

A black and white photograph of the Chicago skyline, featuring several tall skyscrapers and a bridge over a river. A teal-colored rectangular overlay is positioned in the center of the image, containing the title and authors' names.

MAKING DIVERSE ECONOMIES

A STUDY OF LOCAL MAKING AND
MANUFACTURING IN CHICAGO

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July 2018

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Acknowledgements

We would like to thank Chicago Mayor Rahm Emanuel and Milan Mayor Giuseppe Sala for initiating the partnership between IIT Institute of Design and Politecnico di Milano. Additional thanks to their staff for their help and support for the the project.

At the IIT Institute of Design, we would like to thank Dean Denis Weil for his support of this project as well as the faculty, staff and students that participated in this project over the course of the year. We would like to thank Theresa Lafranchise, Urba Mandrekar and David Pollack for their participation in the "Made in Chicago" project in Spring 2018. We would also like to thank the many people throughout Chicago that participated in the interviews and workshops over the past year.

At Politecnico di Milano, we would like to thank Dean Luisa Collina and Deputy Dean Francesco Zurlo. We would like to thank Carla Sadini and Vanessa Monna for their ongoing collaboration on the "Made in Chicago / Made in Milan" project.

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Executive Summary

Executive Summary

Many current governmental efforts to drive economic growth focus on how emerging technology, innovation and entrepreneurship can be harnessed as powerful economic engines for cities, states, and other municipalities. This Fourth Industrial Revolution¹ highlights the intersection of physical, digital and biological developments as powerful economic forces to be harnessed for the benefits of citizens. In **Chicago, this push to reinvent the economy for the 21st century has centered on emergent innovation spaces** such as 1871, UI Labs, and mHUB – which focus on coworking and start ups, digital manufacturing and digital fabrication respectively.

These initiatives, however, are often disconnected from the specific needs and concerns of low-wage workers who seek to improve their lives, economic security, and working conditions. **The tension inherent between governmental emphasis on innovation and technology as economic solutions, and the daily struggles of low-wage workers, raises important questions:** How might Chicago's economy evolve to support more pluralistic modes of making and manufacturing in the future? How might

production, consumption and ownership be transformed to support local and cooperative economies linked to global markets? How might principles of social and economic justice be embedded into these complex economic systems?

In order to better understand these questions, IIT Institute of Design sought to map and understand the ecosystem of making and manufacturing in Chicago's economy in a project called "Made in Chicago." Over the past year, Associate Professor Laura Forlano and a team of design students sought to approach these questions using qualitative research and design methods: secondary research, ethnographic observations and qualitative interviews, in addition to participatory design workshops in order to engage a range of stakeholders. **This report reflects that work and proposes design interventions—from preferable futures to high impact solutions-- intended to inform future prototypes and experiments as points of departure for creating new models to support the development of a diverse, local cooperative economy around making and manufacturing.**

The three key themes on which we based

our recommendations are: 1) Making/Unmaking as a Means; 2) Connected Siloes; and, 3) Diverse Local Economies. First, with respect to Making/Unmaking, we analyzed three distinct modes including making as product and business development, making as organizational innovation and making as inquiry, knowledge and learning. Second, with respect to Connected Siloes, we described with ways in which the city thrives on its connections but it is still hindered by structural disconnections. Third, with respect to Diverse Local Economies, we discussed the need to both diversify the making and manufacturing sector in terms of production, distribution and ownership models, and in terms of who participates in and benefits from the economy. Specifically, If we seek to serve society equitably, we must deliberately build social and economic justice into all of our policies and systems from the beginning.

Our design interventions outline and envision long-term preferable futures as well as high-potential solutions for specific needs. For prototyping long-term preferable futures, we propose a “living laboratory” for experiments in more diverse, cooperative local economies including: 1) Supporting Activities around Maintenance, Repair and Care (rather than constantly innovating “the new”); 2) Creating Cooperative Ownership Models; and, 3) Building More Diverse and Just Economies. In response to specific needs identified through our interviews, we propose the following high-potential solutions: 1) Supporting Greater Access to Professional Services; 2) Developing New Resources for Local Manufacturers; and, 3) Partnering with Community Organizations.



Introduction

Introduction

Many current governmental efforts to drive economic growth focus on how emerging technology, innovation and entrepreneurship can be harnessed as powerful economic engines for cities, states, and other municipalities. This Fourth Industrial Revolution² highlights the intersection of physical, digital and biological developments as powerful economic forces to be harnessed for the benefits of citizens. In Chicago, this push to reinvent the economy for the 21st century has centered on emergent innovation spaces such as 1871, UI Labs, and mHUB, which focus on coworking and start ups, digital manufacturing and digital fabrication respectively.

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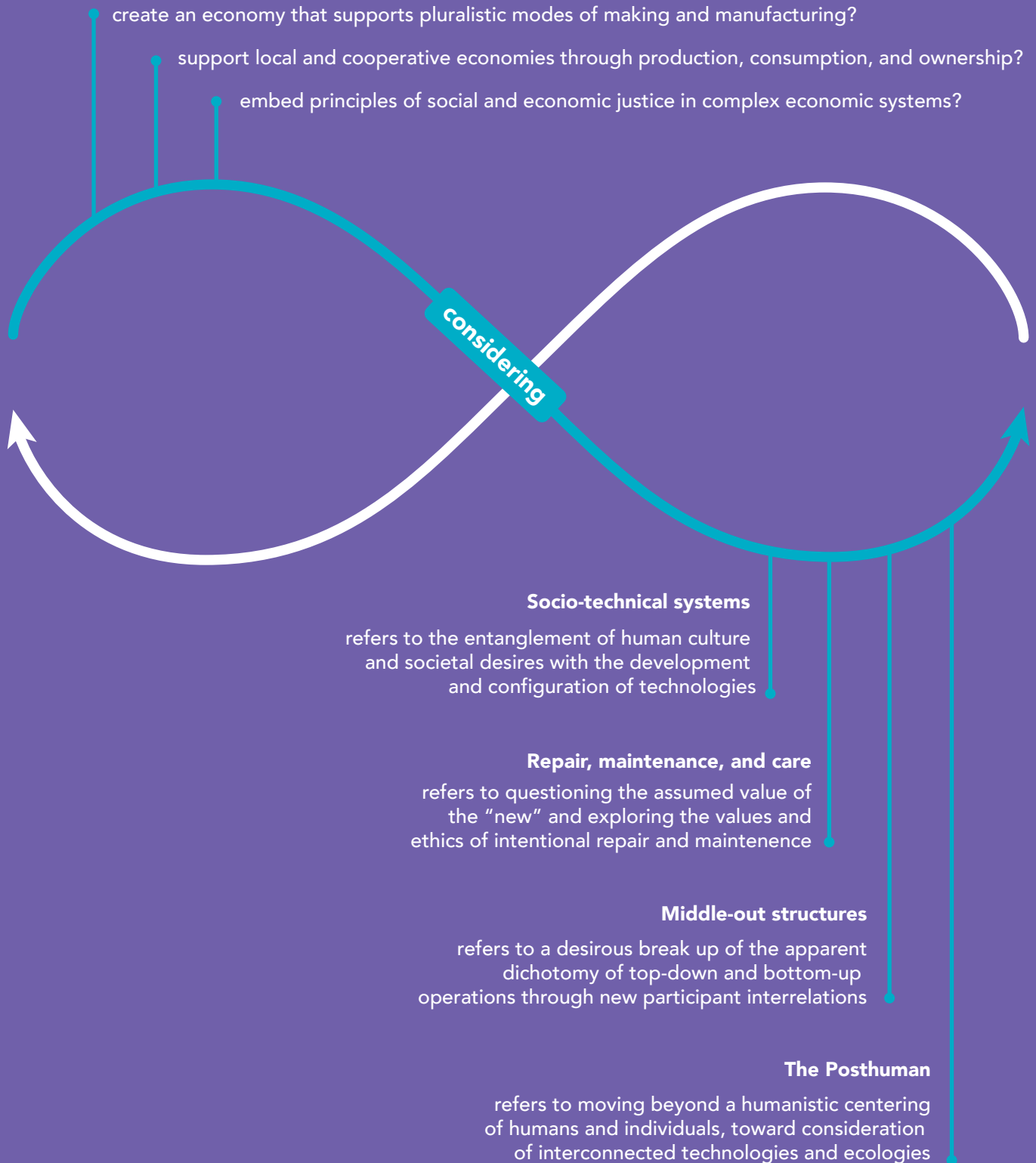
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This project began through an institutional

