

The Federal Role in Supporting Urban Manufacturing

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Executive Summary

As the nation works to recover from the Great Recession, the idea of revitalizing the country's beleaguered manufacturing sector has gained significant traction among political leaders and policy experts. And with good cause: though the United States lost nearly a third of its manufacturing jobs over the past the decade, the sector still accounts for the majority of U.S. exports, is key to the country's innovation capacity, and serves as a crucial gateway to the middle class for a sizeable segment of the nation's population. Recapturing the nation's manufacturing might is thus vital to our ability to realize a "next" economy that is more focused on production and more export-oriented, innovation-fueled, and opportunity-rich than the consumptive, debt-driven economy we're (thankfully) leaving behind.

But before we revive the "Made in the USA" brand, it's essential that we understand just how radically the nature, scale, and spatial characteristics of the sector have changed over the past several decades—and how these changes should inform the federal policies and programs that affect its growth and development.

Unlike the days when large companies dominated the nation's commodity production, today's manufacturing landscape is largely occupied by decentralized networks of small, specialized firms, many of which are hidden in plain sight in America's urban areas. In fact, in 2007, of the approximately 51,000 manufacturers in the United States employing fewer than 20 people, more than a third were located in the nation's 10 largest cities. Making everything from cabinets to computer components, these small urban manufacturers (SUMs) are typically part of interdependent, collaborative networks, the synergies between which promote the spillovers and knowledge-sharing that not only help businesses innovate but in turn help build stronger, more adaptable urban economies. Recent research has shown, for example, that manufacturers in urban areas are more productive than those in less dense areas. They also pay higher median wages than other types of employers in many large cities, while providing opportunities for workers with a wide range of skill levels.

Local policymakers and civic organizations, and some states, have increasingly recognized the strengths and potential of SUMs, and have worked to design policies and initiatives to help them overcome the land and building constraints, capital access problems, workforce issues, and other challenges that can hinder their success.

At the federal level, however, outdated perceptions about the “how, what, and where” of American manufacturing have persisted to the extent that SUMs’ role in urban economies—and hence in the economy at large—has at best been largely overlooked, and at worst undermined (if inadvertently) by policies and programs that may have been adopted to achieve other local development ends.

The moment is ripe for change. The Obama administration clearly recognizes that retaining and growing America’s manufacturing base is a matter of vital national interest and key to new and enhanced national efforts to boost the country’s exports. At the same time, it has been working to solidify a new “placed-based” vision for national economic growth and prosperity, integrating the work of several federal agencies to promote regional sustainability, livability, and economic competitiveness. Yet federal manufacturing and urban policies remain curiously divorced from one another, and from concurrent strategies to boost U.S. exports, fuel innovation, improve the nation’s infrastructure, and pursue environmentally sustainable approaches to development.

This paper identifies specific ways that federal government should work with state and local leaders to better support small-scale, urban manufacturing, and to do so within a thoughtful framework for urban economic development. These activities can be implemented without little added cost to an already overstretched budget and without major operational changes. Rather, they require that existing funding be more clearly focused and that priorities be articulated and coordinated across federal agencies:

1. The federal government should develop a new narrative about manufacturing and metropolitan economies and use it to inform and guide its programs and policies. Federal activities that influence both urban and economic development need to reflect a modern and accurate view of the value and role of manufacturing in each. To this end, policymakers should ensure that policies and programs abide by a basic set of principles:

- Federal reform should encourage cities and states to identify urban and regional manufacturing assets—such as naturally arising industry clusters—and strategically capture their value for regional economic development and job creation.
- Urban, industrial land use strategies should be linked to wider economic development and workforce objectives and should minimize mismatches among workforce, community revitalization, and citywide economic-development goals.
- Where appropriate, conditional language should be added to current programs to encourage high-value-added, industrial activities and clusters, as well as quality manufacturing jobs, in urban areas.

- Where necessary, certain conditions (e.g., eligibility criteria) should be relaxed or eliminated from programs where such conditions might hinder city and state efforts to expand small-scale manufacturing in cities.

2. The federal government should help support SUMs' role in regional cluster growth and development.

Regional clusters are key to many small urban manufacturers' ability to innovate, scale up, and compete as part of synergistic local networks of organization and firms. The federal government ought to explicitly acknowledge this fact by crafting policies and programs that help address the information, technology, and workforce challenges that can hinder firms' assimilation into local clusters, while helping to boost opportunities for SUMs to cultivate new markets domestically and abroad.

- a. *Support research, analysis, and information dissemination to support cities, regions, and manufacturers, including supply-chain mapping and logistics analysis.*** The U.S. Department of Housing and Urban Development (HUD) and the U.S. Economic Development Administration (EDA) should jointly commission research to identify the data and analysis that cities need to support urban manufacturing, and invest in the information collection, analysis, and dissemination that respond to those needs. They should also provide funding and technical assistance to enable states and local intermediary partners to research the strengths and weaknesses of their manufacturing sectors and their relationship to local clusters.
- b. *Provide support to help strengthen the research to production continuum within cities and metro areas.*** The federal government should provide support to states to establish and operate **advanced manufacturing centers** that provide both research to develop new, relevant technologies, and the education to help manufacturers apply these technologies to their work. These centers would focus on one or more areas within advanced manufacturing, conducting self-initiated research of broad usefulness to manufacturers in the state, as well as contract research and extension work for client firms.
- c. *Encourage workforce policies that help workers get the manufacturing-related skills and training needed in their respective regions.*** For example, the Strengthening Employment Clusters to Organize Regional Success, or SECTORS, Act would allow federal workforce funds to be used for industry-specific training programs for incumbent workers. The federal government should also, over the long run, provide greater direct federal support to community colleges, which could help them to strengthen their manufacturing-related programs.
- d. *Help cities and metros design and implement metropolitan export initiatives tailored to their specific clusters and attributes.*** Strengthening supply chains will enable networks of small firms to benefit from expansion of exports, even if individual firms might not have capacity to export internationally. But the federal government could go further by supporting states and metros to develop **metropolitan export strategies** aimed at helping local firms market their goods, services,

and expertise, including newly fashioned advanced manufacturing products, beyond regional borders—while creating new jobs within them.

3. The federal government should help ensure that SUMs have the space, infrastructure, and technical assistance they need to grow and thrive. The Sustainable Communities Initiative promises to coordinate urban policy across agencies and support local efforts to build sustainable and livable cities; it needs as well to consider how infrastructure investments and land use policies support diverse and resilient urban economies. Other agency program reforms are also needed to eliminate bias against small manufacturers and help support and bring to scale local innovation.

- a. *Strengthen the connection between strategic economic development and the sustainability goals espoused by HUD, DOT, EPA, EDA, and NIST.*** New federal efforts to identify and support industry clusters should be integrated within the Partnership for Sustainable Communities (PSC) to make sure that activities targeted toward shaping the physical development of regions are strategically aligned with regional economic development. The Economic Development Administration and the National Institute of Standards and Technology (NIST) should collaborate with the PSC to broaden “economic competitiveness” criteria for PSC grants so that it is inclusive of innovative approaches by cities to support manufacturing firms through their land use and infrastructure policies and investments.
- b. *Direct competitive funding to infrastructure and development innovations that support manufacturing.*** The June 2010 announcement by HUD and DOT of a joint \$75 million initiative to fund “localized planning activities that integrate transportation, housing, and economic development” sets a precedent for funding innovative and integrative approaches to urban development. Planning for the reduction of conflict between freight facilities and residential areas is specifically mentioned as an eligible activity; awards in this round, and criteria for future rounds, should go further to encourage cities to tackle (for example) updating and upgrading goods movement infrastructure, or developing urban industrial parks as transit oriented development (TOD).
- c. *Expand U.S. Small Business Administration (SBA) support to small urban manufacturers so that they have the capital for the land, space, and equipment they need to scale up.*** The SBA should revisit the parameters of its loan programs, with the goal of diversifying the types and amounts of financing available to the widest range of industries and firms possible, and ensuring borrowers are not shut out due to sector or form of tenure. It should also update and simplify SBA size standards

applicable to manufacturers, so that they more accurately reflect industry demographics and demands, and help smaller firms qualify for programs that appropriately mirror their needs.

d. *Help revive the market for industrial real estate development.* Older industrial buildings originally designed for use by large single manufacturers need to be renovated and divided to accommodate today's smaller but more technologically advanced manufacturers. Today, successful nonprofit industrial developers are able to access and invest capital in such conversions and are willing to accept a lower rate of return. To begin to build on these nonprofit strategies, the federal government should

- Revise the Internal Revenue Code to permit the use of industrial revenue bonds (IRB) for acquiring and redeveloping multi tenanted rental (and not just owner-occupied) industrial buildings.
- Ensure that the benefits of IRBs issued for for-profit entities flow to non-owner occupants (tenants) in privately owned, urban industrial buildings.
- Create a recoverable grant program to underwrite predevelopment costs and provide technical assistance to help build the capacity of nonprofit organizations to engage in industrial development.
- Support conversion of decommissioned military and other federal properties as urban industrial parks and revisit or repeal McKinney-Vento restrictions on the reuse of decommissioned federal properties.

Manufacturing may never occupy the dominant position it once had in our economy, but a healthy sector providing high quality employment opportunities is possible if we recognize, and respond to, emerging trends. The federal government needs to demonstrate its commitment and leadership in this policy area by developing a vision for a strong, resilient manufacturing sector, and linking it to an urban policy framework centered on supporting productive economic activities in U.S. cities and metros.

I. INTRODUCTION

The American manufacturing sector faces troubling domestic and global pressures. Manufacturing employment has plummeted, and jobs continue to be offshored in the face of cost competition and trade inequities, even in celebrated “clean energy” industries.¹ Meanwhile, the industrial capacity of our competitors—China in particular—has been growing, so even as U.S. manufacturing output is on the rise, our share of the global market has shrunk on a percentage basis.² These trends predate the Great Recession, but their costs have become more obvious in its wake.

But the potential to revitalize and sustain an innovative, resilient, and robust U.S. manufacturing sector remains strong, as the sector holds many untapped opportunities and assets. Contrary to popular belief, and despite recent recessionary shocks, manufacturing continues to play a central role in the American economy and still serves as a gateway to the middle class for a sizeable segment of the nation’s population. Today, approximately 11.7 million Americans are employed by the country’s 300,000 manufacturing firms, and over 7 million additional jobs are supported by manufacturing-related activities, including jobs in transportation, wholesaling, and service industries, such as accounting, consulting, real estate, and finance. Since 1948, U.S. manufacturing gross domestic product (GDP) has climbed over sevenfold, and in 2008, the sector generated \$1.64 trillion worth of goods.³ New and enhanced national efforts to boost the country’s exports and strengthen value-chains will necessarily need to build on our current manufacturing prowess.⁴

Still, American manufacturing is not what it used to be: The nature, scale, and spatial characteristics of the sector have changed dramatically over the past several decades—even if perceptions of it have not.

Unlike the days when large companies dominated the nation’s commodity production, today’s manufacturing landscape is largely occupied by decentralized networks of small, specialized firms—many of which are hidden in plain sight in America’s urban areas. In fact, in 2007, of the approximately 51,422 manufacturers in the United States employing fewer than 20 people, over a third were located in the nation’s 10 largest cities alone.⁵ These businesses make an astonishing range of products—from high-tech medical equipment to designer coats, artisanal food products to specialized coatings—and serve a spectrum of customers and markets, including small suppliers, contractors, the consumer-public, and large original equipment manufacturers (OEMs).⁶

Small urban manufacturers provide critical economic benefits to—while also profiting from—their locations. Urban centers favor the characteristic organizational form of 21st-century production: supple, peer-to-peer networks, rather than large, vertically integrated, multitiered

entities. Synergies between these decentralized networks promote the spillovers and knowledge-sharing that not only help businesses innovate, but in turn help build stronger, more adaptable urban economies. Recent research has shown, for example, that manufacturers in urban areas are more productive than those in less dense areas.⁷ They are also indispensable partners to other industries, forging strong linkages within metropolitan economies and generating multiplier effects within and across regions.⁸ In New York and Los Angeles, for example, SUMs are critical to the entertainment and fashion industries, both of which have international markets. Finally, SUMs pay higher median wages and have experienced more rapid wage growth than other types of employers in many large cities, while providing opportunities for workers with a wide range of skills.

This report focuses on America's SUMs and the important role they play in the economies of the nation's cities and regions. It highlights what they make and where they make it, the unique challenges they face, and the role the federal government in particular ought to play in helping ensure they can grow and thrive.

The moment is ripe. As the United States struggles to overcome the lingering impacts of a severe recession, it needs to prioritize productive economic activities. Doing so means putting forth a sustained commitment to exporting quality goods and services, both domestically and globally; maximizing the innovation potential of its firms and workers; and embracing greener, more cost-effective strategies for energy production and use—while recognizing that cities and metropolitan areas will continue to lead the nation's economic growth. It also demands a candid, inclusive national dialogue—within and between governmental and private sectors—about the importance of manufacturing to Americans' economic well-being.

The Obama administration clearly recognizes that retaining and growing America's manufacturing base is a matter of vital national interest. To this end, in December 2009, it released a *Framework for Revitalizing American Manufacturing*, which, while far from a comprehensive national strategy for reviving and sustaining a strong manufacturing sector, marks a first step toward reversing decades of complacency and neglect.⁹

At the same time, the White House has been working to solidify a new “placed-based” vision for national economic growth and prosperity, integrating the work of federal agencies to promote urban and metropolitan sustainability, livability, job opportunities, and economic competitiveness.

And yet curiously, the administration's manufacturing and urban policies remain largely divorced from one another—and, as importantly, from its concurrent strategies to boost U.S. exports, fuel innovation and commercialization, improve the nation's infrastructure, and pursue environmentally sustainable approaches to development. Despite the abundant assets and opportunities American SUMs present for urban and regional economic transformation, they have slipped through the spaces between these laudable, but for the most part disconnected, efforts.

This needs to change. For all the strengths and potential of SUMs, they are up against a formidable array of challenges that can undermine their success. Small businesses in other sectors share some of these challenges, such as the need for debt financing and technical assistance, although they can affect SUMs in ways that demand sector- and location-specific planning, financing, and service-delivery tools. Many other challenges are rooted in fundamental differences in patterns of land use and tenure between urban, suburban, and rural manufacturers, which produce disparate regulatory environments, likelihoods of reinvestment, and avenues to access capital, as well as differences in the availability of skilled workers, adequate infrastructure, and appropriately outfitted space.

The idiosyncratic nature of these challenges has given rise to a range of homegrown policy solutions at state and local levels. But in the absence of a decisive federal agenda for urban manufacturing and targeted policy responses, public and private leaders lack the channels and tools to work with the federal government as strategic partners in the manufacturing and export revival the administration currently envisions.

