s manufacturing activities is so large and diversified that it is difficult to be aware of the happenings at any given time and even harder to identify a common set of interests among manufacturers. There are tens of thousands of manufacturing firms in the region, and unlike Silicon Valley or Detroit, no one industrial sector predominates. In addition, there are many different organizations and forums addressing various industry sectors and service areas of manufacturing, but there is no central point of communication for the region’s manufacturers. Stakeholders also mentioned that Chicago has a strong design community with global brands like IDEO and Insight, but it is not well-connected to local manufacturers. Twenty-four percent (24%) of entrepreneurs responding to the question on gaps in resources indicated that there was a lack of a network to identify contract manufacturers that would do small-batch production. This is a critical issue to scaling up as manufacturing entrepreneurs typically do not have the capital equipment to produce even small batches of their products for sale to customers. They need access to a network of manufacturers and their capabilities to identify and contract with them in the early stages to achieve their production goals. Additionally, 18% of the respondents indicated a desire for a network to meet, exchange ideas and learn from other entrepreneurs in similar businesses. Incubator operators and stakeholders also underscored the value of face-to-face contact and chance exchanges that lead to collaboration among different types of engineers and entrepreneurs.
- Lack of University Focus and Collaboration around R&D Commercialization:** Many stakeholders pointed to a lack of enthusiasm among Chicago’s major research institutions to engage with each other and the business sector to commercialize research. Most have historically preferred to pursue their own initiatives and refrain from collaboration unless they perceived an opportunity for short-term gain. Illinois universities lag behind their peers in other states in patent generation, producing 11.4 patents per 1,000 doctorate holders between 1997 and 2008, compared to 17.3 in California, 15.5 in Wisconsin, and 13.6 in Michigan.²

² “Illinois schools more innovative, but still trail powerhouses.” Crain’s Chicago Business, August 22 2012. <<http://www.chicagobusiness.com/article/20120822/NEWS08/120829945/illinois-schools-more-innovative-but-still-trail-powerhouses>>.

- Business Support/Education and Prototyping Resources:** Eighteen percent (18%) of entrepreneurs who were surveyed thought there was a lack of business support services, such as affordable legal and bookkeeping resources, as well as education services to assist in starting a firm, learning new manufacturing techniques, and managing finances and workforce. Ten percent (10%) of entrepreneurs were also seeking access to a machine shop or “fab lab” with shared equipment and tools to develop prototypes for their business.
- Raising Capital:** Obtaining capital is a major issue for many manufacturing entrepreneurs—survey respondents overwhelmingly rely on personal savings and loans from friends and family to fund their start-up, while only 13% reported having outside investors. Loans from banks and the Small Business Administration (SBA) play a very minor role in funding manufacturing start-ups, used by less than 4% and 3% of entrepreneurs, respectively. More than a third of survey respondents identified financing challenges in response to the question: “What is the single biggest obstacle to the future success of your business?” Stakeholders also mentioned that funding is difficult for many start-ups to acquire, particularly in amounts below \$2 million. Moreover, the venture capital and angel investor community has traditionally shied away from investing in manufacturing, since it can require a significantly higher upfront capital investment and a longer time horizon than investments in IT. A lack of funding can slow down entrepreneurs considerably, as they are forced to rely on activities to generate cash flow (bootstrapping) or work another job rather than expand their business.

How entrepreneurs finance their business (n=105)



Addressing the Gaps

While these gaps in the ecosystem are barriers to fostering entrepreneurship, there are ongoing efforts to address most of them. Some of these efforts, described below, are still in the concept stage and ultimately, the successful implementation of these efforts will determine how the Chicago ecosystem can be enhanced.

- Creating a Cohesive Manufacturing Community.** The Digital Manufacturing Commons (DMC) conceived by DMDI is envisioned to be a sophisticated “facebook for manufacturing” that will create online networks of people, manufacturing machines and factories, and enable real-time collaboration and analysis of data during the design and manufacturing processes. The DMDI facility itself, which is expected to be a networking hub for manufacturers in the region, and

the DMC, a virtual platform, will provide an opportunity for greater connectivity between entrepreneurs and manufacturers.

Britehub, an online community connecting entrepreneurs with service providers and manufacturers, is also being set up in Chicago in partnership with the City, IMEC, Made in Chicago, Urban Manufacturing Alliance, and Made in Chicago. The goal of Britehub is to enable entrepreneurs to bring a product to market by helping them find industry partners with appropriate production capabilities, materials, processes and capacity.