partnership between IIT Institute of Design (ID) and Milan Polytechnic. As part of the Sister City relationship between Chicago and Milan, in July 2017, Chicago Mayor Rahm Emanuel and Milan Mayor Giuseppe Sala voiced their support for higher education partnerships between the two cities.³ At the press conference, Dean Denis Weil of

the Institute of Design at Illinois Institute of Technology and Dean Luisa Collina of the Milan Polytechnic signed a memorandum of understanding (MOU) supporting collaboration between the two universities. This project is evidence of the first year of cooperation between the two schools.

How Might We...





Methodology

Methodology

This project builds on an earlier project called “Reimagining Work” that was conducted by Laura Forlano and Megan Halpern with support from the Open Society Foundations in 2014. In order to address the research questions, this project used secondary research, ethnographic observations at 7 field sites, and qualitative interviews with 16 individuals and/or organizations. We interviewed makers, manufacturers, managers, designers and leaders in the social and economic justice community. The team participated in public events at MHub, UI Labs, the Newberry Library, and other institutions, to gain context. In keeping with the norms of social science research, all interviews were anonymized. The interviews were transcribed.

In addition to drawing on qualitative research, the project incorporated design approaches

of participatory and speculative design. This moved the project beyond a descriptive and analytical approach towards one supporting experimentation and imagination. The team organized and conducted two short participatory design workshops in February and April, engaging stakeholders from government, non-profit organizations, and members of the making and manufacturing communities.

Finally, the team used a comparative international approach. The Chicago and Milan teams worked together on a weekly basis from January to June 2018, reviewing secondary literature, identifying key themes, developing research questions and selecting field sites. In April, the Milan team flew to Chicago to participate in a site visit and in a workshop. The Chicago team participated in a conference and workshop in Milan in June.





Background

Background

In his well-known book *Nature's Metropolis*, historian William Cronan describes the ways in which technological, social, economic and natural systems worked together to produce the city of Chicago. According to Cronan, Chicago did not become a great metropolis because of optimal geographical systems but rather because of the transportation technology of the railroad, built and maintained to serve the social and cultural desire to move westward, driven by speculative real estate and business interests.⁴ Today, over 180 years later, Chicago's future is being crafted through a similar interplay between socio-technical, economic, and natural systems.

Many in the business world have dubbed this moment the "Fourth Industrial Revolution" in order to highlight the blurring of physical, digital and biological technologies, which are believed to bring about new potential for economic growth. However, against the backdrop of excitement for new technology, even the boosters of this so-called "revolution" are aware of the need to consider who technology serves, and address existing structural inequalities. For example, according to Klaus Schwab, the founder and executive chairman of the World Economic Forum,

We must develop a comprehensive and globally shared view of how technology is affecting our lives and reshaping our economic, social, cultural, and human environments. There has never been a time of greater promise, or one of greater potential peril. Today's decision-makers, however, are too often trapped in traditional, linear thinking, or too absorbed by the multiple crises demanding their attention, to think strategically about the forces of disruption and innovation shaping our future.

In the end, it all comes down to people and values. We need to shape a future that works for all of us by putting people first and empowering them. In its most pessimistic, dehumanized form, the Fourth Industrial Revolution may indeed have the potential to "robotize" humanity and thus to deprive us of our heart and soul. But as a complement to the best parts of human nature—creativity, empathy, stewardship—it can also lift humanity into a new collective and moral consciousness based on a shared sense of destiny. It is incumbent on us all to make sure the latter prevails.¹

Schwab says that we are entering a new era of production where talent, not capital, is the critical factor for success. Structural inequalities will be exacerbated by this new era, he says, unless leaders create a vision for technology and industry intended to serve people, rather than just use them. Schwab's framing of key terms such as disruption, innovation, values, empowerment and empathy are all up for debate, but for the purpose of this report, we agree that it is currently imperative to rethink the ways in which technological, social, economic and natural systems are intertwined in order to create alternative possible futures that benefit the greatest number of people.

According to the Open Society Foundations, some view technology as responsible for inequalities created between less-educated workers, whose jobs are being transformed and, sometimes, completely automated, by computers, and more educated workers, whose creative and non-routine work is secure in demand, pushing formerly middle-class workers to low-wage jobs. Other view rising inequalities as the work of economic policy, as policy steers what is possible in industry, and thus steers the realities

of industry, technology, and workers. The report concludes that "the weak position of the American worker today is enabled by technology and is clearly also a matter of political will and political choice."⁵ We align more closely with the latter view, which accounts for the interplay of complex socio-technical systems that are shaped both by technology and by social, political and economic choices.

Manufacturing in the United States

The United States produces 21% of manufactured products in the world followed by Japan with 13% and China with 12%.⁶ According to the National Association of Manufacturers, U.S.-manufactured goods exports have quadrupled over the past 25 years, and, if considered independently, the US manufacturing economy is the 9th largest economy in the world.⁷

High production numbers do not correlate with higher employment, however, since boosts in production are most commonly achieved by cutting jobs or wages.⁸

According to the Aspen Institute, jobs in manufacturing represented just 8.48 percent of US employment, its lowest ever, a decline