This paper seeks to identify opportunities for federal policy to support SUMs, and to do so within a thoughtful framework for urban development. First, it will describe the scale, scope, and importance of manufacturing in the nation's 100 largest cities. It will then identify the major challenges facing SUMs today as well as innovations by states, municipalities, nonprofits, and manufacturers to address them. Finally, it will delineate ways the federal government can work with state and local leaders to better support small-scale, urban manufacturing, without incurring major new costs or diverting resources from other priorities, by

- adhering to an updated, accurate narrative about cities and manufacturing that informs and guides programs and policies;
- helping support SUMs' role in regional cluster growth and industrial development; and
- ensuring that SUMs have the space, infrastructure, and technical assistance they need to grow and prosper.

As the United States confronts the challenge of transitioning to a 21st-century economy that is globally competitive, export-oriented, environmentally sustainable, and rich in opportunity, it is imperative to shift the nation's discourse on manufacturing—and acknowledge the central role it plays in creating and sustaining healthy and diverse urban and metropolitan areas.

Small Urban Manufacturers (SUMs): A Definition

Manufacturing is a subset of industrial activities that include utilities, transportation and warehousing, and quasi-service activities, such as equipment service and repair, catering, commercial laundries, etc. While these other activities employ similar workforces, occupy the same land, and face many common challenges with manufacturers, this paper discusses manufacturing as the production and assembly of products (NAICS Codes 31-33), including commodities (consumer goods), high technology (such as medical imaging equipment), and artisanal production (such as artisanal foods and custom furniture).

For the purposes of this paper, small manufacturers are those engaged in these activities, and which employ 100 or fewer workers. However, there is little publicly available data now that allow these businesses to be analyzed by size, sector, and location. The research conducted for this paper has revealed a deep need for data and analysis that more clearly describes the state of the sector and salient trends.

II. CONTRACTION AND REINVENTION OF THE U.S. MANUFACTURING SECTOR

In the United States, industrialization and urbanization have been interdependent processes. From the colonial period through World War II, American industry concentrated in the cities of the Northeast and Midwest, where it was nurtured by proximity to waterways, rail networks, and an influx of migrant and foreign-born labor. By the early 20th century, American cities were renowned for their industry specialties: Pittsburgh's dominance in steel, Boston's booming textile industry, and Detroit's unrivalled automobile production made these cities leading destinations for capital and labor.

By the 1950s, a third of the nation's nonfarm workforce was employed in manufacturing, and wages in the sector were on the rise. But the geography of manufacturing facilities began to change as the nation suburbanized. Lower taxes and abundant, affordable land lured manufacturers away from cities, while the prevalence of new highway networks and near-universal car ownership meant that factories and workers no longer needed to concentrate near transit and freight hubs. Hundreds of inner-city plants contracted or shut down, as manufacturing businesses dispersed to outlying locations within traditional manufacturing regions in the Northeast and Midwest, to the Sun Belt and Mountain West, and to other countries where labor was cheap, and regulations were minimal.¹⁰

Table 1. Population Change, 20 Largest U.S. Cities, 1950–2009

Rank by population, 1950	City	Population in 1950	Population in 2009	Population gain / loss	Percent change in population 1950–2009	Rank by population, 2009
1	New York, NY	7,891,957	8,391,881	499,924	6	1
2	Chicago, IL	3,620,962	2,851,268	-769,694	-21	3
3	Philadelphia, PA	2,071,605	1,547,297	-524,308	-25	6
4	Los Angeles, CA	1,970,358	3,831,868	1,861,510	94	2
5	Detroit, MI	1,849,568	910,920	-938,648	-51	11
6	Baltimore, MD	949,708	637,418	-312,290	-33	21
7	Cleveland, OH	914,808	431,363	-483,445	-53	43
8	St. Louis, MO	856,796	356,587	-500,209	-58	52
9	Washington, DC	802,178	599,657	-202,521	-25	27
10	Boston, MA	801,444	645,169	-156,275	-19	20
11	San Francisco, CA	775,357	815,358	40,001	5	12
12	Pittsburgh, PA	676,806	311,647	-365,159	-54	61
13	Milwaukee, WI	637,392	604,133	-33,259	-5	26
14	Houston, TX	596,163	2,257,926	1,661,790	279	4
15	Buffalo, NY	580,132	270,240	-309,892	-53	70
16	New Orleans, LA	570,445	354,850	-215,595	-38	53
17	Minneapolis, MN	521,718	385,542	-136,176	-26	48
18	Cincinnati, OH	503,998	333,013	-170,985	-34	57
19	Seattle, WA	467,591	617,334	149,743	32	23
20	Kansas City, MO	456,622	482,299	25,677	6	35

Source: American Fact Finder, U.S. Census Bureau (2010)

Yet, despite dramatic declines during the past half-century, manufacturing is far from extinct in America’s cities. Rather, it has changed to the point where it bears just faint resemblance to what it once was, serving markets of different scales and types and helping to generate new, inclusive, and sustainable opportunities for urban economies.

Small manufacturers account for a growing share of a transforming sector

American manufacturing establishments have become smaller than they were in the middle part of the 20th century. Between 1972 and 1992, for example, as American manufacturers with over 500 employees laid off 3 million workers, plants with fewer than 500 employees added 2 million jobs.¹¹ These trends persisted over the past several decades, with small manufacturers representing an ever-increasing portion of the sector: in 2007, 36 percent of America’s manufacturing businesses employed fewer than 5 people; 70 percent employed fewer than 20 employees; and 91.4 percent employed fewer than 100 people (table 2).

Thousands of these small firms are located in the nation’s largest cities—the majority of them employing less than 20 people (table 3).

SUMs are not merely smaller versions of “traditional” manufacturers, which once controlled the operations of small firms in their networks. In fact, the sector has changed dramatically in recent decades, with large, vertically integrated factories having mostly been replaced by “flat” webs of production and distribution. The firms within them function in different subsectors and embody the dominant production model of the 21st century—the lean, small, individual firm as a node in a fluid, far-reaching organism. Today’s SUMs do not compete autonomously, but through deeply interdependent, collaborative networks. Their competitiveness and contributions to their home economies hinge on their ability to identify opportunities to add value along supply chains and access healthy markets of varying scales. Their size, agility, and location typically allow for fast turnaround and rapid circulation of locally and regionally sourced goods and services. These qualities also make them well-suited to serve scattered, niche markets that have distinctive demands, price points, and logistics needs. What’s more, they have enabled many SUMs, such as those in Wichita, to maintain relatively stable performance and employment standards during the Great Recession relative to larger manufacturers in badly hit industries.¹²

Table 2. U.S. Manufacturing Establishments by Size Cohort, 2010

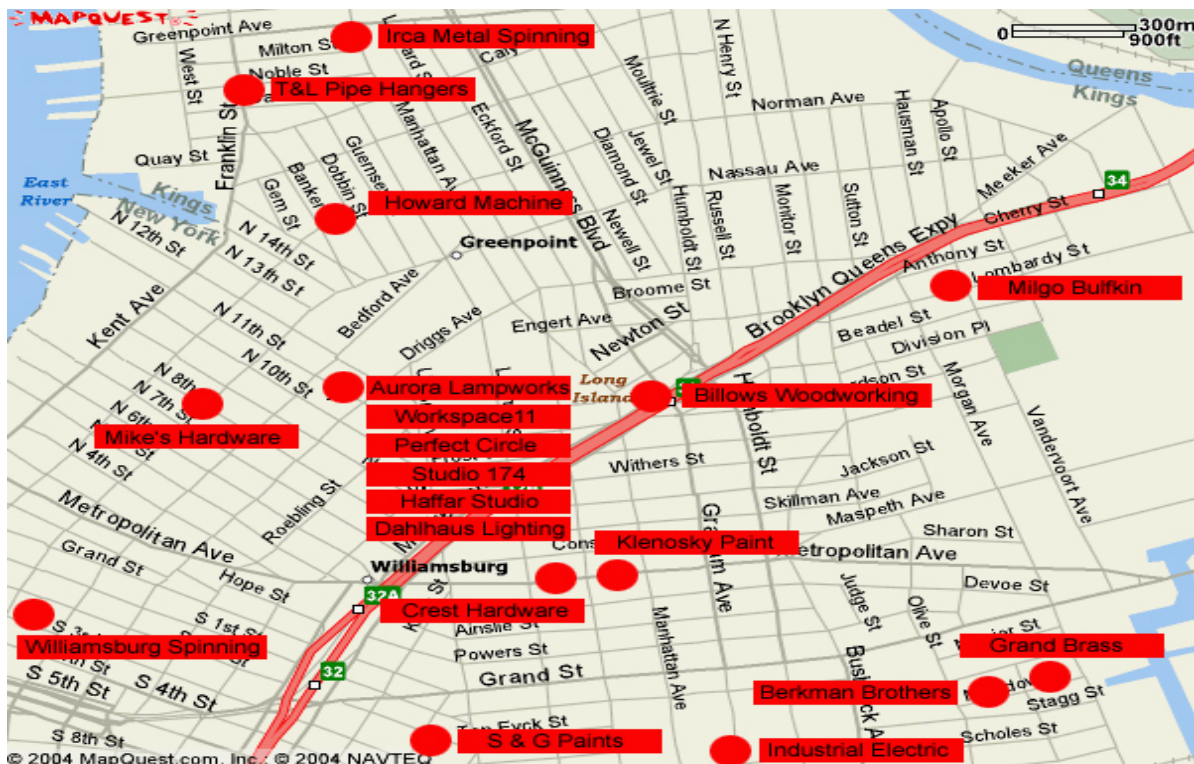
Number of employees	Number of manufacturing establishments	Percentage of manufacturing establishments in U.S.
ALL	331,355	100.0
1–4	119,182	36.0
5–9	57,779	17.4
10–19	51,422	15.5
20–49	50,094	15.1
50–99	24,359	7.4
100–249	18,943	5.7
250–499	6,172	1.9
500–999	2,384	0.7
1,000+	1,020	0.3

Source: NIST/Hollings MEP (2010)

Table 3. Manufacturing Establishments with Fewer Than 20 Employees in the Ten Largest U.S. Cities, 2007

City	Number of manufacturers with < 20 employees	Percentage of manufacturers in city
New York City	5,488	82.8
Los Angeles	4,914	80.3
San Diego	906	74.7
Philadelphia	696	73.6
San Jose	688	71.7
San Antonio	616	71.2
Phoenix	1,117	68.7
Chicago	1,498	68.6
Houston	1,752	67.9
Dallas	886	67.2

Source: American Fact Finder, U.S. Census Bureau (2007)



This map, provided by a manufacturer of designer lighting in Brooklyn, New York, shows the locations of 18 designers, suppliers, and other vendors with whom the manufacturer does business within a one-mile radius of the manufacturer's location.

SUMs make a wide variety of specialized products

Compared to large firms, SUMs are more likely to produce specialized or customized products demanded by niche markets, which may be local, regional, or global. In New York City, for example, thousands of firms now produce artisanal foods, and hundreds build customized furniture and cabinetry. In both strong and weak markets, SUMs trade within metropolitan and regional clusters, enabling larger manufacturers and other economic engines to stay lean and competitive. For instance, many small companies sell materials and components to Boeing in Seattle, and small producers provide printing and medical, food, and other supplies to Cleveland's health care industry. SUMs producing extremely specialized or high-value goods may sell to a national or global market: New York's jewelry industry, San Jose's computer and electronics sector, and Portland's custom bicycle makers are old, mature, and niche examples, respectively.

SUMs and their home cities find the best fit in the creation of products of high value relative to material weight and bulk. The constraints of land cost and capacity for goods movement have, in many cities, winnowed out producers of high-bulk, low-value products. New York City's diamond district may be an extreme case (firms in the city outsource the cutting of small stones to affiliates in cheaper locations), but the jewelry industry exemplifies a broader economic and environmental dynamic, whereby high land costs drive producers to minimize material-handling and maximize the addition of value.

Within cities, the manufacturing sector is populated by a wide variety of subsectors and firms. New and long-established companies, making goods for local and export markets, coexist, compete, and collaborate. Table 4 breaks down the numbers of workers employed in 12 major subsectors in the 20 largest U.S. cities. Some subsectors are well-represented in all 20 cities—many of these firms make consumer or producer goods for local markets. Paper and printing firms serve a broad range of other local and regional sectors and can be found in every city; producers of fabricated metal and wood products are similarly widely distributed. Others are concentrated in fewer cities, where they may be remnants of once-dominant subsectors producing for export—apparel in New York, for example, and food, beverage, and tobacco in Chicago. Machinery and equipment producers support both expanding sectors (e.g., electronics and computers in San Jose) and contracting ones (e.g., transportation equipment in Indianapolis and Detroit).

Manufacturing jobs generally pay higher median wages

Manufacturing jobs have historically enabled American workers to enter the middle class, offering opportunities for both economic and skill mobility to those with limited educational attainment. Manufacturers consistently pay higher wages than the retail and personal-service establishments that constitute the fastest-growing employers in most U.S. cities. In fact, as table 5 shows, in 16 of the 20 largest U.S. cities median wages in manufacturing occupations are higher—often much higher—than median wages overall. In 2008, the median wage for manufacturing workers in Austin, for example, was nearly \$21,000 more than for workers

overall; in San Francisco, the difference was nearly \$14,000. Only in cities like New York, where exceptionally high-wage, professional services make up a significant share of the workforce, do median wages for all occupations (taken together) exceed those for manufacturing.

Table 5 also compares changes in median wages from 2004 to 2008. In all but four of the top 20 cities, median real wages across all occupations declined from 2004 to 2008. But in 10 of the 20 cities, median manufacturing wages rose during the period; manufacturing wages declined less than total wages in two others. The increases were the highest in cities where small, “light” manufacturing is growing. The cities in which manufacturing wages have declined most severely (in absolute terms, and also relative to wages in all occupations) were those like Detroit and Indianapolis, in which large, unionized plants closed or downsized.

These statistics suggest the complexity of wage trends in urban manufacturing, as do qualitative analyses and anecdotal accounts about urban manufacturing subsectors and firm types. Firms competing primarily on price are more likely to pay their workers poorly. Few small manufacturing firms are unionized, and some small firms are sweatshops that engage in wage theft and other low-road practices.¹³ At the same time, firms producing high-value-added goods are more likely to pay their workers well—especially in comparison to service-sector jobs that might be available to those same workers.¹⁴ The value of manufacturing both in directly providing well-paying jobs, and in helping to support a wage floor in urban labor markets, is among the sector’s important contributions to the economies of their host cities.

