

The Maker Economy in Action: Entrepreneurship and Supportive Ecosystems in Chicago, New York and Portland

Executive Summary
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To read the full report, visit <http://www.urbanmakeconomy.org>

As a contributor to the hoped-for renewal of U.S. manufacturing, the **maker movement** commands significant attention and resources, drawing support from the White House, mayors, and growing number of public, private and not-for-profit backers. Emphasizing peer learning and entrepreneurship, the movement promises to place liberating technological advancements (rapid-prototyping technologies, 3-D printing, social media platforms) in the hands of inventors, artisans and entrepreneurs dedicated to the places where they live. But what the maker movement means for work, manufacturing and economic development remains an open question, in part because very little is known about makers themselves.

Our research, funded by the **Ewing Marion Kauffman Foundation** through its Urban and Metropolitan Entrepreneurship research program, provides new information about makers as entrepreneurs. This work fills an important gap: it accounts for makers' motives, goals, and challenges they face in moving from ideas to consumer products. It also reveals the workings of the varied organizations and policies that create and sustain maker-entrepreneurial ecosystems at the urban and regional scale.

Characterizing and investigating the maker economy

To address practical questions of how makers build revenue-generating businesses and help local economies to grow, we focus on maker-entrepreneurs, defined as existing enterprises seeking to integrate the design of new goods and products with their production for sale:

Maker firms integrate design and production in creating goods for sale. For maker-entrepreneurs, production is essential to, and informs, the creative process.

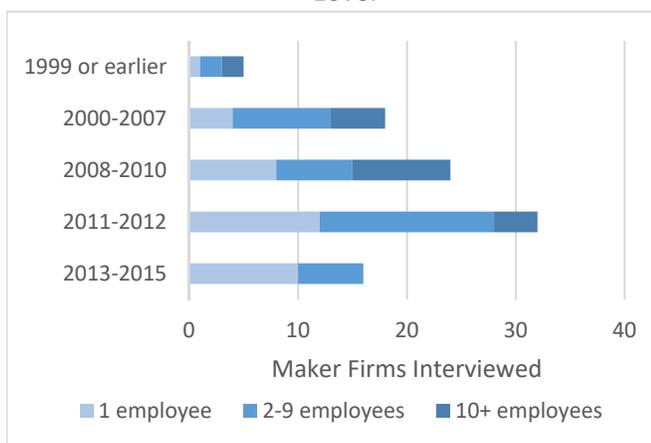
Making draws in a wide range of economic actors, ranging from musicians to software coders. However, we focus on businesses whose products require the inputs and techniques of manufacturing. The output of these businesses falls into three product categories: durable craft goods (“bags”); artisanal food and beverages (“bites”); and products that combine materials and design knowledge with expertise in software and computer-programmable machinery (“bots”).

Typology of Maker-Entrepreneurs

Product Type	Description	# of Firms Interviewed			
		Chicago	NYC	Portland	Total
“Bags”	Durable and/or household craft goods, such as apparel, furniture, and jewelry.	14	18	20	52
“Bites”	Food and beverage products, often produced through artisanal/craft production.	3	13	5	20
“Bots”	Technology-based and/or -embedded objects, such as robots, Internet-connected devices and “wearable” technology.	9	8	5	22
Total		26	39	30	95

Our sample consisted almost exclusively of small businesses.¹ Fifty percent of maker businesses were sole proprietorships, but the average firm had 4.5 employees and just 20% had more than 10. Ninety-five percent of the firms in our sample had been founded since 2000, with fifty-one percent founded after 2010.

Maker Businesses by Year Founded and Employment Level



To capture the ways that makers build businesses in response to distinctive local opportunities and resources, our research is cross-sectional. It encompasses interviews with firms in three cities where the maker movement is strong and growing: New York City, New York, Chicago, Illinois and Portland, Oregon. And because maker-entrepreneurs draw on place-specific design, production, financing and marketing resources, we also interviewed more than 40 firms

¹ For a detailed account of the sampling methodology, see the full report.

and organizations – public, private, and non-profit sector – that work with makers in those three cities. Because many of these maker-supporting firms are entrepreneurial ventures in themselves, we have dubbed this group “maker-enabling entrepreneurs” (MEEs).