- **Fostering Collaboration between Universities and Companies.** The DMDI brought together 23 universities, including Chicagoland’s major research institutions, as well as 41 major companies. It has laid the initial groundwork for more regular collaboration between universities on research commercialization and can strengthen the region’s ability to translate university research into innovative, commercially viable products.
- **Developing an Incubator Dedicated to Manufacturing.** While there are incubators in the region with manufacturing entrepreneurs, there currently appears to be only one, Catalyze Chicago, that is entirely focused on manufacturing and provides education/networking services and a prototyping lab catering to manufacturing entrepreneurs at the product design and development stage. However, Catalyze is still relatively small with less than 10,000 square feet of space. Expansion of Catalyze as planned by their operators could enable more entrepreneurs to access these resources.
- **Hosting a Venture Capital Summit.** As previously indicated, WBC is organizing Chicago’s first venture capital summit scheduled to occur in the fall. The goal of the summit is to invite venture capital firms from around the country to meet with various City start-up companies in the technology field. The summit is programmed to include networking events, “pitch” sessions, and one-on-one meetings to venture capital firms. Making the summit a recurring event and specifically attracting venture capital firms that target manufacturing companies is one way to address the funding gap for manufacturing entrepreneurs.

3 Models for a Manufacturing Incubator

The three Chicago incubators profiled in the previous section can be understood as examples of three distinct but partially overlapping models of manufacturing incubators conceptualized in the table below.³

Manufacturing Incubator Primary Models

	R&D Spinoff	New Product Development	Small-Scale Fabrication
Supporting Institutions	University or research institute	Corporate sponsors, University extension, local government	Corporate sponsorship, non-profit affiliate
Focus	Commercialization of research and/or new technology	Development of new products based on existing technology	Expansion of production and marketing
Tenant/Member Profile	Academic researchers, seasoned entrepreneurs, engineers/designers	Engineers/designers, industry veterans	Industry veterans, midlife career change
Typical Legal Structure	Not-for-profit (independent or university)	Not-for-profit or for-profit	Not-for-profit
Location	On or near university campus/R&D facility	Near central city amenities	Industrial district, adjacent to/near highway
Local Example	The Incubator at IIT	Catalyze Chicago	Fulton-Carroll Center
Case Study Example	i-Gate Innovation Hub (Livermore, CA)	Lemnos Labs (San Francisco)	N/A

Source: SB Friedman

All start-ups go through various phases of development, from the initial business concept through business planning and market validation to growth (see **Phases of Business Development** diagram below). Each of the incubator models above specializes in helping businesses at a particular phase:

- **R&D Spinoff Incubators** provide services to companies from the concept stage onward. A critical component of such incubators is collaboration with researchers at R&D facilities or universities that are dedicated to commercializing research or new technologies.
- **New Product Development Incubators** accommodate companies that are developing a business plan, refining their product through prototype development and securing financing. Entrepreneurs in these incubators typically need access to specialized equipment to develop prototypes and eventually, once the prototype is refined, access to contract manufacturers that would be willing to do small-batch production.
- **Business Growth Incubators**, on the other hand, do not typically provide assistance to businesses at the concept or planning stage, but focus instead on companies that are validating their product and entering the growth stage. Businesses in these incubators typically have a

³ These three incubator models were developed based on the characteristics of the three Chicago incubators plus national case study research. Case study profiles are contained in Appendix C of the report.

defined business plan, and are already engaged (or are about to engage) in small-scale production.