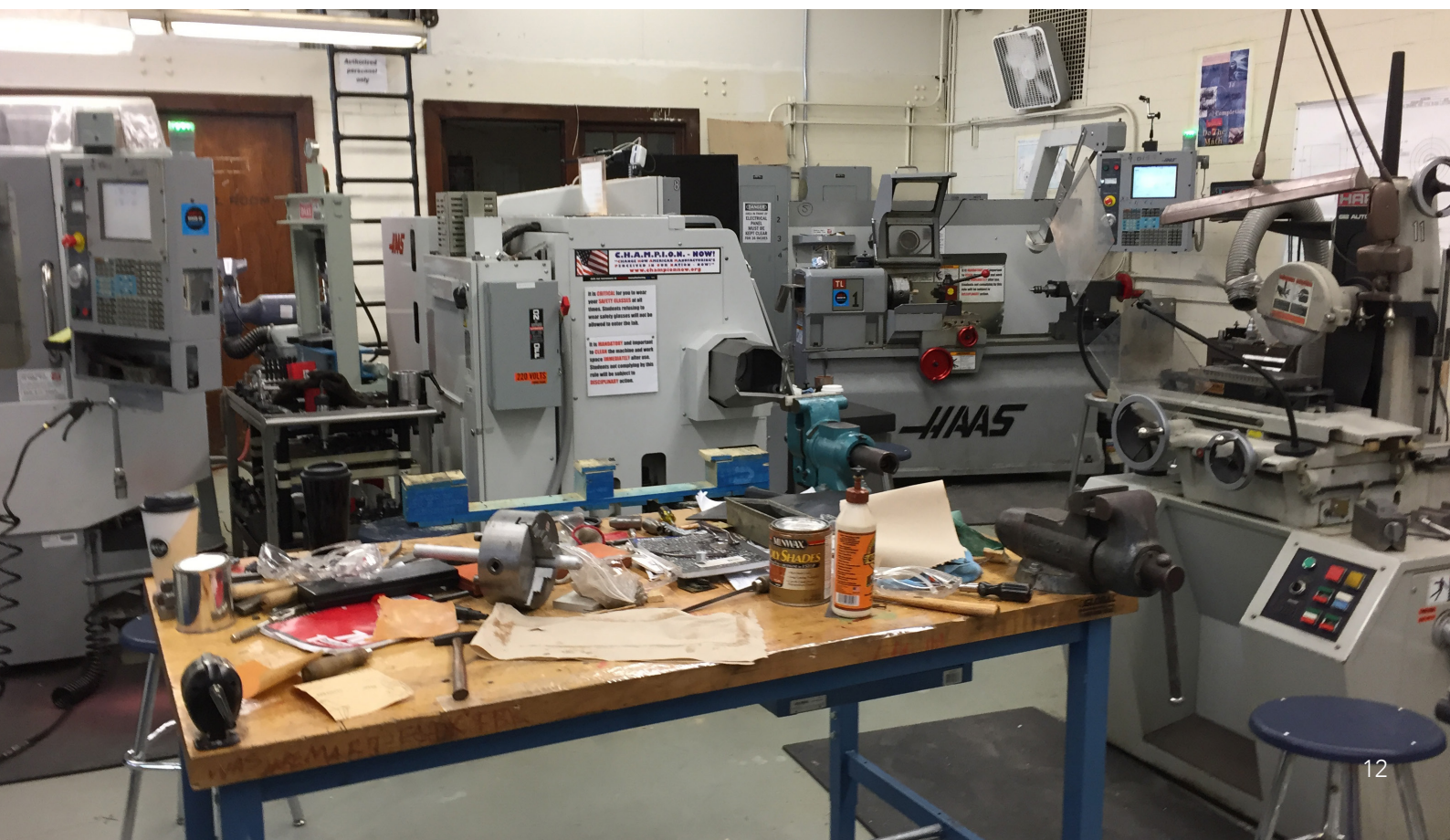
correlated with growing income equality.⁹ Job losses in manufacturing have exceptional economic impact because manufacturing jobs are understood to have a multiplier effect ranging from 1.5x, all the way up to 16x job creation for each manufacturing job.¹⁰

According to the The Century Foundation, contemporary production no longer requires large numbers of middle-class workers. "Nearly half of American front-line automotive manufacturing workers make less than \$15 an hour, and many manufacturers employ workers through staffing agencies which leaves workers with lower wages, reduced benefits and little job security."¹¹ On the other hand, high-tech, education-intensive advanced manufacturing jobs offer

significantly higher wages.

Manufacturing "is the primary source of global innovation and trade...More than two-thirds of research and development, and patenting, come out of the manufacturing sector," said Amy Liu, co-director of Brookings' Metropolitan Policy Program.¹² "In order for the U.S. to continue to be on the cutting edge of global economic growth, we have to be at the forefront of innovation."

According to a 2016 report by Manufacturing USA, an initiative of the US Department of Commerce, an estimated 2 million advanced manufacturing jobs go unfilled annually due to lack of available talent.¹³ In 2016, 80% of manufacturers reported a moderate or serious shortage of qualified applicants,



which is commonly referred to as the “skills gap.” In addition, currently, factory owners are aging out of the workforce en masse, creating potential labor shortages numbering in the millions, which is commonly referred to as the “succession gap.”¹⁰ Specifically, it is not uncommon for factory owners to retire without a successor and, with little alternative, shut down entire plants, erasing however many jobs from the economy in the process. In short, American manufacturing is constrained by the realities of the local talent pool, education infrastructure and aging workforce.

Chicago’s Making and Manufacturing Ecosystem

Chicago is at the crossroads of industrial supply chains, situated at the center of shipping, rail, road, and air infrastructure. Because of this, Chicago supports a concentrated, diverse manufacturing ecosystem. Chicago’s second highest-grossing industry is manufacturing; it added ~\$54 billion to the Gross Regional Product (GRP) in 2014. Manufacturing pumps \$6.4 billion in direct wages into the six-county region including and around Chicago.¹⁴ However, Chicago lost 3,000 of its 7,000

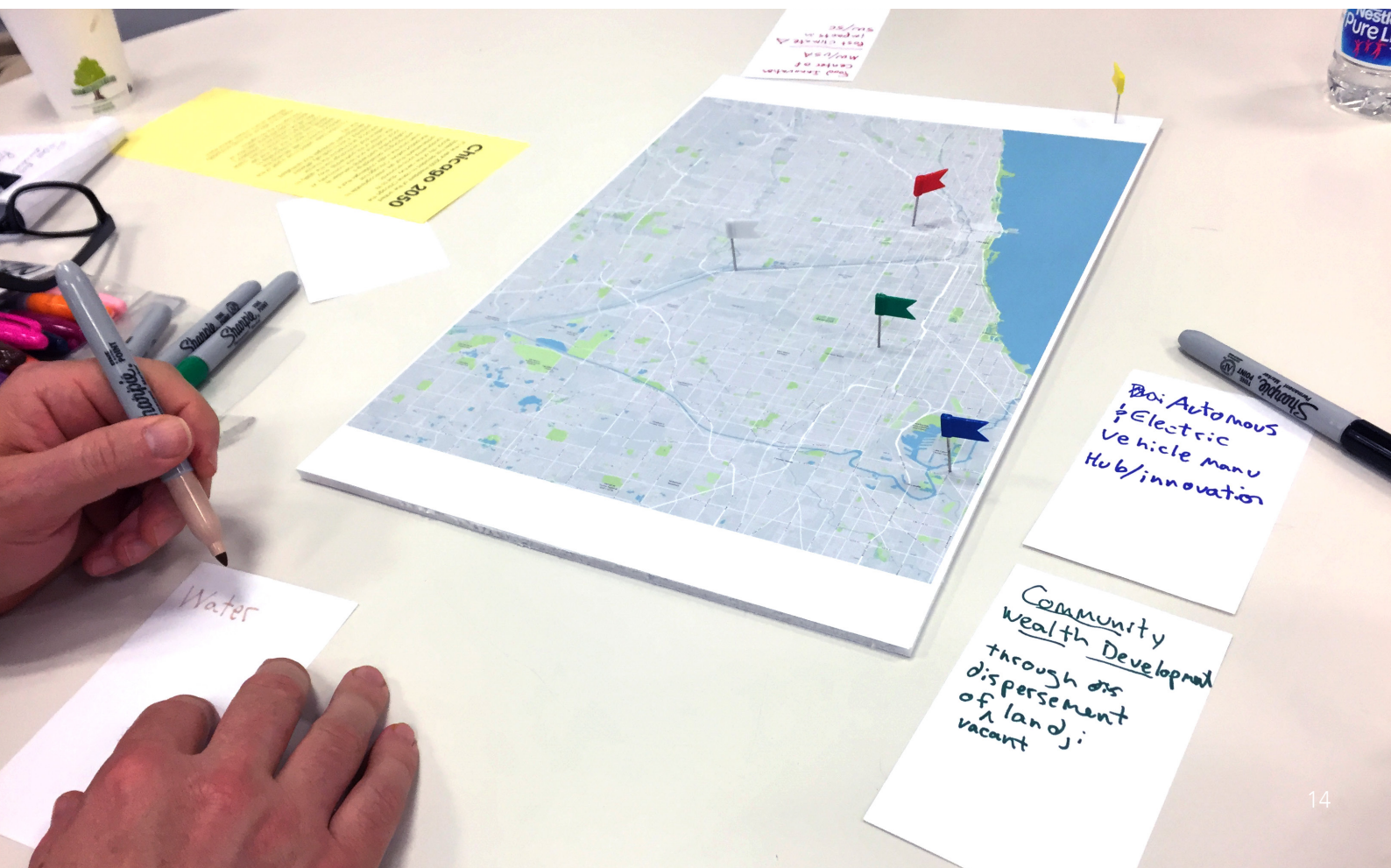
factories in a wave of deindustrialization in the 1980s, translating to 150,000 lost jobs¹⁵ and lost 36% of remaining jobs between 2000 and 2010.¹⁶ In 2010, more highly-paid advanced manufacturing jobs with average salaries of \$76,011 to \$89,813 made up 11% of Chicago’s manufacturing job economy.¹⁷