Functional Roles of Maker-Enabling Entrepreneurs

FUNCTION	DESCRIPTION	EXAMPLES
TECH ACCESS/ PROTOTYPING	“Makerspaces” where maker-entrepreneurs share affordable access to capital-intensive manufacturing equipment, such as laser cutters, 3-D printers and CNC lathes, allowing them to experiment with designs and prototypes and run small batches of their products. Often membership-based and open to the public, with classes where makers learn how to use technology.	ADX Portland Manufacture NYC Catalyze Chicago
REAL ESTATE/ AFFORDABLE WORKSPACE	Shared spaces in which maker-entrepreneurs can rent workspaces flexibly and inexpensively. Can operate as incubators with focused business assistance and technology access, mission-driven real estate ventures, or as maker-run “collectives” with informal knowledge exchange and mentoring among makers.	Organic Food Incubator, NYC Industrial Council of Nearwest Chicago Tillamook Station, Portland
BUSINESS TECHNICAL ASSISTANCE	Support for maker-entrepreneurs with common business challenges, such as input sourcing, personnel management, branding, and product distribution. Established business assistance organizations and newly created ventures offer the services of experienced manufacturing professionals and business generalists.	Evergreen Exchange, NYC MakerBiz, Chicago Crowd Supply, Portland
FINANCE/ CAPITAL ACCESS	Support for maker-entrepreneurs in connecting with localized networks of deal-makers and investors of risk capital. Includes both venture/growth capital for startup and early-stage businesses, and working capital for established businesses.	New York City Partnership Fund Sandbox Industries, Chicago Craft3, Portland
SALES/ MARKETING PLATFORM	Platforms and venues for maker-entrepreneurs to market their goods and connect with customers locally and globally, including online marketing sites, retail establishments, and fulfillment services.	Etsy, NYC Wolfbait & B-Girls, Chicago Made Here Pdx, Portland
NETWORKING, COMMUNITY- BUILDING, AND ADVOCACY	Support for “soft infrastructure” of peer networks, brand identity and attachment to place. Also advocacy for maker-entrepreneurs in local policy arenas, taking up such concerns as industrial land use and services for emerging manufacturers.	New York’s Next Top Makers (NYC Economic Development Corporation) Portland Made Collective

Findings

1. *Makers generally begin with a focus on products, not markets.*

The majority of the makers in our sample came from art and design backgrounds, and those who did not had often been trained as engineers. Most makers' businesses started as hobbies, design ideas or problem-solving exercises not directly yoked to future plans for business growth and expansion. Further, the firms that maker-entrepreneurs build from the products they create often emerge from deeply held values, whether defined in terms of attachment to place, a response to changing norms of work, a sense of social and ecological responsibility, or new ways of relating with the material world. Makers in the electronics and machinery sectors, for example, focus on the pleasure and ease of relying on open source tools and technology, while makers in the apparel, food and household goods sectors value craft and artisanship.

Being part of a community is important. We all want to be a part of a tribe. Seeing a group of people making things – it makes me proud to be a part of it. Having been in bigger business, I realized that in America, we don't make things anymore. There has got to be a group of people like us to help grow the economy, and to make good use of people's time and energy and money. - Preserved fruits and vegetables company, New York City

2. *A sizable minority of maker-entrepreneurs (**micro-makers**) aspires to remain small-scale.*

As a result of being both product- and values-driven at their inception, many makers enter entrepreneurship reluctantly or as an afterthought. While three-quarters of the makers in our sample expressed a desire to expand or sell their businesses, 23% of firms indicated a preference for maintaining their business at its current size. Many of these makers articulated concern that rapid growth would outpace their skills, resources and values, or that growth would interfere with their attachment to place and the desire to make a difference in local economies.