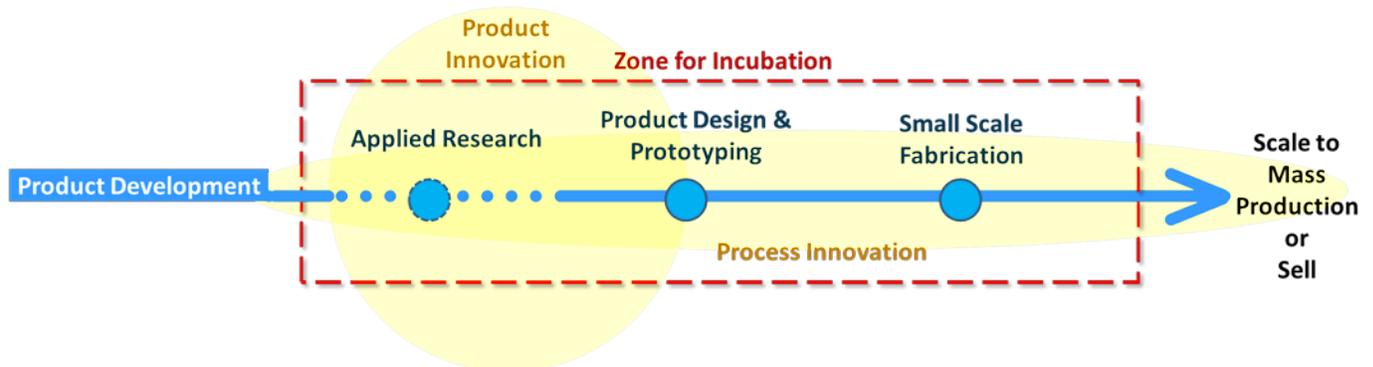
Phases of Business Development



Source: SB Friedman

These phases also correspond to different stages in the cycle of product development, as illustrated below. New products can be developed with existing technologies and processes without the need for applied research or technologies. However, the opportunity for innovation in both product and process increases significantly when product development arises out of applied research or new technologies. Therefore, R&D institutes, such as the proposed DMDI, that have a focus on commercializing research into products and processes that enter the marketplace, can be a crucible for innovation.

Phases of Product Development



Source: SB Friedman

Services Provided by Manufacturing Incubators

While most incubators provide a common set of business support services regardless of model, each model provides more specialized services tailored to the needs of its target entrepreneurs. The typical set of services and advantages offered by each model are outlined in the table and briefly described below.

Manufacturing Incubator Services by Model

	R&D Spinoff	New Product Development	Business Growth
Collaboration between Entrepreneurs	X	X	O
Business/Legal/Marketing Assistance	X	O	X
Flexible Lease Structure	X	X	X
Mentorship	X	X	
Customizable Space	O	X	X
Shared Equipment	O	X	
Engineering/Design Assistance	X	X	
Funding/Financing	O	O	O
Investor Introductions	X	X	
Employee Training Resources		O	O
Supply Chain/Export Assistance	O	X	O
Access to Latest Technology/Research	X		

X = Yes; O = Sometimes/relationship with partner organization

Sources: *SB Friedman*

- Collaboration between Entrepreneurs:** The exchange of ideas was cited by entrepreneurs and stakeholders as a particular benefit of manufacturing incubators, especially at the R&D and Product Development stages. Several entrepreneurs noted that a conversation with their neighbor had yielded solutions to a problem with their product that seemed intractable. Business incubators may hold informal networking sessions to facilitate these conversations, but serendipitous encounters enabled by proximity are also important.
- Business/Legal/Marketing Assistance:** Nearly all incubators help entrepreneurs improve their business plan, provide legal services (or, at minimum, attorney referrals), and assist with marketing plans. R&D and Product Development incubators may provide business or legal assistance that focus more heavily on issues of intellectual property.
- Flexible Lease Structure:** Most incubators allow entrepreneurs the flexibility of a month-to-month lease or membership. This reduces the entrepreneur's risk liability for additional months' rent if their business fails or their space needs change.
- Mentorship:** R&D and Product Development incubators will typically help connect entrepreneurs with engineers and industry veterans with experience and connections (to potential customers, suppliers and investors) relevant to their product.
- Customizable Space:** While Product Development incubators typically provide shared space, both Business Growth and some R&D incubators that cater to entrepreneurs at various stages will often provide a variety of spaces to suit the particular needs of a tenant. This flexibility is especially important in the growth stage, since companies' needs for space can change quickly and dramatically.

- **Shared Equipment:** While the introduction noted that the cost of manufacturing equipment has been decreasing rapidly, a company in the R&D or Product Development stage may need access to a wide range of equipment or specialized equipment. The equipment provided by the incubator may depend on whether it focuses on a particular industrial sector or platform technology that cuts across sectors (e.g., additive manufacturing or CNC machining).
- **Engineering/Design Assistance:** A considerable amount of engineering and design expertise is required to develop a new product whether it utilizes new or existing technology. While an entrepreneur may have expertise in a particular field of engineering, they may require expertise in several different fields to take their product beyond the prototype stage. Consequently, R&D and Product Development incubators often provide assistance with engineering and design, either from in-house staff or through referrals.
- **Funding/Financing:** Some R&D and Product Development incubators directly provide seed capital to entrepreneurs, though this is common only in models that rely on equity participation. More commonly, incubators will assist entrepreneurs with the process of applying for funding from other entities.
- **Investor Introductions:** On a related note, R&D and Product Development incubators often have relationships with investors and can help arrange introductions or meet and greet sessions for entrepreneurs. This may be done on a relatively informal or a competitive basis, although competitions seem to be more common in accelerator programs.
- **Employee Training Resources:** Manufacturing start-ups typically do not have many employees at the business concept or planning stage, but at the growth stage, they may encounter difficulties finding employees with the requisite skills or find that their early employees need to acquire new skills. Business Growth and some Product Development incubators provide classes for employees or referrals to more extensive training services. If the incubator is well connected to state and local workforce programs, these training resources may be available at a significantly reduced cost to the company.
- **Supply Chain/Export Assistance:** Particularly at the Product Development and Business Growth stages, it may be difficult to find high-quality suppliers willing to produce at small volumes. Incubators can aggregate information from tenants to identify reputable suppliers. Also, the fact that incubators house multiple businesses can make suppliers more willing to do small production runs, particularly if the incubator is able to put together a larger purchase order from multiple start-ups. Incubators may also help growth-stage companies learn how to meet certification requirements, procure financing, and put together a marketing plan to enter foreign markets.
- **Access to the Latest Technology and Research:** Because R&D manufacturing incubators are typically affiliated with or operated by universities or other major research institutions, they typically have access to cutting-edge technology, knowledge and equipment.