In Chicago, non-profit organizations are doing important work to bridge the skills gap and navigate the succession gap in the future. For example, organizations such as Manufacturing Renaissance and the Jane Addams Resource Center are training people to earn nationally-recognized advanced manufacturing credentials in skills such as CNC machining. Specifically, Manufacturing Renaissance runs Manufacturing Connect, a high school education program that connects manufacturers with workers in underemployed communities of color. According to the Century Foundation, 41% of workers under 35 years old are people of color, while just 24% of workers of 55 are people of color.¹⁸

One Chicago manufacturer, New Era Windows and Glass, provides an interesting example of how to bridge the succession gap while, at the same time, transforming the economy to

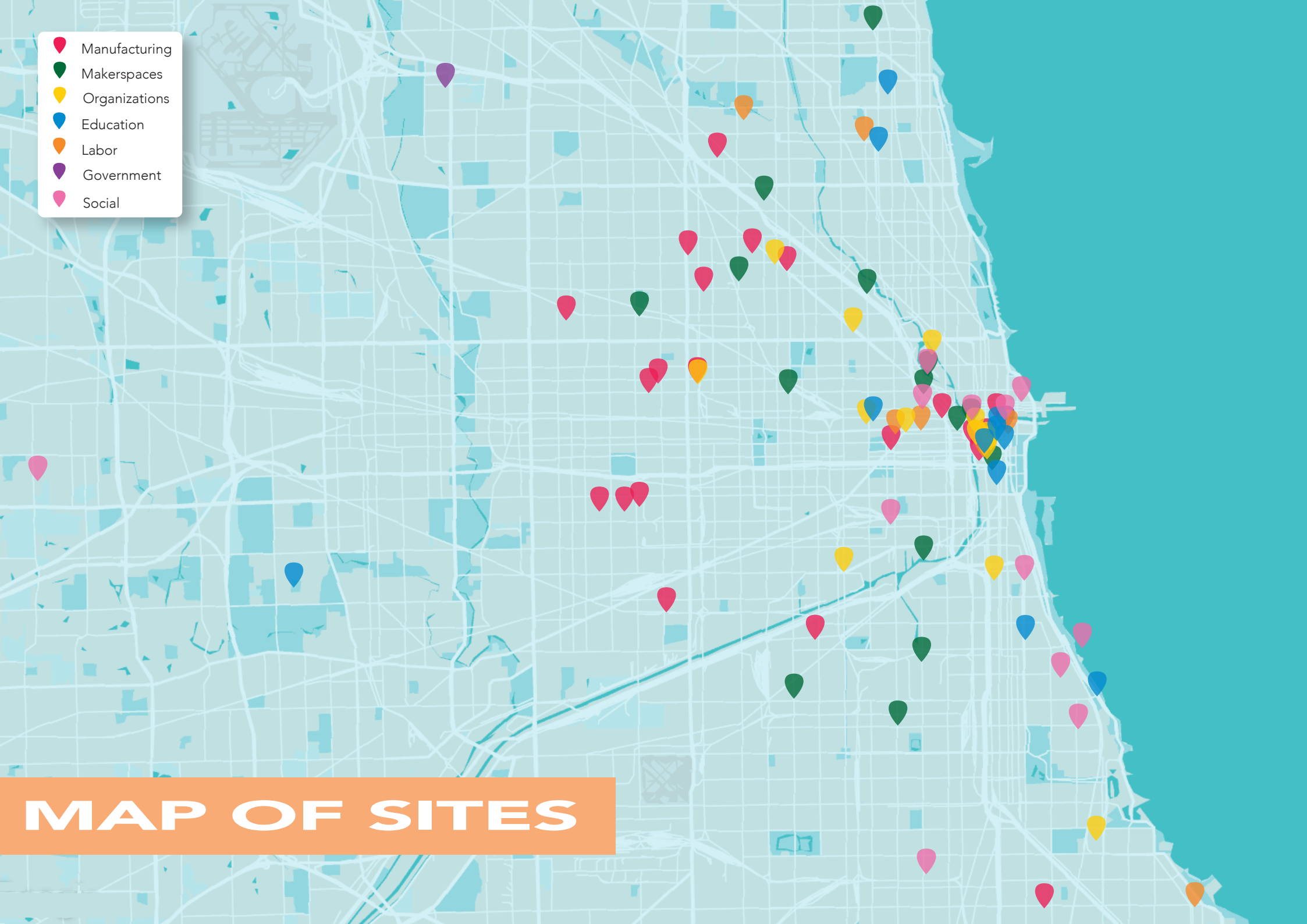
alternative ownership models. Specifically, after successful protesting against two near-closures, the workers now cooperatively own and operate the factory. One worker, Armando Robles, sees worker co-ops as a viable model to save jobs in future plant closures, especially with support from local government.¹⁹ The Aspen Institute featured a blog post in 2017 introducing worker-ownership as a path for economic security

and resiliency.²⁰ These fundamental values of direct relationships and shared ownership are promoted by an organization called the P2P Foundation, which promotes core characteristics of "creation of common goods through open, participatory production and governance processes," and "universal access guaranteed through licenses such as Creative Commons, GPL, Peer Production License."²¹



- Manufacturing
- Makerspaces
- Organizations
- Education
- Labor
- Government
- Social

MAP OF SITES





Key Findings

Key Findings

Our research resulted in a number of key themes, tensions and emergent questions, which we believe are useful for the purpose of making specific recommendations for design interventions for preferable futures and high-impact solutions. Specifically, our secondary research, observations, interviews, and site visits found three specific themes that we will describe in greater detail further in the report. In the following section, we will describe each of these themes in more details along with selected quotes from our interviews.



1 Making/Unmaking as a Means

There are multiple important modes of making/unmaking.

2 Connected Siloes

The city thrives on its connections but it is still hindered by structural disconnections.

3 Diverse Local Economies

There is a need to both diversify the making and manufacturing sector in terms of production, distribution and ownership models, and in terms of who participates in and benefits from the economy. If we seek to serve society equitably, we must deliberately build social and economic justice into all of our policies and systems from the beginning.