SUMs are “cleaner” than their predecessors

The environmental profiles of modern urban manufacturers differ substantially from those associated with large, mid-20th century manufacturers. First off, SUMs today are far more likely to be engaged in “lighter” modes of production, which inherently impose smaller localized burdens than many of the material-intensive activities, like primary metals processing, which have now been driven to regions of the world with lower environmental standards. On the whole, they are also more likely to embrace greener processes, a result of both changing attitudes, and the development of new technologies. For example, technological advances have enabled some manufacturers to adopt processes that minimize or eliminate the use of hazardous materials, reducing risks to both workers and the environment. Industrial processes have also been revolutionized to lower energy consumption and improve efficiency.¹⁵ Efficiency upgrades have become a particular priority for small manufacturers operating in costly, urban areas and energy-intensive industries, such as cold-storage and processing of food and other perishable goods.¹⁶ For example, A to Z Kosher Meats, a meat processing company in New York City, has been able to reduce its energy costs by upgrading its refrigeration system.¹⁷ Small manufacturers in other industries are similarly reaping benefits from “leaning and greening” strategies. Taylor Companies—a Bedford, Ohio-based furniture maker employing 65 workers—was able to save \$63,000 on its annual energy expenditures following a 2005 move into a consolidated industrial facility with new energy-efficient equipment, and reaped additional savings by diverting sawdust, leather scraps, and other waste materials from landfills to recyclers.¹⁸

All told, urban manufacturers are key players in most urban economies, a role which could be strengthened and expanded if the right policies and programs were put in place to support them.

Table 4. Share of Total Manufacturing Employment by Sub-Sector, 20 Largest US Cities

City	Food, Beverage, and Tobacco	Textiles	Apparel and Leather	Paper and Printing	Petroleum and Coal	Chemicals, Minerals and Plastics	Metal	Computers and Electronics	Machinery and Equipment	Transportation Equipment	Wood and Furniture	Miscellaneous
New York, NY	11%	7%	27%	13%	-	8%	7%	2%	5%	2%	6%	14%
Los Angeles, CA	9%	3%	25%	7%	1%	12%	11%	10%	5%	5%	6%	7%
Chicago, IL	26%	2%	3%	11%	-	12%	18%	2%	9%	5%	6%	6%
Houston, TX	13%	1%	1%	8%	2%	15%	22%	6%	19%	2%	5%	5%
Phoenix, AZ	6%	-	1%	8%	-	12%	13%	19%	8%	15%	13%	5%
Philadelphia, PA	20%	2%	9%	13%	4%	10%	9%	2%	10%	11%	4%	5%
San Antonio, TX	26%	7%	10%	8%	-	10%	6%	5%	5%	5%	12%	6%
San Diego, CA	7%	-	1%	4%	-	9%	4%	36%	12%	13%	3%	10%
Dallas, TX	13%	2%	3%	14%	-	9%	10%	24%	6%	10%	5%	3%
San Jose, CA	2%	-	-	2%	-	3%	7%	67%	12%	1%	1%	4%
Jacksonville, FL	26%	-	3%	12%	-	11%	13%	3%	3%	6%	9%	14%
San Francisco, CA	18%	-	39%	15%	-	-	5%	8%	-	-	8%	7%
Indianapolis, IN	7%	-	1%	9%	-	14%	19%	3%	11%	28%	2%	4%
Austin, TX	2%	-	-	5%	-	7%	2%	60%	9%	2%	2%	11%
Detroit, MI	10%	-	-	4%	2%	9%	11%	-	9%	54%	-	1%
Columbus, OH	22%	-	-	6%	-	22%	15%	12%	10%	7%	2%	4%
Charlotte, NC	25%	2%	2%	13%	-	18%	10%	13%	9%	2%	-	5%
Fort Worth, TX	12%	-	-	7%	-	10%	10%	4%	6%	44%	5%	2%
Baltimore, MD	22%	-	4%	17%	-	31%	9%	-	-	9%	4%	4%
Memphis, TN	19%	-	-	25%	-	17%	11%	-	9%	-	4%	15%
20 city average	13%	2%	10%	9%	0%	11%	11%	14%	8%	9%	5%	7%

Source: American Fact Finder, U.S. Census Bureau (2007)

Table 5. Median Wages and Wage Change in Manufacturing vs. All Occupations, 2004-2008

City	Median Wages 2004 (All Occupations)	Median Wages 2004 (Manufacturing)	Median Wages 2008 (All Occupations)	Median Wages 2008 (Manufacturing)	Wage Change 2004 - 2008 (All Occupations)	Wage Change 2004 - 2008 (Manufacturing)
San Jose, CA	42,161	61,889	41,905	71,469	-256	9,580
San Francisco, CA	47,484	53,899	46,254	60,189	-1,230	6,290
Austin, TX	34,890	46,562	31,628	52,418	-3,262	5,856
San Diego, CA	37,740	49,690	37,781	53,537	41	3,847
Jacksonville, FL	34,002	36,582	32,248	40,113	-1,754	3,531
New York City, NY	36,312	27,448	36,127	30,525	-185	3,077
San Antonio, TX	27,351	24,960	26,953	27,967	-398	3,007
Dallas, TX	28,570	25,390	27,218	27,109	-1,352	1,719
Phoenix, AZ	30,670	32,387	31,075	33,805	405	1,418
Philadelphia, PA	32,272	31,181	31,771	31,885	-501	704
Houston, TX	28,926	36,651	28,292	35,659	-634	-992
Los Angeles, CA	28,917	25,632	27,873	24,582	-1,044	-1,050
Charlotte, NC	34,219	38,482	34,067	37,052	-152	-1,430
Chicago, IL	34,983	32,005	32,204	30,562	-2,779	-1,443
Fort Worth, TX	29,094	37,437	30,850	35,481	1,756	-1,956
Memphis, TN	27,967	34,034	26,810	32,010	-1,157	-2,024
Baltimore, MD	32,197	36,142	30,753	33,356	-1,444	-2,786
Columbus, OH	34,332	39,489	31,549	36,471	-2,783	-3,018
Detroit, MI	29,641	41,632	23,998	34,600	-5,643	-7,032
Indianapolis, IN	33,760	45,807	30,846	37,502	-2,914	-8,305
United States average	33,603	40,187	32,002	39,852	-1,601	-335
20 city average	33,274	37,865	32,010	38,315	-1,264	450

Source: American Communities Survey, 2004 and 2008

III. ADVANTAGES AND CHALLENGES OF URBAN MANUFACTURING

Not only is manufacturing an essential component of many urban economies, but cities in turn provide numerous benefits to the manufacturing businesses that choose to locate within them. In fact, the advantages associated with urban agglomeration are more relevant than ever to SUMs competing in regional and global marketplaces, for several reasons:¹⁹

- 21st century, small-scale producers are well-matched with urban environments; agile, decentralized networks of firms utilizing small footprints thrive on proximity to urban assets. Synergies between these networks promote the information spillovers and knowledge-sharing that not only help firms innovate but help build stronger, more innovative urban economies.
- Urban areas provide unparalleled access to workers of every level and variety of skill. Cities and metros are thick markets for labor, and urban transit networks enable workers from entire regions to access centrally located employment sites. Cities also offer rich educational resources that support technical training and skill mobility, as well as global perspectives on cutting-edge business development and management practices.
- Cities give manufacturers excellent proximity to dense infrastructure and logistics networks. The port, rail, and road infrastructure that enabled cities to dominate 19th- and 20th-century production facilitates these exchanges and remains a strategic advantage for import, export, and distribution.
- Finally, dense urban areas offer a dynamic customer base. Large cities and strong regional markets, particularly, can often sustain demand for high-value consumer products adapted to meet local tastes. This is an advantage for both SUMs and the markets they serve, as firms' organization, agility, and proximity to multimodal transportation hubs make them particularly adept at providing customized, rapid responses to fluctuations in local demand. In fact, cities and the metropolitan regions they anchor are often the primary market for goods produced by SUMs, allowing classic cycles of import substitution and industry growth to play out.

These advantages motivate many small manufacturers to stay in urban locations, despite the obstacles these areas can present. Some challenges, such as securing capital, finding appropriately qualified workers, and accessing quality market information, are shared with many nonmanufacturing small businesses, particularly inner-city firms. But SUMs face specific challenges rooted in the very qualities that make cities attractive—challenges that may even be the unintended consequences of policies adopted to achieve other urban-development ends. Among these are industrial land availability and quality, and urban infrastructure conditions.

Availability, Affordability, and Quality of Land and Buildings

The difficulty of acquiring, developing, and maintaining tenure on suitable urban land is a considerable challenge for some manufacturers, in both strong- and weak-market cities. This challenge arises from the increasing conversion of land to other uses, particularly in cities such as Los Angeles and Chicago; from widespread vacancy and blight in weaker markets, such as Detroit and Buffalo; from the prevalence of contaminated urban land, such as in Cleveland; and from the mismatch between the specific needs of manufacturers and the available building stock, such as in Atlanta.

Conversion, encroachment, and speculation

Competition for land with nonmanufacturing users inhibits the emergence and growth of SUMs, most dramatically in strong markets, but in weaker-market cities as well, where short-term fiscal concerns often trump longer-term economic development strategies.

In strong-market cities—most vividly exemplified by New York City and the San Francisco Bay Area—SUMs struggle not only against actual market competition from other land users, but against the misguided paradigm of a “post-industrial” city that has been embraced by many political, civic, and business leaders. This paradigm is based on the notion, fueled largely during the urban boom of the 1990s and early 2000s, that urban revitalization can be led by amenity- and retail-driven growth—an idea that discounts the importance of production-intensive activities and economic diversity.

Cities’ fiscal needs and aspirations also drive the conversion of manufacturing land to uses that will yield higher property taxes. Actual market and assessed values for manufacturing land in cities is nearly always much lower than values for comparably located residential land, particularly residential land that can be developed to high densities. In addition to adding to the local property tax base, land reclassified for retail use generates sales taxes, while land developed residentially generates income taxes. From a strictly fiscal perspective, the pressure to encourage the conversion of urban industrial land to other uses is difficult for cities to resist.²⁰

In the strong-market context, SUMs are particularly vulnerable to land-related pressure, because a large proportion of them rent, rather than own, their spaces.²¹ No U.S. city regulates nonresidential rents, so tenant SUMs are unprotected when rising land values increase rents to unaffordable levels or induce landowners to refuse to renew commercial leases.

In New York City, for example, over 20 percent of the 12,542 acres land that was zoned for industry as of 2002 had been rezoned for other uses by 2010. Beginning in 2002, then-Deputy Mayor Daniel Doctoroff led the Bloomberg administration’s initiative to redevelop the city’s industrial waterfronts to accommodate high-rise residential and office towers, along with retail uses and amenities aimed at attracting affluent new residents.²² Citing the total acreage in New York City zoned for industrial uses, and the decline of large-scale manufacturing, the

administration built a case for rezoning large areas of the Brooklyn and Queens waterfronts, as well as smaller areas of the Bronx, and most of the remaining industrially zoned land in Manhattan.²³ Other cities have undertaken similar conversion initiatives: Atlanta, San Jose, Boston, Portland, Los Angeles, Minneapolis, and Baltimore, for example, have rezoned between 12 and 20 percent of their industrial land for other uses during the past decade.²⁴

In addition to formal rezonings enacted within an intentional policy framework, land for manufacturing is reduced by a number of other mechanisms, including permissive classifications of uses allowed in manufacturing districts, such as big box retail, hotels, and other uses that directly compete with manufacturers; encroachment by nonindustrial uses legalized by waivers, variances, and special permits; and informal encroachment, often by small space users, such as artists, art and art-related retailers, and residents.²⁵ Together, these intrusions erode a city's industrial land base, increase land prices, and often pave the way for comprehensive rezonings that institutionalize what began as piecemeal change. They can also create pressure on local authorities to enforce compliance with standards on noise, sanitation, trucking, etc., that new users demand but which manufacturers are unable to meet.

The Downside of Waterfront Development

SUMs have increasingly become casualties of the global trend of reprogramming urban waterfronts. That trend, which first gained momentum in Europe and the United States in the 1980s, reflects both the decline of “heavy” manufacturing within cities, and the reconfiguration of ports to accommodate containerization and larger ships, which has often led to the relocation of port facilities to outlying areas that can accommodate larger footprints and heavier truck and rail traffic. Waterfront access for residential and recreational use is a key ingredient in the “live, work, play” formula being applied in cities around the world: London’s Docklands, Vancouver’s Yaletown, Amsterdam’s Eastern Docklands, and Washington, D.C.’s Navy Yard are only a few of scores of major projects that have led the transformation not only of their respective waterfronts, but of large areas of surrounding industrial land.

Cities that have undertaken major redevelopment of waterfront and upland industrial areas for new uses have used the full range of tools to bring about the transformations they seek. In addition to rezoning, they have underwritten the creation of public spaces and amenities, either by funding their construction directly or mandating their inclusion in private developments (where upzoning more than compensates developers for their cost). They have, in some instances, used the power of eminent domain to eject industrial users who are unwilling to vacate land slated for new development.

Many urban waterfront redevelopment projects have accomplished their goals of urban revitalization, which is no doubt a good thing. The open policy issue, however, is how cities can include provisions in the redevelopment process to acknowledge and remediate the displacement of the still-viable manufacturers in those areas and preserve sufficient, affordable space in other areas for future industrial uses. While most modern urban manufacturing is not water-dependent, manufacturers remain clustered near waterfronts because of historical land use patterns. When these areas are redeveloped for high-value uses, these firms may be left with limited options. Many need to remain in the cities that house their suppliers, their networks, and their customers, and may be required to relocate to less well-situated neighborhoods, where services, building conditions, and access for workers are less optimal. Or they may be forced out to suburban or semi-rural locations where they lose the advantages associated with their urban locations. Inevitably, some are unable to replicate the advantages of their original locations and are forced to close. Some cities have made efforts to assist manufacturers that are directly displaced by redevelopment—but business owners who do not also own their buildings are not generally eligible for compensation or relocation assistance.

Vacancy and abandonment

SUMs in weak-market cities, particularly those that have experienced dramatic population loss, face a different set of land issues. Cleveland, Detroit, Pittsburgh, and St. Louis, for example, each lost somewhere between 50 and 60 percent of their 1950 populations by 2009 (table 1). Plummeting land values in these cities has resulted in the vacancy and abandonment of acres of commercial and industrial property, which in turn has helped to erode the agglomeration economies that endow cities with their competitive advantages in the first place. Many surviving firms have found themselves stranded in neighborhoods checker-boarded with vacant lots and buildings; land may be available, but only as scattered sites that are difficult to assemble. Abandoned buildings, deteriorated infrastructure, blight, and crime are real and perceived menaces to remaining and potential business owners, workers, and clients.

Land owned by firms that fail or cease operation for other reasons (e.g., when principals retire and are unable to find buyers) often falls into municipal ownership when tax liens are foreclosed. Shrinking cities typically lack the staff and resources to manage extensive portfolios of vacant and distressed commercial properties strategically and/or may be inhibited from doing so by weak and antiquated state laws governing tax foreclosure, land banking, and code enforcement.²⁶ As such, many distressed localities are barely able to maintain an up-to-date inventory, much less synch the redevelopment of available commercial properties with longer-term, holistic planning goals and economic-development strategies.