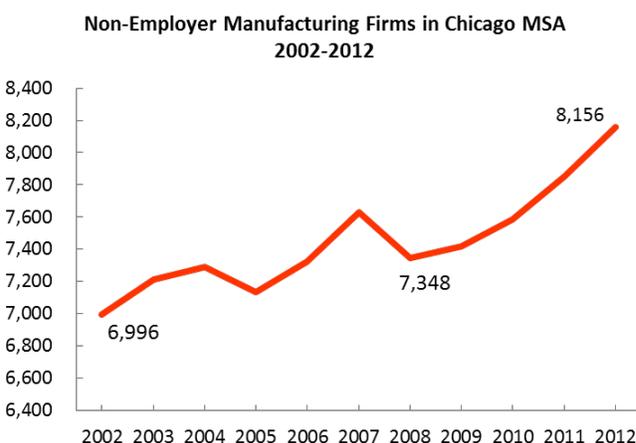
4 Opportunities for a Chicago Manufacturing Incubator

As stated in the previous section, Chicago has a large, diverse ecosystem for manufacturing entrepreneurs, but there are key gaps that may provide an opportunity for a new business incubator focused on manufacturing companies. This section explores several economic indicators to further determine whether enough demand exists to potentially support a new incubator. Based on these indicators and the ecosystem assessment from the prior section, we identified potential incubator models with the greatest potential to meet the needs of manufacturing entrepreneurs and strengthen Chicago's manufacturing entrepreneurial ecosystem.

Indicators of Demand for a Manufacturing Incubator

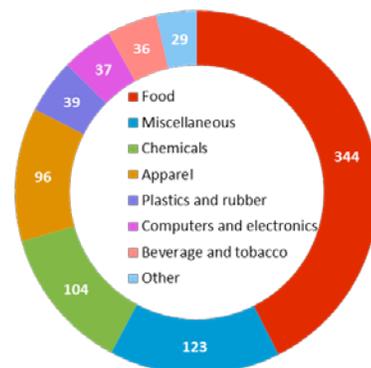
Multiple indicators suggest strong demand for a new manufacturing incubator in Chicago. Each of these indicators is discussed below.

- **Growth in Non-Employer Manufacturing Firms.** Non-employer firms are firms with no paid-employees and typically include entrepreneurs who are starting a business. Therefore, the growth of non-employer firms suggests growth in entrepreneurial firms that could be a source of demand for a Chicago incubator. As shown below, the number of non-employer manufacturing firms in the Chicago MSA has increased by 17% from just under 7,000 firms in 2002 to nearly 8,160 firms in 2012. Since 2008, the growth rate has been faster and has been driven primarily by firms in food, miscellaneous products, chemicals, and apparel manufacturing. While the Great Recession may be responsible for the rise in non-employer firms (as laid-off employees often start new firms), this data is also consistent with the fact that changes in technology, new digital resources and distribution channels are making it cheaper and easier for an individual to start a new manufacturing business.

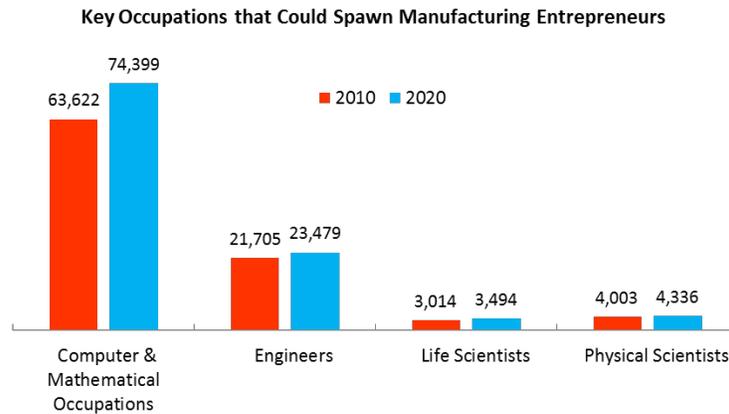


Source: U.S. Census Bureau, Non-employer statistics

Change in Non-Employer Firms in Chicago MSA by Subsector: 2008-2012



- Projected Growth in Occupations that Could Spawn Manufacturing Entrepreneurs.** Manufacturing entrepreneurs are often professionals, including engineers and scientists, who have been previously employed in other companies and want to test their ideas by starting a new company. Employment in key occupations, including computer and mathematical occupations, engineers, life scientists and physical scientists, is projected to grow in Cook County between 2010 and 2020, as shown below. The growth in these occupations suggests that there will be an increasing pool of highly educated professionals that could become entrepreneurs.