MAKING/UNMAKING
AS A MEANS

01

Making/Unmaking as a Means

There is no single understanding of what making is, why (or whether) it is important, how it might scale (if that is the goal) or who it might benefit. For the purpose of this report, it is more useful to think about making(s) and unmaking(s) as having a

multiplicity of meanings and practices, as evident in local making and manufacturing spaces. According to our research in Chicago, making might be understood to mean one or more of the following:



Making as Product and Business Development

Making a product in order to ideate, prototype, test the market, refine a project and sell it to make a profit.



Making as Organizational Innovation

Making to improve design, engineering and organizational processes.



Making as Inquiry, Knowledge and Learning

Prototyping, testing and experimenting for the purpose of learning and inquiring about the world and/or about oneself, either within a problem-solution framework or as a critical and/or speculative practice that seeks to pose new questions and alternative possible futures.

Making as Product and Business Development

According to our interviews, one common use of making is for product development, which includes ideation, prototyping, testing the market, refining products and selling them to make a profit. While traditional manufacturing processes are about linear processes, specialized capabilities, large quantities, scale and return on investment, some manufacturers are using making to diversify and expand their offerings beyond their traditional products. These opportunities are typically forged through relationships between designers, manufacturers, clients and employees that contribute to the development of new products through small batch runs. For example, according to one designer that we interviewed:

A friend of mine decided to make a cast aluminum clamp in the shape of an ampersand, and he called it the 'clampersand.' He decided to make a thousand of them. He made it at a cast aluminum foundry outside of Chicago...for them it was kind of exciting to do something that they could talk about and show their potential customers. It was just cool for them to do something different from [their traditional product], which I'm sure pays the bills but isn't sexy. I don't know if all manufacturers are that way.

Typically, it is difficult for creators to find manufacturers that can work with them to produce small quantities both within the United States as well as abroad, which has given rise to the development of a variety of incubators and accelerators. This suggests that there may be opportunities to more intentionally diversify local manufacturing by cultivating relationships between makers and manufacturers based on similarities as well as complementarities in interests, skills, knowledge, industry, processes or other characteristics.

Another common theme involved making things as a means of investigating business ideas, testing the market for new products and launching new ventures. For example, according to a manager at one maker space, "Our offering goes beyond just access to equipment. We're really in it to provide a community where you can launch a business. Not only you take that idea to prototype, but you take that prototype to a sustainable business." Similarly, according to the organizer of a monthly meet up for entrepreneurs, prototypes are about stimulating the design of future businesses.

She says, "I think in the meetings it's less about the prototyping tech and more about the how do we turn this into a business tech."

Another example is the use of crowdfunding platforms to test demand for a product at a small scale. According to a designer that we interviewed, making and shipping through crowdfunding platforms is a method for business decision-making. He says, "For me, that's what Kickstarter is, it's a chance to test as much to presell. Instead of doing focus groups, I'd rather just make something and put it on Kickstarter. If it fails, or just does OK, then that's enough of a signifier for what to do next."

Making as Organizational Innovation

In our interviews, we also found evidence of using making for the purpose of organizational innovation or, put simply, making as a means to improve the design and engineering of manufacturing processes, products or services. Often, this work is done internally within an organization in order to benefit the organization itself, rather than for a client. This is what economist Von Hippel has described as 'user-driven

innovation'.²² For example, the manager at a maker space described the improvement of the manufacturing process itself as a major byproduct of their making saying, "We're not only helping the entrepreneur. But, we're helping manufacturers innovate. I think that's the real clients. What we're doing with manufacturers, we're helping them with product innovation."

Making as Inquiry, Knowledge and Learning

In this section, we describe the ways in which making might be understood as a process of inquiry. This focus can be oriented towards the use of prototypes for learning about the world or about oneself. Furthermore, the learning can be focusd on solving a specific problem or on the broader pursuit of knowledge, question and possibilities. For example, according to the manager of a maker space,

"Prototypes are questions embodied. A prototype is something you make to test part of a thing. It is a way to answer a question about a particular part of a thing. It is one step along the way to something that is maybe finished."

Here, it is important to note that not all

making can or should be digitally fabricated. A care reflection on priorities can be helpful in determining what is important, relevant and useful about the experiments they envision and the questions they're asking. For example, according to our interviews:

I kind of think of the category of not made in the Fab Lab [emphasis ours] as also valuable. If someone says, 'I'm doing all these other things about my business and I want to make a thing.' Well, maybe the most complex part is your app. Maybe that's really the thing to prototype first. Yes, I'd love you to use our beautiful machines and make packaging, but maybe you get ice cream containers from Amazon and you spray paint them. And you get stickers and make labels.

Over the past decade, narratives about making have embraced the development and transformation of the self. This is, in part, due to the overwhelming focus on cultivating the importance of individuals in the current economic context as has been well-documented by sociologists, anthropologists and historians of technology.^{23,24,25} This view is echoed by Tim Brown, CEO of the design

innovation firm IDEO, who repositions the practice of prototyping from the world of engineering into a social act, a practice for self-investigation and self-improvement.²⁶

These narratives of self-discovery and transformation are present in our research. For example in one interview, we learned that, for people who have never had a hands-on experience building or making, first-time participation in making can shift the way they understand themselves in relation to the world around them. She says:

People literally don't even know you can repair stuff a lot of the time. There's this magical effect that happens once you've revived an object from the dead, it really is a Lazarus effect. Especially if they've had some hand in it, it means even more. Once you touch an object, it becomes intimate, you have a relationship with this object. And people are just shocked.

Of great interest here is the focus on practices of repair, which are widely discussed in scholarly literature around maintenance, repair and care.^{27,28} Importantly, these

discussions re-orient conversations around making the new, novelty and innovation towards reclaiming, fixing and repurposing existing resources and knowledges.

In contrast to the celebratory accounts of personal transformation, which prevail in the making movement, there are alternative rationales for engaging in making, related to professional development. In particular, for people who lack the privilege of a sense of self-determination, learning machine work is a means to understand themselves as skilled, valuable members of a community. For example, according to one non-profit organization we interviewed:

We're in triage mode. Even though someone comes to us and says, 'I want to be a welder.' There's a whole bunch of other things that we have to work with them on. 'That's great. We're going to put you in a welding class. But, in the meantime, you're also going to be meeting with our public benefits screener. And you're going to be meeting with your coaches. [...] People that go down mHUB are more like, 'I want to jumpstart a business.' That's not really where our people are at.

This illustrates the wide variety of knowledge, skills and support necessary

for disadvantaged communities to benefit from technology. The disconnect between these narratives of personal transformation and success, which circulate widely in maker spaces among privileged communities, and the extreme structural inequalities in education and income faced by other communities is a theme that we will address in the next section.

This section has provided an overview of several common ways that making practices are being framed based on our interviews. When initiating projects that engage making, it is important to continually reconfirm the purpose of making. But, for some makers, there is no clear purpose or goal. Making itself is the focus. According to the manager of one maker space, "People get really, really excited about prototyping and a lot of projects just stall out at that stage. Maybe they should, because it just wasn't a product that would do well commercially," and, according to another interview, "If you are a maker, as far as the art world is concerned, you are a tinkerer. You are not serious. You're a dabbler."