Environmental contamination

While suburban or rural manufacturers can build or expand on greenfield sites—where development costs are predictable and low—most urban industrial land has been occupied and built over repeatedly for a century or more, and can be laden with contaminants. Urban manufacturers are often located in areas where responsibility for such past contamination may be difficult to pinpoint, leaving present-day owners responsible for investigation and remediation. Uncertainty and delay, moreover, can be as problematic for owners and prospective end-users as actual cleanup costs. Brownfield issues may not be “surfaced,” for example, until building or utility construction requires excavation, which alone deters many firms from undertaking expansions and upgrades.

Some state and local governments, including Pennsylvania, New Jersey, and New York, have adopted use-based cleanup standards for brownfields, intended to ease the burden on industrial landowners and users by allowing less expensive remediation than would be required for residential or other use. Still, the cost of environmental cleanups and infrastructure upgrades can exceed the reach of individual firms and often requires subsidy in the form of direct government investment or tax credits and other incentives. Where state and local governments are cash-strapped, there is pressure to reserve those subsidies for “highest and best uses” that promise a higher fiscal return to the public sector in the form of property taxes; this dilemma has come up in such cities as Cleveland, where federal dollars for economic development have largely been channeled to the housing sector over the past 20 years.²⁷ Local governments may opt to subsidize the construction of office and entertainment complexes, for

instance, and even exercise eminent domain powers on behalf of their developers, often to the detriment of SUMs in long-established industrial areas.²⁸

Mismatch between space needs and the available stock of land and buildings

Many cities have a surplus of multistory, large-footprint industrial buildings, many of which were built for large, single-occupant firms. These buildings often lack sufficient loading and staging space, and water, sewer, gas, and electricity connections may be inadequate or in poor condition.

Private developers have had some success in subdividing large buildings to meet the needs of small firms, but it is difficult to finance such acquisitions and conversions while keeping rents affordable to small manufacturers. In strong-market cities, this gap is often inflated by property owners' expectations, which are based on the value of the land when converted to offices or high-end residential uses rather than on its existing industrial use. This is also a problem in weak-market cities, where buildings need to be subdivided and upgraded, even where there is insufficient return on the investment to lure private developers. In some instances, this gap has been overcome when a mission-driven nonprofit willing to accept a lower return on its investment undertakes the conversion. But nonprofits typically lack the equity or risk-capital to put a down payment on a property while an environmental impact assessment is undertaken and financing is arranged. This gap in equity and capacity delays projects, just as real estate pressures may be driving up surrounding land costs and otherwise eroding a city's industrial base.²⁹

Even where markets for rental space are well-developed, and move-in-ready space is available, manufacturers usually have more specialized requirements than other space users. Industrial space may seem generic, but firms may have quite specific requirements based on their production processes. For example, a manufacturer may be seeking 30,000 square feet, with off-street loading space, natural light, three-phase power, and 14-foot ceilings. Brokers specializing in industrial space say that a vacancy rate of 10 to 15 percent is necessary to afford mobility to the tenants that make up a diverse industrial sector; this compares to the rate of 5 percent or less considered healthy in the market for office space.³⁰

Small manufacturers in strong-market cities frequently face land- and building-related barriers that disadvantage them relative to larger or higher-tech industrial firms. For example, while small, centrally located research and development (R&D) firms are often able to find accommodating "live/work" spaces in cities such as Los Angeles, many small manufacturers in lower-tech industries struggle to find comparably well-located spaces.³¹ In response to this difficulty, some nonprofit developers in cities, such as the Greenpoint Manufacturing Design Center (GMDC) in Brooklyn, New York, have become adept at customizing retrofits and installations to accommodate low-inventory/manufacture-to-order production techniques. In other instances, large corporations—such as the Allen-Bradley Corporation in Milwaukee—have chosen to embed smaller, compartmentalized "factories" within multistoried sites.³² Many multitenant industrial parks also tend to accommodate "just in time" (JIT) style operations.³³

Inadequate Infrastructure

Along with land and space issues, undersized and obsolete infrastructure also inhibits the growth of SUMs. Manufacturers' day-to-day operations require handling materials and loading and transporting products, and thus they are even more dependent on efficient, modernized urban infrastructure than other types of businesses. Unfortunately, SUMs are likely to be located in neighborhoods where the conditions of streets, utilities, and drainage systems are worse than in residential and commercial areas. From the Harbor area in Los Angeles to the industrial parks in Maspeth and Sunset Park in New York, crumbling roads and curbs, and failing sewers and storm drains, have been obstacles to effective goods mobility.³⁴ Even where manufacturers and landowners are willing and able to invest in upgrading local infrastructure, they are beset with permitting and related obstacles, because abutting industrial sites are often managed by a patchwork of owners with a range of interests and needs.

Regionally and nationally, pressure on transportation infrastructure is driven primarily by the flow of imported goods, particularly those entering the United States via West Coast ports and transported by truck or rail to destinations throughout the country. Manufacturers thus must compete for road space and intermodal capacity with imports and local distribution. Other activities, including waste disposal and construction, also heavily burden local streets and highway capacity. This problem is likely to worsen, as the Federal Highway Administration (FHWA) projects that the total ton-miles of freight moved in and through major metropolitan areas will grow dramatically in the next twenty years, with increases of 70 percent expected between 2005 and 2035 for New York City region and similar increases projected for California's ports.³⁵

Transportation infrastructure in many U.S. cities is already at or over capacity, and public and private investments have failed to keep up with intensifying demands. Recent investment in freight rail, for example, has largely bypassed urban cores, with new intermodal facilities demanding large footprints and thus favoring outlying locations within metropolitan regions. As a result, regional and long-haul freight movement, especially in the eastern United States, has increasingly depended on trucks. This dependence, in turn, is stretching the highway system to its limits, with urban areas experiencing the worst congestion. Capacity challenges are exacerbated by the fact that many roads are in poor condition. Truck traffic wears out road surfaces and crushes curbs and sidewalks. Trucking impacts—congestion, pollution, and degradation of the built environment—are also among the major causes of conflict between urban manufacturers and their neighbors, fueling demands by local residents that SUMs “mitigate, compensate, or relocate.”³⁶

Anticipated increases in both total domestic freight tonnage and the share of domestic freight being moved by trucks will have both positive and negative impacts on SUMs.³⁷ Firms that produce goods for local markets may see their competitive advantage enhanced, as both rising fuel costs and unpredictable transit times make imports less attractive. But SUMs will also

suffer from higher costs and uncertainty in getting raw materials from their suppliers and in shipping finished products to customers outside their own cities.

Inadequate Access to Capital

For many American manufacturing businesses, limited access to capital and cost-based strains remain an obstacle to expansion and entry into new markets, a reality that disproportionately burdens the nation's smallest firms. This is confirmed by NIST's finding that the "limited budgets" of SUMs and "lack of access to the newest technologies" are a "significant barrier" to their productivity.

Even before the Great Recession, many of America's small manufacturers were still trying to regain a competitive foothold after the successive downturns of the past decade. As recently as 2004 and 2005, many small manufacturers in the United States were still reeling from the 2001–2002 recession. Since 2008, turmoil in the banking sector and credit markets has frozen financing options for small businesses in many parts of the country, making it increasingly difficult for small manufacturers to retain a sufficient cushion of capital to meet market demands, stabilize, and expand.³⁸

There are several reasons why a lack of access to working capital tends to put a greater strain on small, urban manufacturers than larger or non-urban firms.

First, suburban and exurban manufacturers have historically enjoyed cost-based advantages over SUMs that contribute to disparities in their ability to attract and retain capital. SUMs not only pay higher rents than their suburban and rural counterparts but tend to occupy older, deteriorated buildings and face limited intracity options for expansion and relocation. In addition, research suggests that small firms in large cities are more likely to be squeezed by high energy costs than large firms, on an energy cost per sales basis and cost per value of industry shipments.³⁹ The cash-flow constraints facing small manufacturers in cities make them less able than large and suburban firms to borrow money on affordable terms.

A second, related issue, is that SUMs in cities are more likely to be tenants in multi-unit, industrial buildings than owner-occupiers. As a result, they remain barred from federal (and many state) loan-assistance programs that condition funds on owner-occupied status.⁴⁰ While the extent of this problem in urban contexts is unknown due to a lack of data and research, industrial lease rates and the treatment of small-manufacturer borrowers by lenders strongly suggest that many small firms are adversely affected by this reality.

Third, geographic and sectoral redlining add an extra hurdle for small firms in an already risk-averse financial climate. America's smallest manufacturers have long been at a competitive disadvantage as borrowers, even more so when associated with little-known or unpopular industries perceived as overly risky. Limitations on data prevent a robust analysis of the extent to which banks limit lending to small manufacturers in cities. However, the evidence on this

front is sufficiently compelling to conclude that such practices continue to affect small, urban firms. Federal Reserve Chairman Ben Bernanke has lamented that “often we see small establishments being excluded in a new form of redlining,” whereby lenders tell small businesses “in a distressed area or a distressed industry... ‘We don’t want to look at you.’”⁴¹

Undercapitalization, whatever the root cause, undercuts what are otherwise among SUMs greatest advantages—their ability to innovate, cluster, and nimbly respond to niche-market demands.⁴² Lack of access to capital limits firms’ capacity to invest in R&D, product development, commercialization, exports, and energy-efficiency upgrades. SUMs typically lack the time, funding, and staff to undertake formal, early-phase R&D, as well as energy-efficiency projects. They also tend to lack the resources to research and apply for competitive grants and loans for product development or commercialization and seek out related technical-assistance programs. Undercapitalization also keeps SUMs at a disadvantage relative to the large firms that represent the vast majority of exporters in the United States; expanding into new domestic and global markets requires firms to invest the time of principals, staff, and consultants not only in developing competitive products and pursuing leads, but in navigating regulatory complications and cultural differences. More capital alone cannot resolve all these issues, but clearly, removing barriers to capital access helps firms manage and meet their priorities and build their capacity to enhance value.

Lack of Appropriately Skilled Workers

Well-trained, knowledgeable workers are vital to the success of manufacturing businesses.⁴³ Unfortunately, over half of America’s manufacturers report shortages of appropriately skilled applicants for job openings.⁴⁴ In fact, small manufacturers across the country cite their inability to find competent technicians as a top barrier to growth.⁴⁵ This trend can be seen in many U.S. cities, including Seattle, Baltimore, Cleveland, Chicago, and Boston. Thus, even where urban factories are enjoying increased demand and greater access to advanced technologies, finding qualified and capable technicians can be a daily struggle.⁴⁶

Tackling the workforce predicament requires confronting a systemic, cultural problem: manufacturing suffers from a poor public image. Study after study reveals that, in recent decades, American youth in cities nationwide have come to view manufacturing jobs—and blue-collar occupations more generally—as unappealing, including positions that require low-to-mid-level skills and offer stability and high median wages.⁴⁷ A 2009 survey conducted by Deloitte reveals that,

while Americans view manufacturing as the most important industry for a strong national economy... they are not pursuing careers in manufacturing. Only 17 percent [of those surveyed] named manufacturing as among their top two industry choices to start a career, and only 30 percent of parents [surveyed] said they would encourage their children to pursue jobs in manufacturing.⁴⁸

Students and parents often share common and inaccurate perceptions of manufacturing and career prospects within the sector. Even those who acknowledge that the sector is still relevant and vital to economic growth associate manufacturing with pollution, assembly lines, and heavy, labor-intensive processes, despite its drastic transformation in recent decades. Such perceptions have been influenced by many factors, including losses in traditional manufacturing jobs during the past several decades, popular media portrayals of the sector, and misleading political debates at all levels of government that have framed “good” economic development in terms that have ignored or marginalized goods production.

Secondary and postsecondary vocational education suffers from similarly outdated and harmful perceptions and assumptions, which affect the type and breadth of coursework offered. Educators, policymakers, parents, and students tend to view a four-year college degree as the most desirable educational goal, overlooking the opportunities available to those with training in technical and mechanical skills. As a result, vocational and technical high school courses continue to be stigmatized, and few resources have gone to training teachers, updating programs, and investing in facilities. Meanwhile, many community and technical colleges around the country have abandoned the manufacturing sector—and the curricula that support it—while expanding courses and tracks in areas such as information technologies, construction, and health care. While nonprofits, unions, and trade associations in many areas offer apprenticeship, career counseling, and skill-up gradation options to entry-level and incumbent workers that can help meet the needs of local manufacturers, demand for such training far exceeds what these organizations and institutions can deliver from their often uncertain base of resources. These groups also typically lack the capacity to shape political priorities and institutionalize their approach or to meaningfully link their training functions to comprehensive, citywide, or regional sectoral or cluster strategies.⁴⁹

Urban workforce development is an urgent policy matter, in light of urban unemployment rates, lagging educational outcomes among urban youth, and impending sector demands. Findings from a few large U.S. cities—including Boston, Seattle, and Charlotte—suggest that the imminent wave of baby-boomer retirements is likely to undercut competitiveness in manufacturing, which suffers more than other sectors from its failure to attract and train younger workers.⁵⁰ Education and workforce programs, and the perceptions that shape them, thus need to be challenged and revamped if the sector is to have the kind of world-class workforce that can plausibly rival our better-equipped competitors.

Limited Access to High-Value Supply Chains, Information, and Expertise

Limited information, connections, and access to technical assistance, finally, can also hinder SUMs’ growth potential. Successful SUMs commonly possess specific industrial expertise, astute judgment, and a strong work ethic. Too often, though, many also lack the higher-level business acumen, access to networks, and quality information needed to expand and compete in an increasingly global and digital marketplace.