Source: Illinois Department of Employment Security

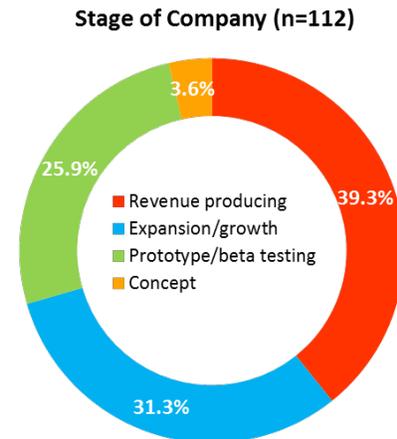
- Game-Changing Research Institutes Opening in Chicago.** Because DMDI will work on new digital technologies and processes with manufacturing partners and members to solve product or process needs, there is expected to be a future pipeline of patents and licenses for technologies for which the industry need/demand has already been established. Experienced entrepreneurs with business acumen can partner with industry experts to commercialize this technology as a start-up.
- Success of Existing Manufacturing Incubators.** Chicago incubators focusing on manufacturing are performing well. Catalyze Chicago reached financial sustainability from an operations perspective within two months of opening and have already doubled their space since opening a few months back. The incubator currently has 13 members, and the co-founders believe there is adequate demand to reach 300 members in a 30,000-square-foot facility within one and a half to two years. ICNC’s Fulton-Carroll Center is also at nearly 100% occupancy. While the goal of ICNC leadership is to attract more manufacturing tenants, this is subject to existing non-manufacturing companies vacating as their leases expire. Additionally, in the past six months since ICNC began tracking tenant applications for space, they received inquiries from 15 manufacturing start-up firms. ICNC leadership believes that there is sufficient demand to potentially start a new business incubator focused on manufacturing.
- Overwhelming Stakeholder and Entrepreneur Support.** An overwhelming majority of stakeholders and entrepreneurs agree that there is a need for a new manufacturing incubator in Chicago. Nearly 94% of survey respondents indicated that there is a need for another manufacturing incubator.

Do you think there is a need for another manufacturing incubator in the Chicago region? n=95



Potential Manufacturing Incubator Model(s)

Roughly one quarter of surveyed entrepreneurs indicated that they are in the prototyping stage, while 39% are producing revenue and 31% are in a growth stage. Only 4% are in the concept stage without a functioning product. While this may reflect the focus of the incubators in which these entrepreneurs are located, the distribution of responses suggests that the Product Development and Business Growth models are likely the most promising models from a near-term demand perspective. In the future, DMDI and IML could be a source of patents and licensed technologies that require a greater focus on R&D Spinoff.



Based on the above indicators and entrepreneur survey responses, it appears that a Product Development and/or Business Growth incubator would best meet the needs of entrepreneurs in the near term, and provide opportunities to leverage existing ecosystem assets and the orientation of various City institutions towards advanced manufacturing. The models and associated economic development opportunities for manufacturing are as follows:

- Product Development Incubator:** This model can leverage Chicago's product design capabilities to launch innovative products that are made here in Chicago. Over time, building linkages with DMDI and IML could create an opportunity for entrepreneurs in the incubator to tap into applied R&D and new technologies. The access to applied R&D and digital technologies would allow the incubator to include an R&D Spinoff component and significantly enhance the potential of the incubator to facilitate the creation of new advanced manufacturing start-ups with innovative new products/processes. However, it will likely be some time before DMDI has developed the infrastructure and portfolio of patents to license technologies to new start-ups.
- Business Growth Incubator:** This type of incubator will enable small emerging manufacturers to scale up without leaving the city.

Rather than be competitive with each other, the two incubator models are synergistic; each provides specialized support at different stages of a company's growth. The City would benefit from both of these incubator models in order to provide a location where entrepreneurs can first refine their prototypes, and then another space in which they can begin scaling up production.