[Making is] about place, it's place-specific with this benefit of being made here and that to some people that means, 'oh cool American made,' and to some people that means, 'oh cool I like Portland I know what that means.' The specificity makes it more charming. - Electronic equipment company, Portland

Most applique work has been exported to Asia over the years because of the high labor costs associated with it. We are happy to pay extra to do this in house I understand the local multiplier effect that comes from paying someone to do the work in house. - Specialty textile producer, Portland

3. *Maker-entrepreneurs who choose to become **manufacturers** face significant challenges in scaling up*

While some makers are ambivalent about growing, most find a practical need to scale up their activities into full-time businesses. Adding finance, marketing, sourcing, and human resources management into enterprises that had been consumed primarily by design, invention and craft generates a unique set of challenges. To create bigger production runs and cultivate extra-local distribution opportunities requires product re-engineering, supply chain management and a search for suitable real estate. Navigating each of these challenges is complex:

That was a major change, moving from one-off to something that has to be reproducible and cost effective at a larger scale. ...Lots of trial and error... I've been through way more iterations of this device than a more experienced person might have been.

-Temperature control device manufacturer, Chicago

It is hard to find suppliers/vendors that are close by. Most of them are on the outskirts and suburbs -- it's cheaper out there. [We] tried closer ones, but they weren't good fits. The older shops are "trapped in their ways"... [we were] looking for people that were excited for a challenging part/order, but most shops gave the impression that they didn't want to do it.

- Wood products company, Portland

The building where we rent in East Williamsburg is shifting. Most "noisy" companies have gone, and there are more clothing designers and photographers. We are on a month-to-month lease and the landlord has made it clear that he doesn't want us.

-Specialty beverage producer, New York City

4. *Some maker-entrepreneurs, typically those in the hardware and electronics sector, scale up by outsourcing production and becoming **global innovators**.*

A strong link between an animating idea and a physical production process is common to maker firms at the beginning of their life cycles. For about 15% of the firms in our sample, however, the problem of scale-up led to a choice to contract with manufacturers somewhere else, and typically overseas. As a result, the primary activity for global innovators in their cities of origin is design and development, not manufacturing. This occurs partly for cost reasons and partly because of limited supply chain capacity in the United States.

At the beginning, we were doing what you would call final assembly - We would get finished circuit boards and then from another supplier we would order the plastic parts that we needed and we would assemble everything here-- then it expanded. We would really have just manufactured this stuff in the U.S. but it was legitimately really hard at that point to do this. You had really high end guys who wanted to do like specialty stuff or you had people doing the cheapest possible stuff. There was not expertise at doing stuff nimbly and inexpensively...

- Connected device firm, New York City

5. *“Ecosystem” actors in local maker economies attend to the institutional resources and networks that strengthen relationships in both physical and social space.*

Supporting maker-entrepreneurs requires more than simply subsidizing or providing undersupplied inputs.² Maker-enabling entrepreneurs tend to be either private for-profit or private non-profit ventures. Some focus on developing hard infrastructure – supply chains and industrial real estate – while others attend to the soft infrastructure of makers’ peer networks, brand identity and attachment to place.³ Nearly three-fourths (73%) specifically target maker businesses, while the remaining 27 percent work with makers in the context of general business and entrepreneurship service provision. In all three cities, we found intermediaries dedicated to helping makers turn designs or recipes into functional products and deliver them to consumers. For example, the Brooklyn Fashion and Design Accelerator features laboratories in which entrepreneurs can perfect manufacturing techniques and experiment with integrating sustainable best practices in textile and garment design and production. In Portland, the firm Crowd Supply first helps makers generate crowd-funding for first runs of their products and then provides them with ongoing assistance as they plan and operationalize manufacturing processes.

6. *Maker ecosystems grow and expand through entrepreneurship and “self-supply.”*

This research affirms findings by other entrepreneurship scholars that industrial clusters are to a degree self-created by firms.⁴ Crowd Supply and similar for-profit intermediaries stand out for proactively occupying important niches in serving makers, rather than waiting for the public sector or not-for-profit organizations to fill them. Another example is New York City’s American Design Club, which represents and markets the work of artisan makers at trade shows. Etsy, which is headquartered in New York City but serves makers throughout the world, not only serves makers’ need for marketing and distribution channels but helped to fuel the movement’s rise in the late 2000s. This suggests that not every functional role in a maker ecosystem need be played directly by a policy institution.