Over the past few decades, American manufacturers have emerged as part of what Josh Whitford calls “a new old economy,” whereby a lot of “what matters” to many manufacturers “no longer happens under roofs they own or control.”⁵¹ The decentralization and reorganization of U.S. firms and industrial activity that have enabled many new manufacturers to succeed have also left firms vulnerable to a phenomenon that Whitford and Andrew Schrank dub “network failure,” which develops when small manufacturers are isolated from potential OEM customers, specialized knowledge, and supportive resources.⁵² While advances in telecommunications, transportation, and web-based technologies have helped to integrate and ease production and distribution, many modern-day firms still struggle with basic steps toward network-building: obtaining high-quality information about markets, identifying new product-lines and support services, and coordinating with other firms to maximize value along supply chains. These impediments become the “weak links,” or “failures,” in supply chains and logistics systems that stymie firm output and market vitality. They also negatively affect the hundreds of medium to large firms around the United States that rely on small suppliers for their survival.⁵³

Access to information about suppliers and market trends is a particular challenge to SUMs, for example. These firms often have little or no capacity to gather, pool, and analyze data on their own, nor can they afford, like many of their large and medium-sized counterparts, to buy (or maintain in house) the expertise they need to navigate complex regulatory, financial, and real estate environments. While agencies in the largest cities, such as New York, Seattle, and Los Angeles, undertake large-scale and complex studies of key sectors, most cities lack significant capacity in this area. Local intermediaries often help fill these gaps by making available applied research on specific sectors and subsectors; their work complements the broad-brush approach of most city economic development agencies. Still, localities and intermediaries are both impaired by a dearth of data on small manufacturing, leaving firms without in-house research capacity, lacking information critical to their business operations and growth potential. The upshot is that small manufacturers are less likely to be able to plan methodically for expansion, relocation, ownership succession, and other foreseeable transitions that characterize the path to growth and expansion.⁵⁴

IV. RESPONDING TO CHALLENGES: LOCAL POLICY INNOVATIONS

Numerous U.S. cities and regions have taken bold steps to preserve and support small-scale manufacturing using policy tools and strategies in land-use planning, financing, workforce development, “leaning and greening” resources, and export assistance, among others. These bottom-up strategies have often involved collaboration among local government agencies, private-sector businesses, consultants, and nonprofit partners working to help small firms better compete in the real estate, capital, and labor markets. Local agencies and intermediaries with on-the-ground knowledge and ties to urban civic, educational, and financial institutions help to “level the playing field” for clusters of small firms in promising industries.⁵⁵ Their activities not only nurture neighborhood economies, but promote a climate of confidence

citywide and regionally that encourages business and finance sectors to direct additional private resources and capital to urban industries.⁵⁶

These efforts can largely be grouped into a few major categories:

Coordinating Land, Transportation, and Infrastructure Management

Conversion pressures have led many large cities to undertake nuanced inventory analyses and industrial land-use studies in recent years. Many of these efforts—including those in Seattle, Baltimore, Minneapolis, and Jacksonville—have resulted in creative land-use reforms that protect designated industrial areas from conversion threats. These reforms strive to maximize the job-generating potential of local land, as seen in San Jose’s framework for designating “employment lands.”⁵⁷ Some land use reforms, such as Jacksonville’s, aim to secure a supply of industrial land proximate to interstate highways and ports for future industrial development and expansion.⁵⁸ Portland, which unlike most cities has a growth boundary, accomplished the same feat by adding 4,000 acres to its boundary in anticipation of future industrial growth.⁵⁹

In many U.S. cities, urban industrial parks have been created to preserve affordable space for manufacturers. The abandoned 300-acre Brooklyn Navy Yard, for example, was reborn as a modern industrial park, owned by New York City and managed by a nonprofit development corporation. The City has committed to keeping it industrial and upgrading BNY’s infrastructure and 4 million leasable square feet. This stability has attracted more than 275 tenants employing some 6,000 workers in everything from artisanal foods to furniture-making to ship repair. At this writing, a waiting list of tenants has led BNY to develop an additional 1.7 million square feet of new industrial space. Aggressive sustainability measures (discussed in the accompanying case study on NYC) are attracting the attention of green manufacturers, which form a new cluster of tenants.⁶⁰

Investing in America’s Urban Manufacturing Workforce

For years now, policy interest in training U.S. manufacturing workers has dwindled nationwide, even as SUMs, workforce-development advocates, and state MEP affiliates have sought to call attention to the issue. Since the 1970s—and more vigorously since the 1990s—many urban community-based organizations (CBOs), trade associations, and union affiliates have rallied to fill this void, creating and sustaining valuable workforce-development and training opportunities for metropolitan residents—even in the absence of strong business and public-sector leadership.⁶¹

Community-based organizations have partnered with community colleges, unions, and employers to create successful urban workforce development and technical assistance programs in every region of the country. The Milwaukee-based Wisconsin Regional Training Partnership (WRTP), for example, was initially born out of an alliance between unions and companies amid skilled-worker shortages and escalating global pressures in the early 1990s. By

2003, the nonprofit's base included 125 businesses, predominantly from the manufacturing sector, that had partnered with community colleges to develop industry-specific training protocol or on-site educational programs. Participating or partner companies have since remained committed to investing in worker training, manufacturing career pathways, and keeping family-wage jobs in the region, values espoused by WRTP.⁶² Over the years, partnerships with the Milwaukee Jobs Initiative (MJI) and local CBOs, such as the YWCA of Greater Milwaukee, have also helped to enrich WRTP's training offerings and job-placement efforts. Today, WRTP's worksite partners cover roughly 65,000 employees and—through their links with workers and communities—continue to keep “high-road” principles, productivity, and profitability at the core of their operations.⁶³

In the Bay Area, Professor Raquel Pinderhughes and the Ella Baker Center developed a model that relies on community-based organizations to recruit young people facing barriers to employment, including failure to complete high school, past incarceration, and drug use. These organizations provide job readiness and soft skills training, and support trainees as they advance through hard skills training at community colleges, and then into paid apprenticeships.⁶⁴ Similarly, Project Quest in San Antonio specifies the skills required of workers in targeted occupations and provides training and career-advancement ladders in partnership with local community colleges.⁶⁵ Work Chicago, for its part, launched efforts to introduce career-ladder training options within a few key sectors, including the city's food sector. Within a few years, new initiatives had grown out of this work, including Food Chicago and the cluster-centered Manufacturing Career Path Pilot.⁶⁶

Over the past decade, a handful of urban public high schools around the nation have also developed pioneering vocational-training models. Austin Polytechnical Academy on Chicago's West Side, for example, has formulated and implemented specialized STEM (science, technology, engineering, mathematics) curricula and internship programs that orient low-income, urban youth toward careers in engineering and technical trades.⁶⁷ Several small, themed high schools have also been created in New York City.

Filling Gaps in Services and Resources for SUMs

Local nonprofits—sometimes working with city agencies—can help identify and remedy the kind of research and information gaps that limit SUMs' capacity to develop strong, interfirm networks of communication and collaboration; strong ties between customer and supplier bases; and dense, higher-value supply chains. These mission-driven, goal-oriented efforts rely on these organizations' keen familiarity with an area's history, assets, shortcomings, and aspirations—block by block, neighborhood by neighborhood, and industry by industry.

Community Development Tech (CDTech), for example, is a nonprofit based in East Los Angeles, which, in the absence of more formalized channels for networking, provides forums for regular, community-based networking events for small manufacturers. Opportunities to network allow firms within the same small sector—for example, a cluster of local food manufacturers—to

discuss pricing, fines, permitting, tariffs, infrastructure maintenance, wages, and related issues. These matters tend to be especially difficult for small, immigrant-run manufacturing businesses in central cities to tackle, as navigating local administrative and bureaucratic channels to resolve problems or gain assistance can be a tricky process. CDTech, whose partners include a local community college and workforce-development groups, works closely with local food-manufacturing and toy-manufacturing firms to support clustering that might not otherwise occur and to bridge gaps in informational and technical resources.⁶⁸

Another urban model is the \$8 million Grow Seattle Fund, a partnership between Seattle's Office of Economic Development (OED), the Seattle Foundation and the National Development Council's Grow America Fund. The fund, which was established in late 2009, provides low-interest financing to established small- and medium-sized manufacturers (start-ups are not eligible for financing under this program).⁶⁹ The OED prioritizes engagement with local, small-scale industries through different methods of outreach and network-building, from casual happy-hour events to formal consultations. The OED staff considers these efforts to be central to the ultimate effectiveness of their assistance.⁷⁰

The Trade Development Alliance of Greater Seattle (TDA), finally, is an example of a program aimed at helping local manufacturers broaden their global reach. Recognizing potential opportunities for SUMs to expand into global markets and develop partnerships with large export-driven manufacturers, TDA sponsors trade missions as well as educational and technical assistance to help firms overcome regulatory and financial hurdles to developing their global-export capacity.⁷¹

Embracing “Triple-Bottom Line” Economic Development Planning

A number of organizations around the country, finally, have embraced “triple-bottom line” solutions to address the challenges facing urban manufacturers. *Environment* (green processes and products); *equity* (shared prosperity with workers, through family-wage jobs); and *economic development* (value-added, competitive activities) together form the backbone of this philosophy and the public- and private-sector efforts that adhere to it.

One example of this approach can be seen in the work of Cleveland WIRE-Net’s Great Lakes Wind Network (GLWN), which in 2006 received Community Development Block Grant (CDBG) funding from HUD to scale up its wind-turbine-parts supply-chain mapping activities. GLWN tailors specialized support to the demands and needs of firms interested in leaning and greening strategies, through marketing, process-management counseling, and energy-efficiency grants customized to account for local market dynamics (e.g., energy and space costs) and sectoral specifications. They are also familiar with acceptable training certification and workplace standards and, where applicable, how they might intersect with “green job” opportunities.⁷²

Organizations such as the New York Industrial Retention Network (NYIRN) in New York City and CDTech in East Los Angeles have also been involved in efforts to “green” small-scale industries in central-city areas. NYIRN has published two studies to increase the awareness of business owners about growing demand for green building products and then created the Spec It Green event series to bring potential buyers of green products together with the manufacturers and to provide information about technologies, certifications, life cycle analysis, and other emerging issues. CDTech is piloting a marketing and technology assistance initiative to upgrade a group of companies in four sectors.⁷³

Massachusetts Growth Capital Corporation

Some states have also been developing initiatives to help industrial businesses weather the recession, navigate barriers to financing, and prepare for future market demands. The Massachusetts Growth Capital Corporation (MGCC), a statewide quasi-public entity, was created in August 2010 upon authorization of a comprehensive economic-development bill by Governor Deval Patrick and the Massachusetts Legislature. MGCC is designed to provide small- and mid-sized businesses—including many manufacturers—with access to capital and technical assistance, including grants and mentoring services. The corporation seeks to help small firms expand in place, while providing greater job opportunity and improving local tax revenues. The MGCC will also use public funds for infrastructure improvements. As of November 2010, MGCC has invested \$77 million in 126 Massachusetts companies.

The MGCC model may be instructive for states seeking to use quasi-public mechanisms to help improve SUM performance and access to loans and growth-opportunities in private markets. Such entities might also be ideal for facilitating state-federal partnerships, whereby federal agencies could assist state quasi-publics with providing capital infusions to small manufacturers.

See: Colleen Quinn, “Lawmakers advancing \$75m development plan,” Boston Globe, November 24, 2010.

V. THE ROLE AND LIMITATIONS OF FEDERAL POLICY

“The answer isn’t to stop building things, to stop making things; the answer is to build things better, make things better, right here in the United States. We will rebuild this economy stronger than before and at its heart will be three powerful words: Made in America.”

—Remarks by President Obama at the signing of the Manufacturing Enhancement Act of 2010, August 11, 2010⁷⁴

The enactment of the Manufacturing Enhancement Act of 2010, and the remarks by President Obama that accompanied its passage, are encouraging signs that the federal government is committed to building an American economy that is more productive, diverse, and resilient than the one it inherited. However, this measure, which reduces or eliminates tariffs on certain

materials imported by U.S. manufacturers, was not born out of a comprehensive policy framework of any kind; it reflects a singular, ad hoc agenda, not adherence to a guiding vision.

While long-standing and emerging competitors are purposefully building their productive capacity through strategic and sustained interventions—laying 21st-century communications and transportation infrastructure, investing in R&D, creating massive incentives for clean technologies and their manufacture—our own federal policies have remained weak and unfocused. As forces of globalization decimated America’s heavy manufacturing sector over the past several decades, the federal government was blinded by ideologies of free trade and free markets and thus grossly inattentive to the needs and demands of America’s changing industries. Rather than employing policies and performance metrics designed to revitalize and nurture a cutting-edge, high-value manufacturing sector in U.S. cities and metro areas, it embraced an economic vision based on consumption, finance, and real estate that helped drive American people and industrial jobs out of urban areas, manufacturing out of America, and, most recently, the nation’s economy right into the ground.

As discussed above, city and state governments, nonprofit intermediaries, state MEP affiliates, and urban manufacturers have implemented a range of innovative responses to help retain and support production in the nation’s cities and metros—some of them assisted with federal funds of one sort or another. But without stronger, more focused, and better integrated federal policies and investments that appreciate the potential of the manufacturing sector and recognize how radically it has changed, even the best state and local efforts will largely remain isolated and of limited effect. After a half century of neglect, we have a long way to go, in three fundamental ways:

The Federal Government (Still) Lacks a National Manufacturing Agenda

Unlike many other industrial nations, the United States has no formal strategy for boosting and sustaining a robust manufacturing sector.⁷⁵ Instead, current federal programming affecting manufacturers is made up of a patchwork of programs cutting across a range of agencies with assorted missions.⁷⁶ This hodgepodge of efforts is marked by little or no coordination among agencies, and no cohesive vision or strategy to guide it forward or benchmark against.

Today, over 200 programs lodged in multiple federal agencies target assistance to the U.S. business sector at large, 100 of which serve “small” businesses of all types. Over 50 such programs exclusively offer business management or technical assistance to small businesses, with fewer programs offering both nonfinancial and financial assistance. At least 10 federal programs target assistance to manufacturing firms of all sizes, spanning the areas of process management, business counseling, export assistance, and workforce training. These programs include NIST/MEP and the Next Generation Manufacturing Technology Initiative, administered by Commerce and Defense, respectively. In 2007, five federal programs targeted small manufacturers, located anywhere, all of which were concentrated in the areas of defense and agriculture.⁷⁷

Since 2009, the Obama administration has avowed its commitment to revitalizing American manufacturing. In September 2009, the administration named Ron Bloom senior counselor on manufacturing policy and three months later released the *Framework for Revitalizing American Manufacturing*, bringing a new focus on the need for federal reform in this policy area. Prior to that, the Recovery Act of 2009 allocated roughly \$100 billion for R&D and manufacturing related to alternative and renewable energy as well as energy efficiency.⁷⁸ The administration also pledged to expand resources for small businesses of all types, through increased SBA loan guarantees; support to small businesses through the Troubled Asset Relief Program (TARP); increased support to the NIST/Hollings Manufacturing Extension Partnership (MEP); tax reforms aimed at spurring investment in the small-business sector, with an emphasis on clean-energy manufacturing; and additional support for the nation's community colleges. President Obama's goal of doubling exports over the next five years, announced in his 2010 State of the Union address, provides a yardstick by which the impacts of these public investments can be measured over time. However, more nuanced metrics for understanding and gauging the effects of federal support for American manufacturing remain elusive.⁷⁹

Still, while these measures represent a step in the right direction, they do not represent any sort of purposeful, strategic industrial policy aligned around a national vision for renewing and supporting U.S. manufacturing know-how and the sector's economic might. Nor does it appear that either emerging or existing efforts have yet acknowledged how significantly manufacturing has changed over the past few decades, in terms of how, where, and for whom goods are produced—putting SUMs in particular in a problematic policy blind spot.