Potential Champions

As part of the Team's survey and interviews, entrepreneurs and stakeholders were asked to identify entities that they thought would be most capable and willing to champion the establishment of a new manufacturing incubator. The entrepreneur survey produced a wide-ranging list of individuals from most respondents, while respondents who were members of Catalyze Chicago mostly mentioned Catalyze or its co-founder, Bill Fienup. Additionally, leadership at local business incubators has expressed an interest in expanding or opening a new manufacturing incubator and potentially serving as the champions for a new incubator. Three potential champions include the following:

- **Co-Founders of Catalyze:** As previously indicated, the co-founder of Catalyze does have plans to expand to a 30,000-square-foot facility, which he would ideally like to be located as close to DMDI and IML as possible in order to take advantage of potential support services and opportunities for entrepreneurs arising out of the institutes' activities.
- **ICNC Leadership:** ICNC's Executive Director, Steve DeBretto, also expressed interest in opening a new business incubator focused on manufacturing.
- **Rev3:** The organizer of Rev3 Innovation Center (located in Du Page County), Neil Kane, indicated that Rev3 would be interested in having an incubator footprint in Chicago while also having a location in the suburbs.

Location

More than half of surveyed entrepreneurs want a manufacturing incubator to be located in or near downtown Chicago. No other area of the city (or suburbs) garnered a significant number of responses, although it should be noted that because the survey was administered to entrepreneurs at three city incubators, most of them are already located within three miles of downtown. Access to transit also appears to be a key factor, with almost 80% of surveyed entrepreneurs identifying it as an important consideration to them.

Based on the stakeholder interviews, it appears that there is a significant opportunity to collocate a manufacturing incubator with DMDI's new facility at Goose Island in Chicago. Collocation would provide tremendous advantages for entrepreneurs at the incubator, including:

- Opportunities to collaborate with experts at DMDI
- Use of resources at DMDI, including supercomputing capabilities, digital technologies, educational resources, and the shop floor (subject to membership fees or other use parameters)
- Opportunities to license cutting-edge R&D and new digital technologies
- Opportunity to be part of the future manufacturing hub of Chicago
- Benefit from the national publicity associated with DMDI

The incubator, in turn, could be an opportunity for DMDI to facilitate the commercialization of new technologies, with the goal of entry of a new product or process into the marketplace.

Capital Financing for a New Incubator

Based on the Team's interviews with the three Chicago incubators and national case study research, it appears that incubators of all types generally cannot cover the capital cost of the facility without external subsidies. However, it is possible for rents or membership fees to cover the cost of operations: both Catalyze Chicago (which has been open for less than a year) and the Fulton-Carroll Center are able to do so, as are three of the four national case study incubators (see Appendix C).

Conclusions

Based on the Team's assessment of entrepreneur demand and the manufacturing ecosystem, it appears that:

- There is demand for one or more manufacturing incubators in Chicago;
- Manufacturing incubators focused on Product Development and Business Growth would be most likely to fill a niche for companies prototyping or entering the growth stage;
- Over time, there will likely be a role for an R&D Spinoff, but that would require establishing a relationship with DMDI and IML;
- There are champions for both incubator models that have experience in operating incubators and have expressed interest in opening a new manufacturing incubator in Chicago;
- There is a tremendous opportunity to collocate a manufacturing incubator with DMDI's new facility at Goose Island in Chicago; and
- Financial assistance will be needed to cover the capital cost of the facility, but operational sustainability can be achieved.

5 Implementation Steps

Creating a new manufacturing incubator will require coordinated efforts between multiple stakeholders in Chicago's manufacturing ecosystem and the public sector. The City's role could be engaging stakeholders, defining the vision of the incubator(s), selection of the operator, framework and location and helping raise initial funds. This section recommends several key steps to gather input and support, find an operator, and define operational parameters.

- 1. Identify one or more champions for manufacturing incubator(s):** The role of incubator champions is to advocate for the creation of the incubator, and work with the City (WBC) in engaging stakeholders. The champion(s) should be an effective advocate for the incubator, have prior success in operating an incubator, and have the industry connections, reputation and knowledge to rally support from a broad cross section of the ecosystem. Members of the manufacturing or entrepreneurship community are often effective champions for this reason.
- 2. Convene stakeholders and local leaders to obtain buy-in for a manufacturing incubator, establish a vision and mission statement, and gain feedback on the potential model and design.** Convening could be orchestrated by the City or WBC, perhaps via the new advanced manufacturing hub and/or other networks seen as credible by the manufacturing community. Consulting widely will help to publicize and establish the legitimacy of the incubator, as well as lay an initial foundation for a network of mentors and investors critical to the success of future incubator tenants. The input should help the City decide whether it should proactively pursue one or two incubators and confirm the type of business model/niche that it is seeking.
- 3. Engage in discussions and/or solicit proposals from potential operators of a manufacturing incubator.** Proposals should include the following key elements:

Qualifications

- Prior experience and success in operating an incubator with manufacturing tenants
- Understanding of manufacturing entrepreneur needs and the innovation/entrepreneurial ecosystem.