More recently, the maker movement has been

criticized for its lack of critical reflection and, in particular, its inability to incorporate issues related to social and economic justice. For example, Silvia Lindtner et al. challenge maker culture's aspirations and claims to democratizing production for its limited focus on designer/user and producer/consumer relationships, while failing to engage in the broader ecosystem, such as the "relationship to the factory worker, producer, mechanical engineer, and so on."²⁹ In addition, Garnet Hertz writes, "In

making, there is no discussion about how to come up with an idea of what to make, or how to evaluate whether or not it should be made. There is no robust system of critique or debate."³⁰ In response to some of these criticisms, scholars have proposed more reflective forms of making that incorporate critical thinking practices related to values, ethics and justice, such as critical making³¹, critical fabulations³², critical futures, design justice³³, and decolonizing design.



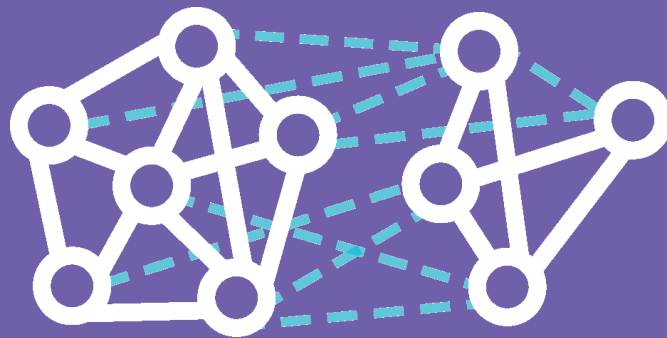
CONNECTED SILOS

02

Connected Silos

Our research on making and manufacturing in Chicago revealed a paradox. On one hand, the maker community is a small, well-connected group that knows each other. On the other hand, they are operating in distinct silos demarcated by traditional

boundaries including disciplines, sectors (academic, business, non-profit, government, media), demographics (race, class, gender, age, sexuality, disability), and urban and geographic boundaries such as neighborhood.



Connections and Disconnections

According to the manager of a maker space, "It's such a tight knit community...They all know each other. I don't feel like there's a ton of isolationism anymore because Chicago is small, the maker community is small. We all do know each other." The maker community does collaborate across entrepreneurs and businesses, researchers and universities as well as organizations such as mHUB. Specifically, she says, "I want people to

prototype with us and then go to mHUB to scale...Or, to have people from mHUB who would benefit from connecting with researchers, or connecting with some of the expertise we have here."

A report done for the City of Chicago in 2014 also found notable disconnections. Specifically, the size, scope and diversity of manufacturing in Chicago makes it difficult

to identify common interests and events.³⁴ The report identified these characteristics of the manufacturing sector: no single sector dominates, no central point of communication, no connection between design and local manufacturing, and the need for resources to identify manufacturers that will do small-batch production.

Furthermore, while some organizations in the making community are collaborating, formally or informally, other smaller non-profit and community-based organizations have yet to benefit from these initiatives. "...the money that goes into helping businesses is different from the money that goes into helping education. So I think sometimes it gets a little siloed...Maybe the city could do something with recognizing that those two things need to be more interconnected." Similarly, while community organizations are interested in maker spaces, their constituents, needs and challenges are disconnected from the main focus of these initiatives. For example, according to an interview with a community organization:

People say 'Oh, you should be collaborating with maker spaces.' But we really don't serve the same types of clientele...There might be childcare issues, there might be transportation issues, there might be domestic violence issues. There might be housing issues. Criminal background. We're really working on all of those other things... I feel there's a little bit of a culture clash there.

'If You Can See It, You Can Be It'

In the previous section, we illustrated a paradox that emerged in our interviews. On the one hand, Chicago is highly connected; on the other, it is quite disconnected. In order to create economic opportunities tied to local making and manufacturing that can serve all residents of the city, we must deliberately find ways to connect these siloes, working closely with non-profit and community-based organizations while integrating principles of social and economic justice. In part, the framings of entrepreneurship, innovation, making and manufacturing practices results in exclusion based on demographics. This continued exclusion exacerbates existing structural inequalities.

In a recent conference on Inclusion & Industry 4.0 hosted by The Century Foundation³⁵, one of frequently mentioned themes was the concept that 'If you can see it, you can be it,' referencing the importance of providing inspiring role models for young people of all backgrounds. "The reality is, most young people barely know what the word manufacturing means, much less a career path or why would I want to? You can't communicate it on a flyer," said the manager of a community organization that we interviewed. According to another organization, "We're looking at being intentional about underserved neighborhoods...[How do we] find those entrepreneurs who are doing something who maybe don't even realize that those resources are there and help make those connections."

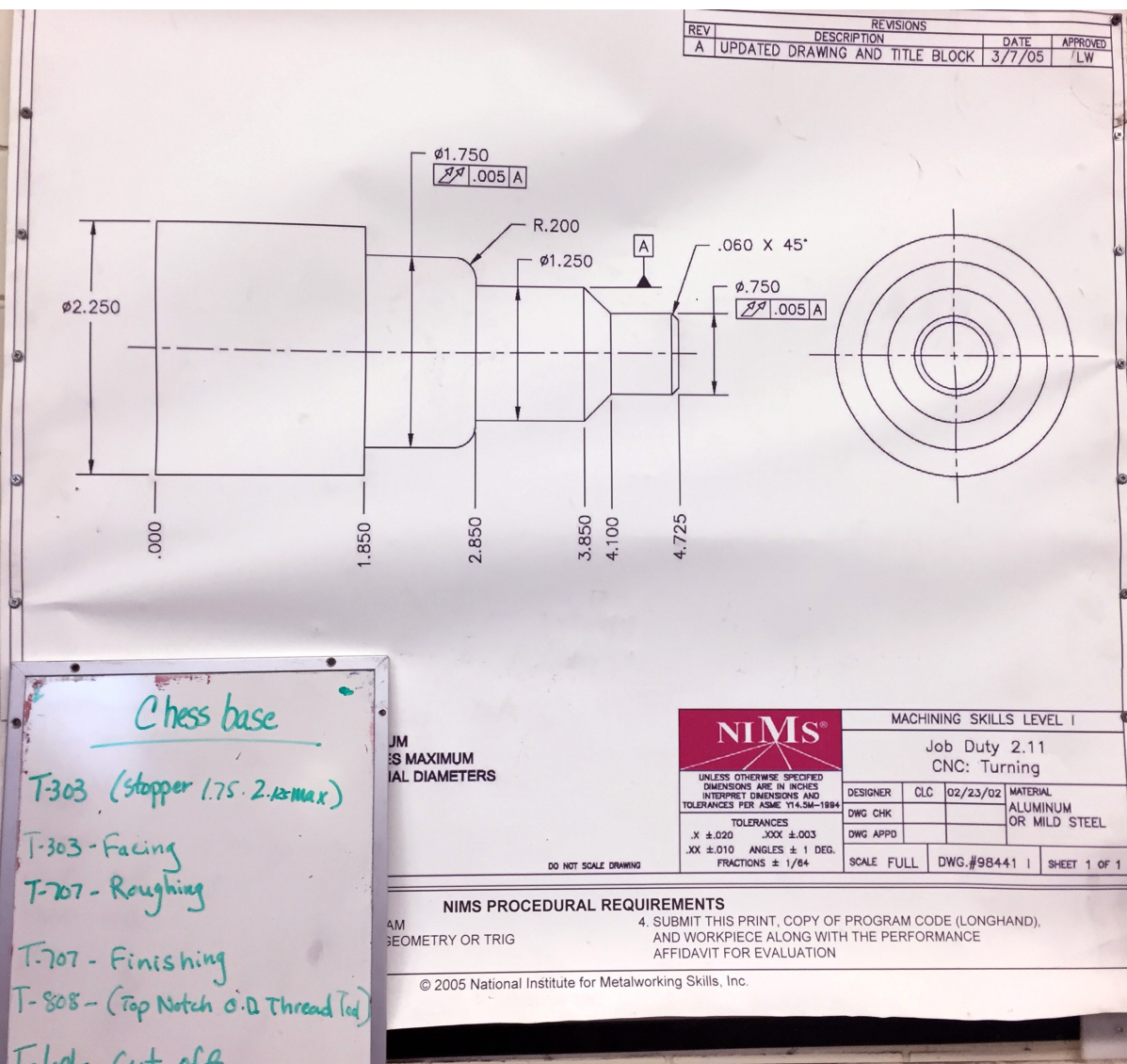
The non-profit and community-based organizations that we interviewed were enthusiastic about the city's initiatives

in making and manufacturing but, they simultaneously underscored the need for more attention and funding for social infrastructures, equity and community development, saying "...as much as you invest in the technological side of the innovation, you have to invest in the social inclusion side of it." Another organization put it this way:

If you're going to invest millions, if not billions of dollars in these installations, why not maximize that by adding just a little bit more so that you can have meaningful community engagement and community outreach and summer camps and summer jobs and internships, where you have a full network of reasons for kids to want to come there. We should be hosting all kinds of activities, them coming here or us going there and there's money for transportation and food and prizes. We need that kind of stuff to really get people bought in. And, not just bought in but "Hey! This is actually useful to me." We believe it's actually useful but it's kind of like an ivory tower kind of situation right now. Kind of, it's over there, it's kind of shiny, it's nice and it's good for them. We're not seeing any effect.

Our findings are supported by a broader literature about hackerspaces, maker spaces and manufacturing. Specifically, in research on the role of hackerspaces in innovation, Silvia Lindtner et al. described them as “crucial sites in this contemporary movement as physical spaces that provide social and technological resources for people to collaborate on the production of new technologies.”³⁶ Similarly, Austin Toombs et al. unpack the supposed coincidence that the majority of hackerspace members have a certain demography (often,

young middle-class, white male). They argue that “the ethos that anyone can be a maker obscures the fact that not everyone can be a maker.”³⁷ They highlight the “intentioned blindness” to gender, race, social class and so forth, and argue that “in some ways, care can be seen to be subordinated to and in service of the more traditional neoliberal values of the hackerspace.”³⁸

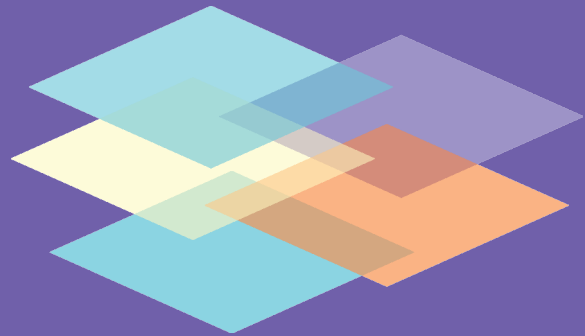


DIVERSE LOCAL
ECONOMIES

03

Diverse Local Economies

The previous two sections described the multiple meanings of making and the paradox around connected silos in Chicago. This section will illustrate the ways in which makers and manufacturers understand what it means to build more diverse, local economies and what the role of design and technology might be in that future for the city. These perspectives are helpful in informing the kinds of design interventions that we propose in the next section.



Design as Local Infrastructuring

In this section, we propose that design might be a way of infrastructuring the local making and manufacturing section in order to provide the knowledge, resources and support that is currently lacking in Chicago. One of Chicago's differentiators is its large number of local manufacturers and, in particular, the large number of small and medium sized companies. Unlike other Rust Belt cities like Detroit that depended on

large manufacturers, Chicago has a large number of smaller manufacturers. However, many of these small manufacturers are threatened due to overspecialization³⁹, aging ownership¹⁵, lack of access to knowledge about emerging manufacturing practices, and the lack of infrastructure to support their business. For example, according to one of our interviews:

All of these people go to the coasts, because they use Chicago as a platform and then they go where the infrastructure is to support their industry. Chicago just creates a real rich and fertile place to experiment and there's audience here. There's audience and you can afford, because it's affordable, you can afford to experiment and fail. It allows for that kind of innovation that probably you can't do that in New York or San Francisco or Seattle.

In order for the manufacturing sector to thrive, it is necessary to cultivate manufacturers with multiple, complementary capabilities. For example, according to one of the designers that we interviewed:

My vision for it is that we embrace automation, we embrace the flexibility that comes with advanced manufacturing tools, and that we figure out really neat ways for designers to engage with manufacturing and highly flexible small batch run style, so that lots of people can be designing and producing in tackle-able batch sizes, and maybe not as a firm or a big company that employs a lot of people, but in a small scale sort of way.

This finding is supported by scholarship on local manufacturing. According to Cindy Kohtala, “the notion of distributed economies promotes small-scale, flexible networks of local socio-economic actors using local resources according to local needs, in the spirit of sustainable development.”⁴⁰ Small and medium sized firms often do not have the budget to invest in re-thinking their processes or learning best practices. According to one of the manufacturers that we interviewed:

One of the ways that we try to bring value to our customers, is design to manufacturing. So we’re experts in sheet metal fabrication. We know how to process materials from laser cutting, forming, welding...What we’ll see with our customers, is that they’ll design something that will have a heavy cost element, [such as] seam-welding a part. And we would go to them and say, if we can change the design early in the process rather than later, we may be able to reduce cost too.

This suggests the need to re-think and redesign the early stages of production for local manufacturers. Furthermore, manufacturers currently have difficulties in finding competitive resources including production methods and suppliers, along with pricing and real-time quoting. According to one of our interviews:

I think what makes these other manufacturing ecosystems around the world so great is that, it’s very well connected and very easy. There’s great supply chain networks that are very easy to get. One part of the challenge in manufacturing is you need all these parts and you need to be able to get the parts at a low cost and quickly and have a sustainable source of these parts.

Our interviews revealed two specific meanings for the value of the 'local'. First, local can be understood to mean control. One designer explained: "I am a local designer because it means I have more control over my design process and I can guarantee results...I know there were a lot of people working very hard to make Chicago a leading design city, because they shared the same goals that I did. It wasn't Chicago that was important, it was being close to a place of manufacture that was important." Second, local can be understood to mean intimacy. According to another designer:

I think working locally means that the money you are moving around, or that the training that you're moving around, or the knowledge that you're moving around, impacts things that you could see. Neighborhoods that you can see, people that you can see, people that you can know. Local to me implies that level of intimacy. If I am improving my local economy, that probably means that I might meet a kid at a school who is benefiting from the jobs I'm creating or the commerce that I'm generating.

These two understandings of what it means to be local can inform our design interventions, which we will cover in the next section of the report.



Recommendations and Design Interventions

This section provides some initial ideas for policy recommendations and design interventions based on our research. These

are intended to be points of departure for continued discussions rather than prescriptive findings.