There are a few exceptions: Many of the MEP's centers are located in cities or metropolitan areas, for example, and are attuned to local market conditions and sector-specific challenges. And recent changes within the EDA suggest a shift in federal focus toward regional-scale, industrial-development planning and more targeted, sectoral strategies. The EDA's nascent Regional Innovation Clusters (RICs) Initiative, for example, draws on evidence that "geographic concentrations of firms and industries" have positive spillover effects on regional and domestic productivity and innovation.⁸⁰

But beyond these few examples, federal policy and programs have been, at best, silent on the significance and needs of SUMs in defining program goals and the state and local activities eligible for federal support. As a result, current policies and programs are not designed to address these firms' special challenges and contexts, and in many instances, create barriers to their participation. SBA loan-eligibility standards, for instance, include size criteria that bar many SUMs, while federal loan programs favor manufacturers who own rather than lease their space, which is more common in urban areas. Meanwhile, programs like MEP are just drops in the federal budget bucket: federal spending on the MEP was just \$124.7 million in fiscal year 2010—a mere quarter of that allocated toward agricultural extension.⁸¹

Federal Urban Policy Ignores Industrial Development and Competitiveness

If federal manufacturing policies and programs have been more or less spatially agnostic, federal place-based policies and programs have, for their part, largely ignored urban economic development and job creation—and, consequently, the important role that manufacturing plays in improving cities' economic growth and employment opportunities.

The largest federal funding programs that offer direct, flexible financial assistance to cities, metropolitan counties, and regional organizations come primarily through HUD's Community Development Block Grant (CDBG) and HOME programs. In FY 2010, these and other "formula" programs distributed \$6.2 billion to states and localities.⁸² Though federal regulations establish broad criteria for eligible uses of funds, states and localities have great discretion in prioritizing expenditures. Unfortunately, they also give state and local governments little incentive to work across programs to craft comprehensive development agendas that address not only housing and physical revitalization—the bread and butter of traditional urban policy—but that create productive, competitive urban economies. As such, federal funding and tax incentives for local economic development initiatives are more likely to be used to develop shopping malls, sports arenas, and other "ribbon-cutting" projects than to invest in strategies aimed supporting the long-term growth of urban manufacturing and the quality employment base it provides.⁸³ In short, manufacturing—long under the purview of the Department of Commerce—simply has never been part of the nation's (i.e. HUD's) urban policy formula.

The Sustainable Communities Partnership has the potential to transform both federal urban policy and the on-the-ground revitalization of our cities—but, as yet, its concern with economic competitiveness and job creation is limited and vague. In June 2009, HUD, the Department of Transportation (DOT), and the Environmental Protection Administration (EPA) announced this groundbreaking partnership, under which the three agencies will coordinate policies and funding around a set of "Livability Principles."⁸⁴ In June 2010, the agencies released guidelines for a total of \$175 million in competitive funding: \$100 million from HUD for Sustainable Communities Regional Planning grants and \$75 million in Transportation Investment Generating Economic Recovery (TIGER) II grants.⁸⁵ Proposals are jointly reviewed by the three agencies and ranked based on how well they advance their shared goals as framed in the Livability Principles.

Though aimed in the right direction, the Livability Principles—which include "improving economic competitiveness through reliable and timely access to employment centers, educational opportunities, services and other basic needs by workers, as well as expanded business access to markets"—emphasize the physical form of communities (e.g., transportation and infrastructure), while not necessarily encouraging regions to develop more sophisticated and targeted strategies for growing and sustaining diverse, job-creating industries.⁸⁶ While the formulation and embrace of an urban development framework that transcends traditional agency silos is a major step forward, the process of integrating community revitalization, industrial growth, and urban and regional economy-building remains to be undertaken in this inaugural phase of the program.

Federal Investment in Infrastructure Has Been Insufficient and Not Strategic

Finally, federal infrastructure support has not sufficiently prioritized the upgrading of infrastructure within urban cores, to the detriment of SUMs and other businesses that rely on it for efficient goods movement and supply-chain operations.⁸⁷

The current federal law—the 2005 Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU)—authorizes \$286 billion over six years for highway and transit projects.⁸⁸ Nearly 80 percent of SAFETEA-LU’s funding is allocated by formula to state departments of transportation, who enjoy near-complete discretion in prioritizing disbursement for state and local projects.⁸⁹ The vast majority of these funds are highly flexible and can be spent on a wide range of highway projects (e.g., new construction, rehabilitation, maintenance), regardless of the economic benefits such projects provide relative to those aimed at fixing current infrastructure in already established communities.⁹⁰

On the upside, criteria for the \$600 million in TIGER II capital and planning grants, awarded by the Department of Transportation in October 2010, did include “economic competitiveness,” and the list of projects funded demonstrates the Obama administration’s desire to reinvest in urban road, transit, port, and rail infrastructure.⁹¹ And in late January 2011, a bill was introduced in the House that will, if passed, establish a National Infrastructure Development Bank, and promote a range of job creating and economy-boosting infrastructure projects; a similar proposal is included in the President’s 2012 budget.⁹² It is hopeful that the much larger transportation reauthorization bill, now expected to be introduced into the 2011 congressional session, will attach strategic targeting and competitiveness criteria to the much larger formula-based pot.

Of particular consequence for SUMs is the lack of a national interagency policy coordination around urban freight mobility. According to the Organisation for Economic Co-operation and Development (OECD), this sets the United States apart from its competitor nations in Europe and Asia, several of which began formulating urban-logistics and urban goods-mobility strategies over a decade ago.⁹³ Korea, for example, has had a national Logistics Improvement Law since 1991, which includes a component focused on the transport of urban goods. A few years ago, the Korean government also required that seven large cities in the country, including Seoul, establish urban goods transport plans by a mandatory cutoff date. In the Netherlands, where cities have more flexibility to initiate their own transportation reforms, localities adapt their freight needs to nationally recommended traffic mandates.

VI. RECOMMENDATIONS FOR FEDERAL ACTION

Around conference tables and kitchen tables alike, there is growing consensus that our economy must emerge from economic crisis not only recovered but transformed. We need to become a nation that not only imports and consumes, but one that also produces, innovates, and exports, both domestically and abroad. So, too, is there increased recognition of the need

to embrace the imperatives of environmental sustainability and opportunity—to identify and advance accessible, practical methods for greening consumer goods and reducing greenhouse gas emissions, while creating the next generation of middle-class jobs.

America’s small, urban manufacturers can help the nation move toward these ideals, as leading visionaries in an emerging “next economy” that is export-oriented, innovation-fueled, low carbon, and opportunity-rich, and that capitalizes on the diverse strengths and assets of our cities and metros. To this end, these firms, their workers, and the cities in which they are located need a federal government that recognizes their unique strengths and challenges and embraces a modern framework for reinforcing and building on the benefits they offer.

The recommendations that follow focus on ensuring that urban manufacturing firms are integrated into regional economic cluster strategies and that they have the space, infrastructure, and workers needed to sustain and grow their enterprises. These are actions that can be taken at little added cost to an already over-stretched budget and without major operational changes. Rather, they require that current funding be more clearly focused and that priorities be articulated and coordinated across federal agencies. Overarching the specific recommendations for agency actions and legislation is a call for the administration to frame a new narrative about cities and about manufacturing, one that grounds a resilient, competitive economy in diverse and livable cities and metros that offer opportunity and a high quality of life to all.

1. The federal government must develop a new narrative about manufacturing and metropolitan economies and use it to inform and guide its programs and policies.

Federal activities that influence both urban and economic development need to reflect a modern and accurate view of the value and role of manufacturing in each. To this end, policymakers should ensure that policies and programs abide by a basic set of principles:

- City and regional economies are interdependent. High-functioning networks, sustained linkages, and well-resourced systems of collaboration and interfirm communication are the glue of urban, regional, and global manufacturing activities in the 21st century. Network and supply-chain enhancement is important to cities, regions, and the nation, as strong networks and supply chains are critical to value-maximization and wealth generation. Federal reform in this area should encourage cities and states to identify urban and regional manufacturing assets—such as naturally arising industry clusters—and strategically capture their value for local and regional economies and job creation.
- Urban, industrial land use strategies should be linked to wider economic development and workforce objectives and should minimize mismatches among workforce, community revitalization, and citywide economic-development goals. Transit-oriented industrial development that supports worker access to sites,

and manufacturers' access to the rest of the city and beyond, should be prioritized.

- Where appropriate, conditional language should be added to current programs to incentivize (not mandate) high-value-added, industrial activities and clusters, as well as quality manufacturing jobs, in urban areas; criteria in support of “green” objectives should also be included. This should decrease flexibility in the implementation of certain programs and encourage small-scale, environmentally sustainable, urban manufacturing.
- Where necessary, certain conditions (e.g., eligibility criteria) should be relaxed or eliminated from programs where such conditions might hinder city and state efforts to expand small-scale manufacturing in cities. This should encourage manufacturing as an urban economic development strategy.

2. The federal government should help support SUMs' role in regional cluster growth and development.

Twenty years after the concept of clusters—geographic concentrations of interconnected firms and supporting organizations—began to gain traction among business and economic development analysts and practitioners, the White House and Congress have finally joined state and local leaders across the country to embrace Regional Innovation Clusters as a framework for structuring many of the nation's economic development activities.⁹⁴ By doing so, policymakers have created a platform for policies and programs aimed at helping build connections among large and small firms, institutions, and state and local governments to leverage the assets of cities and metro regions.

Regional clusters are key to many, albeit not necessarily all, small urban manufacturers' ability to innovate, scale up, and compete as part of synergistic local networks of organization and firms. The federal government ought to explicitly acknowledge this fact by crafting policies and programs that help address the information, technology, and workforce challenges that can hinder firms' successful assimilation into local clusters, while helping to boost opportunities for them to develop new products and cultivate new markets domestically and abroad.

a. Support research, analysis, and information dissemination to support cities, regions, and manufacturers, including supply-chain mapping and logistics analysis. Few data are now available on employment and gross output of manufacturers by industry within individual cities. Even less information is available to track changes in these indicators over time. And while a few cities have undertaken supply-chain mapping initiatives, much more of this information is needed at local, regional, and national levels than local governments can provide or bring to scale. HUD and EDA should jointly commission research to identify the data and analysis that cities need to support urban manufacturing and invest in the information collection, analysis, and dissemination that responds to those needs. They

should also provide funding and technical assistance to enable states and local intermediary partners to conduct sectorally relevant research to highlight the strengths and weaknesses of their manufacturing sectors and their relationship to current and emerging local clusters.

- b. Provide support to help strengthen the research to production continuum within cities and metro areas.** Many small manufacturers are parts of long supply chains in which layers of specialized firms provide components for a finished product. Over the past few decades, these firms have become responsible for designing and making much of the content of manufactured goods. Yet most of them lack the capacity to undertake formal R&D and cannot easily take advantage of university-based R&D. Moreover, implementing new technologies often requires changes in management processes, work organization, and relationships between suppliers and assemblers. As such, manufacturers need to learn not only about the technologies but about the management and organizational changes needed to successfully adopt them.

The federal government should provide support to states to establish and operate **advanced manufacturing centers** that provide research to develop new, relevant technologies and the education to help manufacturers apply these technologies to their work.⁹⁵ These centers would focus on one or more areas within advanced manufacturing, conducting self-initiated research of broad usefulness to manufacturers in the state, as well as contract research and extension work for client firms. The precise areas of the centers' research focus will vary from state to state, but they should contribute to economic development by building on the economic development strengths of each state or of regional industry clusters within the state. The centers would also include a Supply Chain Office, which could help align incentives and capabilities where many firms within the same supply chain, acting in coordinated fashion, could produce big efficiency gains.

All told, the establishment of such centers—the organization of which (i.e., where they are housed and by whom they are governed) could vary from state to state— would cost approximately \$10 million per year. While states would provide the bulk of these funds, along with some fees for service, complementary expenditures by the federal government are also needed. Specifically, the federal government should provide more funding for a restructured Manufacturing Extension Partnership program, grants to consortia to help solve supply chain and other multi-firm problems that cross state lines, and additional manufacturing center capacity to the extent that states do not fund all the centers required to meet the nation's critical manufacturing needs.⁹⁶

- c. Encourage workforce policies that help workers get the manufacturing-related skills and training needed in their respective regions.** In contrast to other industrialized nations, vocational training programs in manufacturing-related occupations today receive minimal policy attention and public funds. As a result, the pipelines between K–12 and postsecondary educational institutions, the workforce-development system, and manufacturers in most regions are weak or inattentive to the needs of diverse sectors, to

the detriment of workers and businesses alike.⁹⁷ This is not due to a lack of concern or demand on behalf of the private sector; on the contrary, small manufacturers across the country cite their inability to find competent technicians with specialized skills as a top barrier to growth.⁹⁸

The federal government needs to encourage federally funded state and local workforce organizations to develop programs that train and help absorb the next generation of manufacturing workers in jobs in clusters that offer long-term mobility along well-defined pathways. For example, the Strengthening Employment Clusters to Organize Regional Success, or SECTORS, Act, authored in 2008 by Sen. Sherrod Brown, would allow federal workforce funds to be used for industry-specific training programs for incumbent workers. The program would support groups of firms, educational institutions, local workforce training providers, and unions to develop plans aimed at building new workforce pipelines connected to specific regional sectors or clusters in which shortages of skilled workers have been identified. The Bill was passed by the House in July 2010, but never came to vote in the Senate.⁹⁹

In addition, the federal government should, over the long run, provide greater direct federal support to community colleges, which currently receive less than a third of the funding provided to their four-year counterparts, despite the fact the majority of postsecondary students start at a community college.¹⁰⁰ (The American Graduation Initiative would have been a start at rectifying that imbalance.) Such support could help strengthen community college manufacturing-related programs, for example, by developing associates degrees in manufacturing technologies; offering language and business training to technical students; supporting partnerships with community-based job-readiness programs; linking to intern and apprenticeship programs with local firms; and becoming key links in community-wide efforts to create career ladders and pipelines that are synched with region cluster strategies and which help workers gain certification in areas where there is proven industry demand.

- d. *Help cities and metros design and implement metropolitan export initiatives tailored to their specific clusters and attributes.*** National focus on doubling exports provides the opportunity to help some small manufacturers expand into global markets. Many more SUMs, moreover, could be competing in larger, domestic markets (and thereby replacing imports) than they now serve.