Business Plan

- Mission and vision of the entity to operate/run the incubator
- Specific niche to be served – early stage/prototyping and/or small -scale production
- Preferred location options
- Desired facility size and specifications (prototyping labs, shop floor, office spaces, collaboration area, training areas, etc.)
- Type of business services to be provided to entrepreneurs
- Relationships/Availability or connections with an initial pool of entrepreneurs and networks among manufacturers, owners, investors and entrepreneurs.
- Measurable goals and metrics to be tracked
- Entrance and graduation policies

Financing Plan

- Ideas to obtain initial and continuing funding sources for capital costs and equipment
 - Availability of seed money to fund initial years of operations
 - A five-year operating pro forma of the incubator including proposed rents/membership fees
 - Plan to achieve financial sustainability within two to three to five years
4. **Review and select operator.** Proposals should be reviewed and one or two operators should be selected depending on City goals and priorities.
 5. **Define preliminary relationships with key entities in the ecosystem.** Relationships and partnerships that have the potential to be especially significant to the ecosystem in the long term, such as with DMDI and IML, should be explored early with the operator, partner entities and stakeholders so that expectations and roles are defined in advance.
 6. **Explore location options including the opportunity to locate proximal to DMDI.** It is our understanding that the City has several locations in mind for a manufacturing incubator. The incubators should be centrally located (in or near downtown) and accessible by transit. Since there is a tremendous synergistic opportunity to be located proximal to DMDI, the City should consider opportunities to locate the incubator in the same facility or in an immediately adjacent facility.
 7. **Explore financing options including possible public sources of support.** The City's Task Order #2 will provide detailed guidance on potential facilities and sources of financing for a potential manufacturing incubator.

Appendix A: Limitations of Our Engagement

Our report is based on estimates, assumptions and other information developed from research of the market, knowledge of the industry and meetings during which we obtained certain information. The sources of information and bases of the estimates and assumptions are stated in the report. Some assumptions inevitably will not materialize, and unanticipated events and circumstances may occur; therefore, actual results achieved during the period covered by our analysis will necessarily vary from those described in our report, and the variations may be material.

The terms of this engagement are such that we have no obligation to revise the report or to reflect events or conditions which occur subsequent to the date of the report. These events or conditions include, without limitation, economic growth trends, governmental actions, additional competitive developments, interest rates and other market factors. However, we are available to discuss the necessity for revision in view of changes in the economic or market factors affecting the proposed project.

Our study did not ascertain the legal and regulatory requirements applicable to this project, including zoning, other state and local government regulations, permits and licenses. No effort was made to determine the possible effect on this project of present or future federal, state or local legislation, including any environmental or ecological matters.

Furthermore, we neither evaluated management's effectiveness, nor are we responsible for future marketing efforts and other management actions upon which actual results will depend. Our report is intended solely for your information and for submission to City of Chicago governmental entities, economic development organizations, and should not be relied upon by any other person, firm or corporation, or for any other purposes. Neither the report nor its contents, nor any reference to our Firm, may be included or quoted in any offering circular or registration statement, appraisal, sales brochure, prospectus, loan or other agreement, or any document intended for use in obtaining funds from individual investors.

Should a developer or financial institution wish to indicate in an offering memorandum, prospectus or similar document that our firm prepared market and/or financial feasibility analyses regarding this project, the following statement may be used:

“In preparing its development plans and projections, the developer (or sponsor) conducted research and analysis, consulted various sources and obtained studies from third parties including S.B. Friedman & Company. The information, estimates and projections contained in this prospectus are the conclusions of the developer (or sponsor) after consideration of the various sources noted. The developer (or sponsor) alone is responsible for these conclusions.”

To obtain our permission to include this statement in a prospectus, we must be permitted to review the offering materials including, without limitation, the identity and backgrounds of all principals, the description of the project, the market and financial projections utilized, and the text of the materials. We will be compensated at our current hourly rates for the time required to conduct such reviews and to provide our consent.

In no case does this permission include or imply the right to specifically cite the conclusions or recommendations of our report in such a document.

We acknowledge that our report may become a public document within the meaning of the Freedom of Information Acts of the various governmental entities. Nothing in these terms and conditions is intended to block the appropriate dissemination of the document for public information purposes.