7. *Like makers themselves, maker-serving organizations often have clearly stated value propositions.*

Many of the institutions of the maker movement, like many maker-identified entrepreneurs, see themselves as agents of larger transformations in work, business and society. Inherent in the maker ethos are several interrelated aspirations or “value propositions.” These include celebrating the distinctiveness of places, particularly cities;⁵ creating jobs; validating a craft ethic;

² Auerswald, 2015; Mason & Brown, 2014; Motoyama, Konczal, Bell-Masterson & Morelix, 2014; Motoyama & Knowlton, 2016.

³ Marotta, Schrock and Heying, 2016.

⁴ Feldman, Francis & Bercovitz 2005.

⁵ See Heying, 2010; Roy, 2015.

and contributing long-term to local and regional economies through the diffusion of technology, knowledge and skill.

8. *Maker ecosystems thrive in dense urban environments.*

While commercial and industrial space, taxes, and business services usually cost more in cities, those high costs are offset by the benefits of urban density: institutional thickness, the presence of early adopters, access to consumers with disposable income, and support from socially conscious consumers striving to support local wealth accumulation and environmental stewardship. Urban locations, particularly in the one-time industrial centers of New York, Chicago and Portland, also help makers build the knowledge and relationships that enable them to undertake the production of manufactured goods or to navigate the complex world of contract manufacturers. The presence of peer producers is critically important. Organizations that succeed in helping maker firms capitalize on proximity to other makers and manufacturers are key to local ecosystems' success. As the President and CEO of the Brooklyn Navy Yard Development Corporation explains:

Collaborations happen all the time...We have woodworkers and metal workers who have different expertise and equipment, but someone is building a table that requires metal – and their woodworker literally goes down the hall. They know all of their neighbors and who can bend the metal this way and not that way – whatever it is that they need. Our artists actively partner with our industrial businesses. We have a company that specializes in sandblasting the surfaces of metal or glass – they can etch extraordinary stuff in these materials. They can etch 3-D images that look nearly photograph quality into glass – they partner with everyone here.

9. *Makers need affordable industrial space, but not necessarily makerspaces.*

Discussions of the maker movement focus heavily on the role played by makerspaces. As places in which hobbyists and hackers, fledgling firms and more experienced entrepreneurs have the chance to access shared equipment and interact with one another, makerspaces such as Portland's ADX, Chicago's Catalyze and New York City's NYC Resistor and Staten Island Maker Space are important institutions. Bill Fienup (who has also launched two hardware companies) speaks to the social learning and partnership-building functions of Catalyze:

As we built this initially, we thought sharing the tools was going to be best benefit, but what we saw was that the community was so much more important. Being able to sit next to an electrical engineer is amazing and an industrial developer, and an iOS developer. Just having all those skills, those are the skills I needed to build this but didn't have.

It is important to recognize from a policy perspective, however, that makerspaces are not heavily utilized by maker enterprises, especially once they have fully commercialized. More important is affordable real estate that allow maker businesses to survive in expensive markets.

10. Local maker ecosystems reflect and build upon bases of knowledge and skill specific to individual regional economies

Economic geographers have identified the importance of path dependence and place-based technical and technological specialization in regional development. The findings of this study substantiate that significant ecosystem variation among “maker cities” in the United States derives from geographically embedded cultural, institutional, and industrial legacies. In Chicago, hardware and electronics entrepreneurs are a major category, while the balance in New York City and Portland tips more toward craft and artisan makers. New York City’s historic specialization in food is evident, as are Portland’s origins in the wood products and metalworking sectors. Ecosystem institutions in each city target the dominant maker-entrepreneur populations.