Strengthening supply chains, as noted above, will enable networks of small firms to benefit from expansion of exports, even if individual firms might not have the capacity to export internationally. But the federal government could go further by supporting states and metros to develop metropolitan export strategies aimed helping local firms market their goods, services, and expertise, including newly fashioned advanced manufacturing products, beyond regional borders—while creating new jobs within them. Ideally, such strategies should be organized and even implemented by metro business groups with support from civic, government, labor, and university sectors. Such initiatives should start by creating a

clearinghouse for data collection and analysis on exports and imports, using surveys, publicly available data, and research to achieve a clear understanding of the metro area's strengths, its current and potential export markets, and new opportunities for import substitution. And they should build from the knowledge of firms and universities already engaged in international business, commercial, research, and learning partnerships, and that sell their products and services across the globe. Most metro areas could begin by taking advantage of the Department of Commerce's Export Assistance Centers to organize trade missions under a metro brand. They can also tap into the resources offered by the newly created National Export Initiative, which was created to help firms successfully compete overseas, and, ultimately, to help the nation reach the goal of doubling U.S. exports over the next five years.¹⁰¹

3. The federal government should help ensure that SUMs have the space, infrastructure, and technical assistance they need to grow and thrive.

The Sustainable Communities Initiative promises to coordinate urban policy across agencies and support local efforts to build sustainable and livable cities; it also needs to consider how infrastructure investments and land use policies support diverse and resilient urban economies. Other agency program reforms are needed to eliminate bias against small manufacturers and help support or bring to scale local innovation.

- a. ***Strengthen the connection between strategic economic development and the sustainability goals espoused by HUD, DOT, EPA, EDA, and NIST.*** The HUD, DOT, and EPA Partnership for Sustainable Communities (PSC) is having a transformative impact. It is encouraging state and local innovation and raising awareness of the need to transcend traditional policy divisions and agency operations to build smart, sustainable communities. The partnership acknowledges the reality already grasped by cities seeking advantage in 21st century competition: investments in housing, infrastructure, transportation need to be coordinated to build places where people will choose to “live, work, and play.”

But if U.S. cities are to offer both sustainability and livability, they need to be places where diverse businesses and workers from can find opportunities, resources, and greater stability. “Work” needs to include the full range of diverse, productive activities that constitute healthy economies, not just retail and services. To this end, land, environment, and infrastructure-related activities need to support the growth of key industry sectors in their regions, especially those that can be accommodated by, and benefit from, urban core locations. As noted earlier, federal agencies are engaged in multiple efforts to identify and support industry clusters. These activities should be integrated within the PSC to make sure that activities targeted toward shaping the physical development of regions are strategically aligned with regional economic development. Commerce, and specifically EDA and NIST, should collaborate with the PSC to broaden the “economic competitiveness” criteria for PSC grants to help ensure it is inclusive of innovative and strategic approaches by cities to better

support manufacturing firms through their land use and infrastructure policies and investments.

Place-based tools informed by localized knowledge are also needed to accomplish the alignment between sustainability and job/firm growth—for example, zoning policies to mitigate conflict between freight facilities and residential areas, or taxation changes to protect land for manufacturing. HUD and its agency partners could identify and publicize effective innovations by cities and states, and clarify that such activities are eligible uses of CDBG funds. HUD’s Office of Policy Development and Research (PD&R) could also develop and make available model codes, regulations, and design standards that help states and cities protect and expand SUMs.

b. *Direct competitive funding to infrastructure and development innovations that support manufacturing.* The June 2010 announcement by HUD and DOT of a joint \$75 million initiative to fund “localized planning activities that integrate transportation, housing, and economic development” (blending \$35 million in TIGER II Planning Grants with \$40 million in Sustainable Community Challenge Planning Grants) sets a positive precedent for funding innovative and integrative approaches to urban development. Planning for the reduction of conflict between freight facilities and residential areas is specifically mentioned as an eligible activity; awards in this round, and criteria for future rounds, could go further by encouraging cities to tackle, for example, the challenges of updating and upgrading goods movement infrastructure, or to develop urban industrial parks as Transit Oriented Development (TOD).

c. *Expand SBA support to small urban manufacturers so that they have the capital for the land, space, and equipment they need to scale up.* According to SBA Administrator Karen G. Mills, the “3 Cs” of the SBA are “capital, contracts, and counseling.”¹⁰² The SBA has made laudable impacts in these three areas since the arrival of the current administration, backing 63,000 loans and millions of dollars in contracts under the Recovery Act. SBA’s 7(a) and 504 loan programs remain the agency’s largest and most popular lending programs. The Obama administration’s 2009 manufacturing framework mentions these programs but does not address the barriers to loan assistance faced by the smallest of America’s “small” manufacturers, nor other uniquely urban hurdles.

SBA’s loan-assistance efforts, for example, remain strongly focused on small-business construction and the purchase of real estate, which overlooks the needs of the many urban manufacturers who rent their facilities. Meanwhile, SBA’s manufacturing size-standards are out of date and unnecessarily complex, distorting policymakers’ and the public’s perceptions of sector demographics and needs, and undermining the ability of small manufacturers to access many SBA programs.¹⁰³

SBA should revisit the parameters of its loan programs, with the goal of diversifying the types and amounts of financing available to the widest range of industries and firms

possible, and ensure borrowers are not shut out due to sector or form of tenure. It should also update and simplify SBA size standards applicable to manufacturers, so that they more accurately reflect industry demographics and demands and help smaller firms qualify for programs that appropriately mirror their needs.

d. Help revive the market for industrial real estate development. The market for modern urban industrial space has broken down. Older industrial buildings originally designed for use by large single manufacturers need to be renovated and divided to accommodate today's smaller but more technologically advanced manufacturers. But in strong-market cities, because of the speculative nature of real estate, property owners generally perceive that they can receive a higher return if they convert industrial space to other uses. In weak market cities, there is simply inadequate return to attract private investors willing to acquire, renovate, and manage older industrial buildings.

The financial incentives developed under the old manufacturing model need to be updated to reflect today's modern manufacturer. As is the case for affordable housing, the development and operation of high-quality urban manufacturing space is often financially feasible when a mission-driven developer is able to access and invest capital, and is willing to accept a lower rate of return. Ownership by a nonprofit dedicated to strengthening the manufacturing sector and providing space for manufacturing companies would enable small urban manufacturers to operate in secure space, at a predictable cost. This in turn enables the manufacturers to invest in equipment to expand production and upgrade processes. It also protects the public sector's investment by ensuring long-term industrial uses against conversion pressures in gentrifying markets.

Today, successful examples of nonprofit industrial developers include the Brooklyn Navy Yard, the Greenpoint Manufacturing and Design Center in New York City, and the National Development Council (which has done industrial projects in New York, New Mexico, and Ohio). While creating and preserving space for manufacturing, these mission-driven nonprofits not only integrate economic development services into their operations (such as training, linkages to resident employment, assistance arranging financing, etc.) but adapt their operations to meet their tenants' changing needs, such as incorporating renewable energy and recycling options in their management practices. To begin to build on this nonprofit strategy, the federal government should

- **Revise the Internal Revenue Code to permit the use of Industrial Revenue Bonds (IRB) for the acquisition and redevelopment of multi-tenanted rental industrial buildings.** Currently, IRBs are used only for owner-occupied buildings, inhibiting both private and nonprofit developers from renovating these spaces and bringing them back to productive use by smaller industrial firms. These restrictions derive from a time when not only the nature of manufacturing was different but the fear of speculative over-development may have been well founded. The space needs and the market have changed, and the IRC should be revised to reflect it. The revisions

should also encourage the Industrial Development Agencies issuing the IRBs to promote sustainable building features, such as renewable energy and water conservation systems. Providing sustainable infrastructure will not only help the tenant-manufacturers to reduce long-term costs but to reposition into the growing market for green products.

- **Ensure that the benefits of IRBs issued for for-profit entities flow to non-owner occupants (tenants) in privately owned urban industrial buildings.** Tenants and operating companies should benefit under an IRC reform, because these firms, not the developers of the real estate they occupy, actually create permanent jobs. There should be a mechanism that ensures the tenants or operating companies in a multitenant, industrial building are the beneficiaries of IRB incentives, whether the developer or owner is a for-profit or nonprofit entity.

Some complications would need to be resolved, including modified gross leases that cover shared services, leases of varying duration, and questions about who gets tax-depreciation benefits.

- **Create a recoverable grant program to underwrite predevelopment costs.** A major impediment to nonprofit development is the lack of “risk capital” to finance initial predevelopment costs, such as environmental assessments, legal fees, and the down payment on properties needed to provide time for predevelopment work. While some of these projects will not be completed, and the predevelopment costs will not be recovered, other projects will be completed and their costs can be included in the long-term financing. While real estate development assistance strengthens the likelihood of successful project completions, these risks should be included in the program’s development such that some loss is appropriate and expected. Funding should be provided to HUD or EDA to contract with cities, states, and nonprofit organizations (such as the National Development Council) to implement a recoverable grant program and provide technical assistance to help build the capacity of nonprofit organizations to engage in industrial development.
- **Support conversion of decommissioned military and other federal properties as urban industrial parks; revisit or repeal McKinney-Vento restrictions on the re-use of decommissioned federal properties.** HUD and EDA should collaborate with GSA to investigate the state of the current inventory of decommissioned properties, their suitability to meet local needs for industrial space, as well as their ability to house homeless populations and meet other local needs. The agencies could also research the prevalence and nature of past dispositions to cities and states for industrial use. HUD, GSA, and EDA could then collaborate to formulate deed restrictions that would facilitate conveyance of suitable properties for industrial use, protect the public interest, and uphold the intent of McKinney-Vento. Possible solutions could include

land swaps, especially where properties are poorly located for residential use, but well suited for industry.

The 1987 McKinney-Vento Homeless Assistance Act included provisions mandating the Department of Defense to offer decommissioned federal properties to nonprofit providers of homeless services before making them available to any other potential user. There appear to be no clear provisions for homeless service providers who subsequently find the properties unsuitable for housing homeless people, or who are unable to maintain the properties or address problematic site conditions, to convey the properties to other users—though there are reports of such conveyances having been made. Former military bases are often difficult to adapt to new uses due to their size, location, and environmental conditions, but they can make superb industrial parks, as demonstrated by the example of the Brooklyn Navy Yard. The Navy Yard was decommissioned in 1971; its success would be very difficult to replicate today.

VI. CONCLUSION

The revitalization of the U.S. manufacturing sector is not a quixotic notion driven by a nostalgic vision of past American economic well-being or romanticism about “the glory days” of American industries. Rather, it is a realistic response to the confluence of long-term global trends and the crisis of the current economic moment. Manufacturing may never occupy the dominant position it once had in our economy, but a healthy manufacturing sector providing high-quality employment opportunities is possible if we recognize these transformative trends and the emerging nature of manufacturing in the 21st century. Sprawling factories producing commodity products remain, but innovation and growth are more likely to come from small, urban manufacturing networks, whose locations and density enable them to respond rapidly to the changing needs of markets, whether local, regional, or global.

In these times of fiscal disorder and thinly spread resources, city, state, and federal governments should align their priorities to help cities remove obstacles to innovative manufacturing growth and help SUMs create and sustain a diverse base of quality, “family wage” jobs and value-added goods. The federal government, for its part, needs to demonstrate its commitment and leadership in this policy area by developing a vision for a strong, resilient manufacturing sector and linking it to an urban policy framework centered on supporting productive economic activities in U.S. cities and metros.

Notes

¹ China already dominates roughly half of the world-market share in the wind-energy sector and a third of the world-market share in the solar industry. See Joan Fitzgerald, “We Need a Manufacturing Agenda” *New York Times*, Jan. 19, 2011. It is worth noting, however, that small manufacturers are less likely to offshore production than medium or large firms. See Small Business Administration Office of Advocacy, *Off-Shoring and Small, U.S. Manufacturers* (2008).

² In 2000, American manufacturing exports were over three times greater than those of China. By 2008, Chinese exports were 28 percent higher than those of the United States. The Manufacturing Institute, *The Facts about Modern Manufacturing, 8th Ed.* (2009).

³ The Manufacturing Institute, *The Facts about Modern Manufacturing*.

⁴ In his 2010 State of the Union address, President Obama called for a doubling of the nation’s exports over the next five years; he reiterated this point in his 2011 address, calling for such a doubling by 2014.

⁵ U.S. Census Bureau (2007).

⁶ Office of Advocacy, *The Small Business Economy: A Report to the President* (Small Business Administration, 2009).

⁷ Sue Helper and Marcus Stanley “External economies: How innovative, small manufacturers compete,” Working Paper (Case Western Reserve University, 2010).

⁸ Pratt Institute Center for Community and Environmental Development, “Making It in New York: The Manufacturing Land Use and Zoning Initiative” (2001).

⁹ Executive Office of the President, *A Framework for Revitalizing American Manufacturing* (2009).

¹⁰ Jurgen Essletzbichler, “The Geography of Job Creation and Destruction in the U.S. Manufacturing Sector, 1967–1997,” *Annals of the Association of American Geographers* 94(3) (2004): 602–619.

¹¹ Josh Whitford and Jonathan Zeitlin, “Governing Decentralized Production: Institutions, Public Policy, and the Prospects for Inter-Firm Collaboration in U.S. Manufacturing,” *Industry and Innovation* 11, (2004), citing Luria (2000).

¹² Daniel McCoy, “Majority of Area’s Small Manufacturers Maintain Employment Total in 2010,” *Wichita Business Journal*, Dec. 3, 2010.

¹³ A 2008 survey and subsequent analysis by the National Employment Law Project found the highest rates of minimum wage, overtime, off-the-clock, and similar violations among employers of service workers, though significant rates of violations also occurred in some manufacturing firms. Annette Bernhardt and others, “Working without Laws: A Survey of Employment and Labor Law Violations in New York City” (New York: National Employment Law Project, 2010).

¹⁴ City of Los Angeles Department of City Planning and Community Redevelopment Agency, “Los Angeles’ Industrial Land: Sustaining a Dynamic City Economy” (2007).

¹⁵ In many instances, the payback period is sufficiently favorable to demonstrate the medium- and long-term cost-effectiveness of energy-efficiency retrofit programs. See Center on Wisconsin Strategy, “Capturing Home Energy Savings in Milwaukee” (2007).

¹⁶ Adam Friedman, “Transforming the City’s Manufacturing Landscape,” in J. Hicks and others, eds., *From Disaster to Diversity: What’s Next for New York City’s Economy* (New York: Drum Major Institute, 2009).

¹⁷ New York Industrial Retention Network North Brooklyn Energy Grants, see <http://www.brightpower.biz/nyirn>.

¹⁸ Amy Barrett, “Creating Eco-Friendly Operations,” *Bloomberg BusinessWeek*, August 7, 2009.

¹⁹ There is a rich history of research and literature on agglomeration effects within urban economies and across economies of scale. See Edward Glaeser, *Agglomeration Economics* (University of Chicago Press, 2010).

²⁰ States control cities’ ability to tax incomes, sales, and property; cities determine through zoning and other regulations how properties are classified—for development and use, and also for tax purposes. Cities therefore have a fiscal motivation to reclassify land from lower to higher value uses.