Appendix B: List of Stakeholders Interviewed

- 3D Printing Experience
- BriteHub
- Catalyze Chicago
- Digital Manufacturing and Design Institute (DMDI)
- Healthbox
- Heartland Angels
- Illinois Institute of Technology (IIT)
- Illinois Manufacturing Excellence Center (IMEC)
- Illinois Manufacturing Lab (IML)
- Illinois Science and Technology Coalition (ISTC)
- Illinois Science and Technology Park
- Industrial Council of Nearwest Chicago (ICNC)
- Institute for Work and the Economy
- Polsky Center for Entrepreneurship and Innovation
- Rev3 Innovation Center/Choose DuPage
- Sandbox Industries
- Technology Innovation Center
- UI Labs
- World Business Chicago (WBC)

Appendix C: Manufacturing Incubator National Case Studies

Organization Name	Lemnos Labs	Incubator at MAGNET	i-Gate Innovation Hub	Manufacturing Development Center
City	San Francisco, CA	Cleveland, OH	Livermore, CA	Gainesville, GA
Web Site Address	http://lemnoslabs.com/	http://www.manufacturingsuccess.com/	http://www.igateihub.org/	http://www.laniertech.edu/ecodc/
Sector Focus	Automation hardware, sensors, aerospace innovation.	Technology, engineered products or processes with high growth potential	Technology Mix of service and product firm	General Manufacturing; has attracted several medical device companies
Company Stage Focus (e.g., concept/ discovery, prototyping/validation, growth)	Prototyping/validation	Firms with a well conceived concept; may be start-up or in early stages of development	Concept development. prototypes, validation	Prototype validation and growth
Institutional Sponsor/Affiliation		Cleveland State University	Lawrence Livermore and Sandia National Labs	Lanier Technical College
Other Key Relationships		MAGNET consulting services	Robot Garden; Mannex Consulting	GeorgiaTech, University of GA SBDC
Services				
Workspace	X	X	X	X
Shared Equipment	X		Through a partner org	
Business/marketing mentorship	X	X	X	X
Engineering/design review	X	X	X	X
Funding/Financing	Yes, up to \$200K. Typical \$100K/10% equity stake.	Series of small state grants for start-ups. Plus works with foundations and venture funds	Not directly, but through their mentoring program, tenant firms have been able to collectively raise \$10 million from investors in amounts of \$.25 to \$2.5 million	Rapid prototyping with 3D printers and other equipment to test design concepts
Employee Training Resources		X	See Note	Lanier Tech's mission is to train a workforce for local business
Supply Chain/Export Assistance	X	Not specifically	See Note	Can if needed
Investor Presentations/Intros	X	X	X	Selectively
Other (Describe)		A pre-incubation program to help entrepreneurs evaluate the feasibility of their concepts		
Shared Equipment (if Applicable)	<ul style="list-style-type: none"> •Arbor Press •Drill Press •Grinder •Access to nearby machine shop 	•Office equipment	<i>Through Robot Garden</i> <ul style="list-style-type: none"> •Laser cutter •3D printers •Computers with ROS/CAD/CAM •Hand tools and sewing machines 	<ul style="list-style-type: none"> •Access to prototype development center •Three dimension printers

Organization Name	Lemnos Labs	Incubator at MAGNET	i-Gate Innovation Hub	Manufacturing Development Center
Screening Criteria for Entrepreneurs/tenants	Working prototype; relevant experience; technical ability; identified market	Inovative product or process; sound business plan; high growth potential	Valid technology; large enough market to be viable; determination of the team	Marketable concept; a valid business plan; financial resources to last at least one year
Graduation Rate		Two very good graduates over past four years	Just graduated first two companies	97%, 18 firms have graduated in 8 years
Legal Structure	Private for-profit	Nonprofit	Nonprofit	Nonprofit
Revenue Model (Membership, Equity Participation, Lease)	Equity Participation	Above market rents for space; royalty program	Lease	Lease
Funding Source(s) for Incubator Operations	Venture capital (2 rounds)	Royalty program; above market rents for space	Totally supported by local governments, five cities within the Tri-Valley region	Combination of public and private funding but reaching breakeven from revenues generated
Are incubator operations self-sustaining?	Yes, up to \$200K. Typical \$100K/10% equity stake.	Yes / on operations	No	Almost
Year Opened	2012		2010 (2012 "reboot")	2006
Size (SF)	8,000	30,000	15,000	50,000
# of Entrepreneurs	8 to 12 per year	25 currently	5	12
Occupancy Rate	100%	95%	80%	90%
Typical Tenant Duration	6-15 months	18 months for tech firms; 3-5 years for manufacturing firms	15 months to two years	2 to 5 years
Notes	Have established relationships with contract manufacturers who work well with startups	One tenant with large space, other tenants occupy about 70% of space.	Model is exclusively focused on mentoring. Services are tailored to the needs of the entrepreneur, most of which have tech rather than business backgrounds	In addition to space, the business counseling given the firms is the main "value-added" provided by the Center.