Implications for policy

Maker firms benefit from standard entrepreneurship policies, sometimes directly and sometimes indirectly. But maker-entrepreneurs stand out for their connection to the re-emergence of the U.S. manufacturing sector, and their importance in shaping both the perception and the reality of that re-emergence. Making carries the rare potential to convert individual innovation to local regional, and national economic growth and job creation. It is important to bear in mind, however, that different types of makers have different goals, different barriers to expansion, and varying potential to stimulate economic development. As a result, each of the three types of maker firm identified in this study benefits from a distinct set of policies:

1) Micro-makers

Nearly one-quarter of the makers we interviewed have no desire to grow or sell their businesses. They impact the regions in which they work, primarily because they influence their peers, promote household prosperity and contribute to quality of place – these makers do not employ large numbers of workers or spend hundreds of thousands of dollars annually on inputs. Our findings point to two areas where policymakers can intervene effectively:

- **Facilitating access to peer mentoring.** Micro-makers are likely to value making as an end in itself, and as a source of identity and social purpose. These businesses are well-served across their life cycles by community institutions, including makerspaces.

- **Initiating and supporting efforts to promote financial security for entrepreneurs in the gig economy.** Micro-makers can benefit profoundly from the broadening of the social safety net for people who are self-employed. Universal health insurance has recently been made more accessible through the Affordable Care Act, but similar benefits pools can be established that help entrepreneurs weather shocks and downturns and enable them to more easily save for retirement. The micro-makers we interviewed also expressed a need for free or low-cost resources that help them to comply with regulations, enforce contracts, keep current with skills and technology trends, and engage in personal and business financial planning. Many of these policy supports appear in Etsy's "Five Proposals to Support the Emerging Maker Economy," which describes these interventions in greater detail.⁶

2) Emerging place-based manufacturers

Nearly two-thirds (64%) of the businesses in our sample were either growing or attempting to grow. These businesses represent a cohort of actual and potential manufacturing firms. Yet unlike global innovators (see below) they intend to maintain some or all their production capacity – certainly final assembly – in or close to their place of origin. Our data suggest that public policy can help maker-entrepreneurs mature into manufacturing enterprises by:

- **Ensuring broad-based access to scale-up resources.** As noted above, moving from prototype to batch production involves a set of capacities that few makers initially possess. This presents opportunities for other entrepreneurs (whether in the private, non-profit or for-profit sectors), who can help aspiring makers to prototype, commercialize, market and distribute products. Makerspaces are often part of the infrastructure that initially helps place-based manufacturers to launch, but they tend to fade in importance as firms scale up. In policy terms, this means complementing a focus on the narrowly defined services makerspaces can provide with support for affordable production space, debt relief, workforce development and other services that lie beyond the capacity of organizations targeted to the needs of start-up firms.
- **Providing high-quality municipal services.** Just as commercial businesses rely on safe, clean business districts where people and goods can move freely, so do manufacturers. The emerging place-based manufacturers in our study placed value on high-quality transportation and sanitation services in the industrial areas where they have set up shop. They also looked for consistency and transparency in the enforcement of environmental and other small business regulations, including zoning enforcement to ensure that manufacturing is not priced out by more lucrative uses.

⁶ https://blog.etsy.com/news/files/2014/06/MakerEconomyPaper_0617.pdf

- **Sponsoring or facilitating place-centered marketing.** Makers who are scaling their businesses often have little time for marketing and customer development. “Made In _____” campaigns, whether sponsored by city governments or by trade or advocacy organizations, build demand and generate orders.⁷
- **Helping firms build connections to input suppliers and contract manufacturers.** When emerging place-based manufacturers source inputs locally or use contract manufacturers in their cities and regions, their economic multiplier effect is amplified. Public or mission-driven referral services and exchanges can add this value.⁸
- **Maintaining a stable real estate environment.** Some interviewees in this category pointed to an irony of growing enthusiasm for the maker movement: increased instability in the real estate climate. Where the term “maker” has come to encompass firms that are commercial rather than industrial, it accelerates a process by which office-based enterprises employing professionals crowd out production-based enterprises.⁹ Firms and advocates point to a need in many of the most vibrant maker cities for an acceleration in non-profit multi-tenant industrial development.¹⁰
- **Promoting debt-minimizing educational opportunities.** A surprising number of the makers in our sample pointed to the absence of student debt, or limited student debt, as a major factor allowing them to make the leap into entrepreneurship.