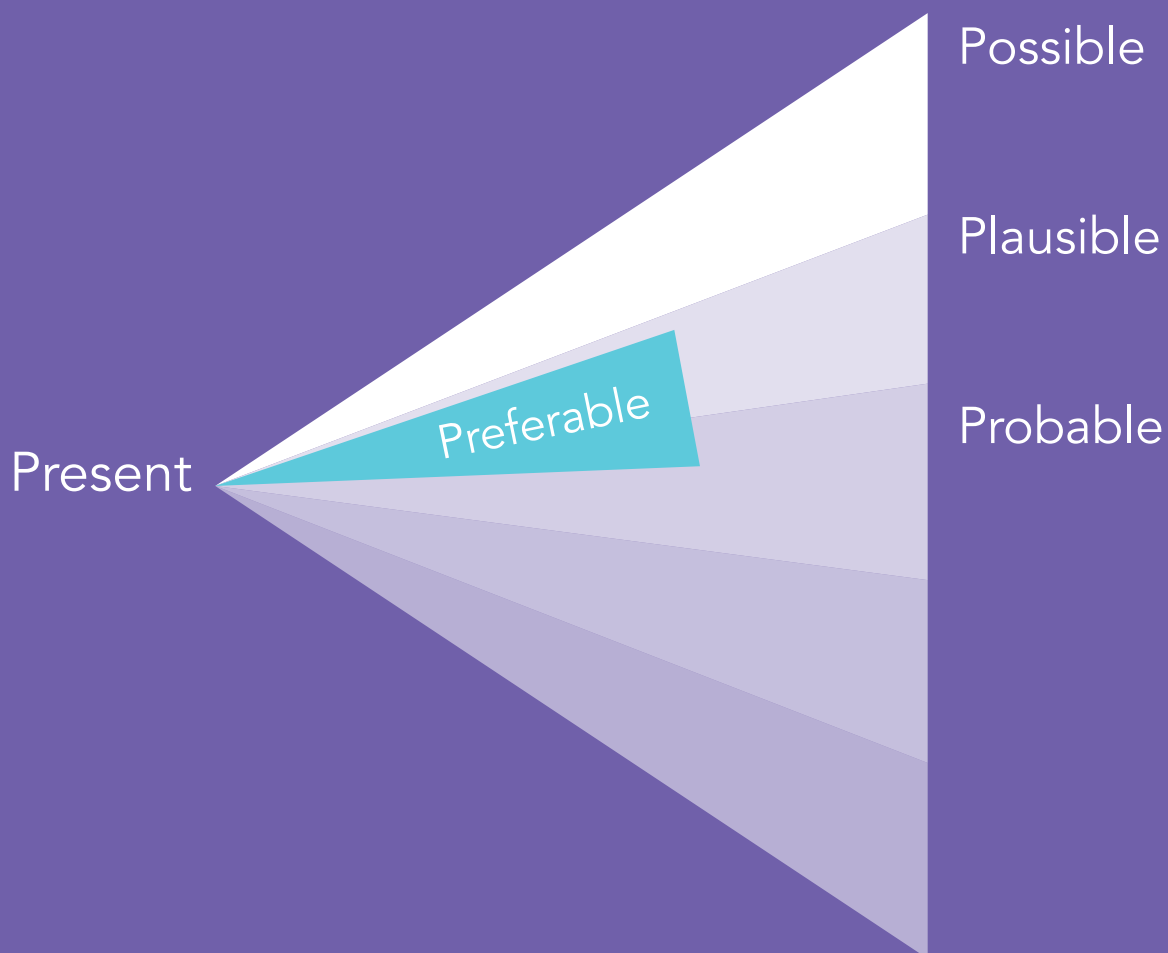


Image Credit: Dunne, Anthony, and Fiona Raby. *Speculative everything: design, fiction, and social dreaming*. MIT press, 2013.

Long-Term Preferable Futures

Our research revealed several opportunities for to support long-term preferable futures that could transform local making and manufacturing in Chicago. These activities could form the basis for a “living laboratory” for experiments in the creation of more diverse, cooperative local economies. These activities might include one or more of the following:

1 Supporting Activities around Maintenance, Repair and Care

A great deal of the activities related to making and manufacturing focus on the innovation of “the new”. However, the ability to reuse, reclaim and re-appropriate existing resources (including underutilized government resources) is of great value to the creation of more diverse, cooperative local economies. This might be introduced in a variety of ways:

Showcasing initiatives designed around principles of maintenance and repair.

Partnering with existing repair-focused initiatives such as repair clinics to integrate these practices and values into making and manufacturing.

2 Creating Cooperative Ownership Models

Our research revealed the interesting case of New Era Windows, a worker-owned cooperative manufacturer. Currently, there is great interest in the potential of cooperative ownership models and peer production. For example, the Platform Cooperativism project recently received a \$1 million grant from Google.⁴¹ This could be accomplished in a variety of ways:

Succession plans for cooperative, local ownership of manufacturers whose current owners are aging out.

Identifying resources, knowledge and capabilities that can be shared between makers and manufacturers.

Creating a shared tool library.

3 Building More Diverse and Just Economies

Our research revealed the ways in which existing linear, industrial economic models have resulted in disconnected silos and structural inequalities. Chicago can experiment with and test new economic models that offer alternatives including:

Create a local currency for exchanging goods and services i.e. Ithaca Hours.⁴²

Identify government spaces that can be used freely or cheaply in off-hours.

Encourage additional programs such as Good Food Purchasing Program.⁴³

Reconceptualizing categories such as “entrepreneur”, “maker” to encompass include a wide variety of individuals, communities and activities.

High-Potential Solutions

Our research revealed several opportunities for short-term solutions that have a high-

potential to support local making and manufacturing in Chicago:

1

Support Greater Access to Professional Services

Support Greater Access to Professional Services
Startups and small businesses lack sufficient access to professional services such as accounting and law. Greater support for these services could be provided in a variety of ways including:

A clinic model.

Hiring paid professionals part-time or full-time at key organizations.

Create resources for small organizations in order to help them identify professional services suited to their needs and budgets.

2

Develop New Resources for Local Manufacturers

Local manufacturers are facing a number of opportunities and challenges including the need to find local resources, diversify their products and services as well as re-design the early stages of their processes. Resources could be provided in a variety of ways including:

Databases to help local manufacturers connect to competitive resources including production methods, suppliers, raw materials and information about pricing in real-time.

Partnerships with faculty at local design, business and engineering schools (faculty could gain access to interesting case studies for their research while manufacturers could gain a better understanding of complementary products and services as well as best practices).

Incentives for research and development activities and exploration of new processes, materials and batch sizes.

3

Partner with Community Organizations

Non-profit organizations in Chicago do considerable work to support education, training and employment opportunities for youth, women, people of color, people with disabilities, immigrants and formerly incarcerated individuals. These communities have faced structural inequalities that unfairly impact their ability to fully participate in the economy. These partnerships could take a variety of forms:

Build connections with existing education and training programs for high-school students as well as other communities.

Events hosted at making and manufacturing spaces intended to include specific audiences.

Community events including festivals across Chicago neighborhoods.



Conclusion

Conclusion

Chicago's history is a testament to the mutual entanglement of technological, social, economic and natural systems. Today, against the backdrop of great enthusiasm for the potential of The Fourth Industrial Revolution, existing forms of technology maintain structural inequalities that prevent the majority of people from fully participating in the economy. We must rethink and re-design local economies to address these specific challenges. While Chicago shares some

concerns with cities worldwide, there are also opportunities to expand and experiment with alternative models. Based on one year of research, this report is intended to shape, frame and set the context for testing new policies and design interventions toward the goal of developing a diverse, local, cooperative economy around making and manufacturing.



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⁴⁵Cover Photo of Chicago River and Skyline - Photographed by Melissa Cadet

⁴⁶Chicago Bridge Photo - Photographed by Melissa Cadet

⁴⁷Italy press conference photo - Photographed by Laura Florlano

⁴⁸All other photograh - Photographed by Becky Marshall

⁴⁹Illustrated icons by Becky Marshall