3) Global innovators

These growing makers (about 15% of our sample) started similarly to the other two types, with an idea for a material product and a desire to produce it themselves. But while they perhaps relied originally on shared tools and space or local distribution outlets, their primary local activity is now design and development, not manufacturing. To manufacture products, global innovator makers contract with external firms, usually in Asia. These maker companies typically have venture capital funding, have been acquired, or are looking to be acquired.¹¹

⁷ See Urban Manufacturing Alliance 2013 (<http://urbanmfg.org/uma-content/uploads/2013/05/UMA-Local-Branding-Toolkit-Final1.pdf>)

⁸ See Urban Manufacturing Alliance 2015 (<https://vimeo.com/136939100>)

⁹ See Tarry Hum, <http://www.metropolitiques.eu/The-Hollowing-Out-of-New-York-City.html>.

¹⁰ See Urban Manufacturing Alliance 2014 (<http://urbanmfg.org/uma-content/uploads/2013/03/NonProfitRealEstateDevelopmentToolkitFINAL.pdf>)

¹¹ A notable phenomenon in the universe of hardware startups is the emergence of investment firms, founded by successful hardware entrepreneurs or larger companies, that help new hardware makers incubate, prototype and commercialize new products while providing them with start-up financing and taking an equity stake. Examples include Y Combinator, Bolt, and Highway 1. Firms incubated in this way typically go directly to contract manufacturing after developing a prototype in a hands-on setting.

Global innovators need what all urban creative and professional businesses need: transparent and consistent local regulations, responsiveness from departments in charge of providing basic infrastructure, and amenity-rich residential neighborhoods to attract highly mobile professional talent. But public policy for this type of enterprise is not, ultimately, maker-specific; it is standard business climate policy. Policy makers should welcome and support global innovators – firms that started as makers but which are now properly classified as research and development operations. They are unquestionably vital components of urban maker entrepreneurial ecosystems. Nevertheless, enthusiasm for global innovators should not be permitted to obscure the needs, or the potential, of makers who are creating production jobs.

Conclusion

This study, a first-of-its-kind in its direct investigation of maker-entrepreneurs, provides much-needed detail about firms and production ecosystems in three cities where the maker movement is strong and growing. Studies of other “maker cities” will continue to fill important knowledge gaps – especially studies of cities and regions where entrepreneurs and policy makers are attempting to build maker ecosystems without the advantages of density, concentrated human capital, and industrial diversity that characterize the cities studied for this report. Research that informs public policy – both entrepreneurship policy and manufacturing policy in the context of local and regional economic development strategy – is particularly important as mayors and city councils across the U.S. begin promoting the maker movement in their cities.

Our research highlights the heterogeneity of makers, and thus the varying means and ends of their potential contributions to regional economic development. Dealing capably with this unevenness in what makers do requires especially thoughtful policy approaches. *Micro-makers'* impact lies with promoting household prosperity and quality of place, and in enabling creative people to contribute to the economy outside of the boundaries of traditional corporate enterprises. *Global innovators'* principals began as maker-entrepreneurs, but their primary local activity is now design and development, not manufacturing, and their need is for high standards in business climate policy. *Emerging place-based manufacturers* have the greatest potential to drive local economic development, because when firms source inputs locally or use contract manufacturers in their cities and regions, their economic multiplier effect is amplified. Firms in this group benefit from place-centered marketing, strong connections to input suppliers and contract manufacturers, help with the unique challenges of scaling up production, and actions to promote affordable space and stable real estate environments.

Another area in which knowledge is needed relates to the potential for maker enterprises to become a source of employment for traditionally excluded and marginalized residents of urban areas. Renewed interest in and attention to manufacturing policy in the United States—whether manifested in the President’s announcement of a manufacturing revitalization strategy or in local governments’ embrace of the maker movement—is premised in part on the presumed role of the sector in creating new blue collar jobs with middle class earnings profiles. But the current

demography of the business side of the maker movement – dominated by college-educated workers and aimed at affluent consumers – suggests that the inclusion of disadvantaged populations is not automatically occurring. Efforts to link the local development potential of maker-entrepreneurship with opportunities for middle class job creation are thus worthy of further study.

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