²¹ New York Industrial Retention Network, telephone survey of small manufacturers in New York City, March 2010. Of 105 firms responding, 66 (63 percent) rent their spaces, and 39 (37 percent) own.

²² New York City Department of City Planning, “Shaping the City: A Strategic Blueprint for New York’s Future” (2010).

²³ Pratt Center for Community Development, “Protecting New York’s Threatened Manufacturing Space” (2009). The Pratt Center’s analysis also revealed that much of the industrially-zoned land Doctoroff referred to was occupied by nonmanufacturing uses, including utilities, transportation, and distribution activities, as well as municipal infrastructure, such as sewage treatment plants. Since such uses permanently remove the very large tracts that they occupy from the market, the land area actually available for industry was much smaller than the industrially zoned total, so the impact of the rezonings on the inventory of available land was even greater.

²⁴ Nancey Green Leigh and K. Driemeier, N. Hoelzel, R. Jain, J. Mansbach, E. Morrow, C. Moseley, S. Stevens and E. Zayas, “A Plan for Industrial Land and Sustainable Industry in the City of Atlanta” (Atlanta: Georgia Tech Research Corporation, 2009).

²⁵ Pratt Institute Center for Community and Environmental Development, “Making It in New York: The Manufacturing Land Use and Zoning Initiative.”

²⁶ Alan Mallach and Jennifer S. Vey, “Recapturing the Value of Urban Land: How State Policy Reform Can Help Turn Vacant Properties into an Asset for Economic Growth” (Washington: Brookings Institution, forthcoming).

²⁷ Personal Communication from Tracey A. Nichols, Director of Economic Development, City of Cleveland (Ohio), July 7, 2010.

²⁸ See e.g. *Berman v. Parker*, 348 U.S. 26 (1954) (conferred broad deference to municipalities to take land for urban renewal).

²⁹ Personal communication from Adam Friedman, Director, Pratt Center for Community and Environmental Development, April, 2010.

³⁰ Personal communication from Adam Friedman, Director, Pratt Center for Community and Environmental Development, April, 2010.

³¹ Personal communication from Sharon Gi, Community Redevelopment Agency, City of Los Angeles (California), March 1, 2010.

³² Joan Fitzgerald and Nancey Green Leigh, *Economic Revitalization: Cases and Strategy for City and Suburb* (Thousand Oaks: Sage Publications, 2002).

³³ JIT-style production, ubiquitous within the U.S. manufacturing sector, emphasizes low-inventory and rapid turnaround.

³⁴ Personal Communication from staff members at Los Angeles Community Redevelopment Agency (CRA/LA), Feb. 2010; Personal communication from Maspeth (Queens, New York) Industrial Business Zone.

³⁵ Federal Highway Administration projections, http://intermodal.transportation.org/Documents/fhwa_NatlFreightTrends.pdf.

³⁶ "Maspeth Has Had Enough," *Times Newsweekly.com*, November 25, 2010.

³⁷ Federal Highway Administration projections, cited in the New York Metropolitan Planning Council "Regional Freight Plan, 2005–2030" (2005).

³⁸ Most small businesses in the United States, including in cities, rely on small banks for financing, with many supplementing conventional bank financing with in-kind funds, credit and home-equity loans. Office of Advocacy, "Financing Patterns of Small Firms: Findings from 1998 Survey of Small Business Finance," U.S. Small Business Administration (2003).

³⁹ The data in this area examine the impact of energy costs on small firms at the national scale. This inference can be drawn from available findings. E.H. Pechan & Associates, *Characterization and Analysis of Small Business Energy Costs* (Small Business Administration, Office of Advocacy, 2008). (In 10 of 17 manufacturing sectors analyzed, "small firms spent considerably more for energy than large firms did on a per value of industry shipments basis. For food manufacturers, leather and allied products manufacturers, and computer and electronic products manufacturers, the costs per dollar of output were more than double those of their larger counterparts.")

⁴⁰ Some state loan assistance programs for small manufacturers secure collateral in the form of lien positions on the assets being financed, and the business' guarantee. Sometimes personal guarantees and additional collateral may be required.

⁴¹ Greg Gardner, "Bernanke: Give help to small firms," *Detroit Free Press*, June 4, 2010.

⁴² In fact, SUMs very size and structure may give them edge over larger businesses in terms of manufacturing innovation and new-product development. Research indicates that small manufacturers tend to be less bureaucratic than large, traditional firms: their employees tend to have a greater voice in business and product development, which means that their suggestions for innovations and improvements are more likely to be adopted by management than they would be at a large firm. Thus, while small firms are typically unable to shoulder large R&D expenditures, their money often goes further than large firms in terms of innovation outcomes, as small firms produce more patents and innovations than large businesses per unit of input invested in R&D.

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- ⁴³ Richard Deitz and James Orr, *A Leaner, More Skilled U.S. Manufacturing Workforce* (Federal Reserve Bank of New York, 2006).
- ⁴⁴ Fitzgerald, *Moving Up in the New Economy: Career Ladders for U.S. Workers*.
- ⁴⁵ “These Aren’t the Workers You’re Looking For” *The Economist*, July 2, 2010.
- ⁴⁶ Motoko Rich, “Factory Jobs Return, but Employers Find Skills Shortage,” *New York Times*, July 1, 2010.
- ⁴⁷ Fitzgerald, *Moving Up in the New Economy: Career Ladders for U.S. Workers*.
- ⁴⁸ Deloitte and The Manufacturing Institute, “Made in America? What the Public Thinks about Manufacturing Today” (2010).
- ⁴⁹ Joan Fitzgerald, *Emerald Cities: Urban Sustainability and Economic Development* (New York: Oxford, 2010).
- ⁵⁰ Center for Urban and Regional Policy, School of Social Sciences, Urban Affairs, and Public Policy, Northeastern University, “Staying Power: The Future of Manufacturing in Massachusetts” (July 2008); Community Attributes, “Basic Industries Economic Impact Analysis,” City of Seattle, Office of Economic Development (2009).
- ⁵¹ Josh D. Whitford, *The New Old Economy: Networks, Institutions, and the Organizational Transformation of American Manufacturing* (Oxford University Press, 2005).
- ⁵² Andrew Schrank and Josh Whitford. "Industrial Policy in the United States: A Neo-Polanyian Interpretation," *Politics & Society* 37 (4) (2009).
- ⁵³ Whitford, *The New Old Economy: Networks, Institutions and the Organizational Transformation of American Manufacturing*.
- ⁵⁴ Personal Communication from Yvette Nunez, Community Development Technologies, Los Angeles, March 2, 2010.
- ⁵⁵ Office of Policy Development & Research, *Saving and Creating Good Jobs: A Study of Industrial Retention and Expansion Programs* (Dept. of Housing and Urban Development, 1999).
- ⁵⁶ Robert Pollin and Dean Baker, “Public Investment, Industry Policy and U.S. Economic Renewal” (Amherst: Center for Economic and Policy Research, 2009).
- ⁵⁷ Vicki Elmer, Abigail Thorne-Lyman, and Dena Belzer, “Fiscal Analysis and Land Use Policy in California: A Case Study of the San Jose Employment Land Conversion Analysis,” Prepared for the Lincoln Institute of Land Policy (Institute of Regional and Urban Development, University of California at Berkeley, 2006).
- ⁵⁸ City of Jacksonville, *2010 Comprehensive Plan: Future Land Use Element* §1.1.14., <http://www.coj.net/Departments/Planning+and+Development/Current+Planning/2010+Comprehensive+Plan.htm>.
- ⁵⁹ Portland Development Commission, “Freeway Land Property Industrial Site Assessment,” http://www.pdc.us/pdf/ura/lents_town_center/Lents-Industrial-Site-Analysis.pdf.
- ⁶⁰ Brooklyn Navy Yard Industrial Park, <http://www.brooklynnavyyard.org/about.html>.

⁶¹ Committee on Small Business and Entrepreneurship, *Workforce Development Consortia Provide Needed Services* (General Accounting Office, 2001).

⁶² Center on Wisconsin Strategy, "The Wisconsin Regional Training Partnership," (2003), <http://www.cows.org/pdf/workdev/wrtp/ov-wrtp.pdf>.

⁶³ Robert Atkinson and Howard Wial, "Boosting Productivity, Innovation and Growth" (Washington: Brookings Institution, 2008).

⁶⁴ Dr. Raquel Pinderhughes, "Green Collar Jobs: An Analysis of the Capacity of Green Businesses to Provide High Quality Jobs for Men and Women with Barriers to Employment" (Berkeley, CA: City of Berkeley Office of Energy and Sustainable Development: 2007).

⁶⁵ See Project Quest, available at www.questsa.org/About/Description.html.

⁶⁶ Fitzgerald, *Moving Up in the New Economy: Career Ladders for U.S. Workers*.

⁶⁷ Meribah Knight, "Students Aim for Success with a New View of Vocational School" *New York Times*, October 14, 2010.

⁶⁸ Personal Communication from Yvette Nunez, Community Development Technologies, Los Angeles.

⁶⁹ Dept. of Housing and Urban Development, "Grow-nomics," <http://portal.hud.gov/hudportal/HUD?src=/states/washington/stories/grow-nomicss>.

⁷⁰ Personal communication from Brian Surratt, Office of Economic Development, City of Seattle, Feb. 12, 2010.

⁷¹ Trade Development Alliance of Seattle, <http://www.seattletradealliance.com>. See also Emilia Istrate, Jonathan Rothwell, and Bruce Katz, "Export Nation: How U.S. Metros Lead National Export Growth and Boost Competitiveness" (Washington: Brookings, 2010).

⁷² Industry Week.com "Great Lakes WIND Network Announces Center of Excellence," January 13, 2010.

⁷³ Personal Communication from Yvette Nunez, Community Development Technologies, Los Angeles, March 2, 2010.

⁷⁴ The White House Blog, *Another Step For American Manufacturing*, 2010, <http://www.whitehouse.gov/blog/2010/08/11/another-step-american-manufacturing>.

⁷⁵ The U.S. House of Representatives passed The National Manufacturing Strategy Act of 2010 (HR 4692) in July 2010, but it was never passed by the Senate.

⁷⁶ This year, India's Central Government established a National Manufacturing Competitiveness Council and, at this writing, is expected to roll out a comprehensive, national manufacturing policy by the end of 2011. Sreejiraj Eluvangal, "Government Scripts New Manufacturing Policy." *DNA News*, April 2, 2010.

⁷⁷ Government Accountability Office, "Information on Federal Programs and Interagency Efforts That Support Small Businesses Engaged in Manufacturing" (2007).

⁷⁸ Mark Muro and others, "Metro Potential in ARRA: An Early Assessment of the American Recovery and Reinvestment Act" (Washington: Brookings Institution, 2009).

⁷⁹ Some specifics of the administration's agenda are beginning to take shape, and some first fruits can be seen. For example, in October 2010, NIST/MEP indicated that it would award funding to 22 nonprofits for projects aimed at promoting enhanced technologies, supply-chain resources, and new product lines, and would continue exploring ways to expand similar assistance in the coming year. In December 2010, SBA reported that the reduced-fee measures and loan enhancements of increased guarantees introduced under the Recovery Act have demonstrated benefits for small businesses shut out of private lending markets. Also in December, the president reported to his Export Council that U.S. exports were up 18 percent last year, the highest level since August 2008, and that the nation is "on track to meet" its five-year target.

⁸⁰ U.S. Department of Commerce, <http://www.eda.gov/AboutEDA/Programs.xml>

⁸¹ Susan Helper, "The High Road for U.S. Manufacturing," *Issues in Science and Technology* 25 (Winter, 2009).

⁸² The \$6.2 billion total includes Community Development Block Grants (CDBG); HOME Investment Partnerships (HOME), also Housing Opportunities for Persons with AIDS (HOPWA); and Emergency Shelter Grants (ESG).

⁸³ This is complicated by the inadequacy of prevailing indicators for measuring the community revitalization and/or economic development impacts of CDBG and other federal grants. Office of Policy Development and Research, *The Impact of CDBG Spending on Urban Neighborhoods* (Dept. of Housing and Urban Development, 2002).

⁸⁴ HUD-DOT-EPA Interagency Partnership for Sustainable Communities, *Livability Principles*, June 2009, <http://www.epa.gov/smartgrowth/partnership/index.html#livabilityprinciples>.

⁸⁵ Livability Initiative, Federal Highway Administration, "Frequently Asked Questions about HUD's Sustainable Communities Regional Planning Grants," <http://www.fhwa.dot.gov/livability/resources/hudfaq.cfm>.

⁸⁶ Partnership for Sustainable Communities fact sheet, <http://www.whitehouse.gov/sites/default/files/uploads/SCP-Fact-Sheet.pdf>.

⁸⁷ "Freight Transportation: National Policy and Strategies Can Help Improve Freight Mobility" (Government Accountability Office, 2008).

⁸⁸ Federal Highway Administration Office of Legislation and Intergovernmental Affairs, "A Summary of Highway Provisions in SAFETEA-LU" August 25, 2005.

⁸⁹ About 6 percent of the highway dollars are directly suballocated to metropolitan planning organizations. See Puentes/Bailey from *Taking the High Road*.

⁹⁰ Federal Highway Administration Office of Legislation and Intergovernmental Affairs, "Funding Tables," August 25, 2005.

⁹¹ Department of Transportation, "Secretary LaHood Announces More Than 70 Innovative Transportation Projects Competitively Funded Under TIGER II: Requests Top \$19 Billion for \$600 Million Program," October 20, 2010.

⁹² Robert Puentes, "Unfinished Infrastructure Business," *Upfront Blog*, October 12, 2010, http://www.brookings.edu/opinions/2010/1012_infrastructure_puentes.aspx.

⁹³ Organisation for Economic Co-operation and Development, *Delivering the Goods: 21st Century Challenges to Urban Goods Transport* (OECD Publishing, 2003).

⁹⁴ Mark Muro and Bruce Katz, "The New 'Cluster Moment': How Region Innovation Clusters Can Foster the Next Economy" (Washington: Brookings Institution, 2010).

⁹⁵ For a more detailed description on the role and function of state manufacturing centers, see Susan Helper and Howard Wial, "Revitalizing Manufacturing with State-Supported Manufacturing Centers" (Washington: Brookings Institution, 2011).

⁹⁶ That could occur because there is some critical industry or technology for which no state has chosen to fund an advanced manufacturing center, or because the funding that states provide for such an industry or technology is inadequate in view of the industry's or technology's importance to the nation.

⁹⁷ Maureen Conway, Amy Blair, Steven L. Dawson, Linda Dworak-Munoz, "Sectoral Strategies for Low-Income Workers: Lessons from the Field" (Aspen Institute: 2007).

⁹⁸ Motoko Rich, "Factory Jobs Return, but Employers Find Skills Shortage," *New York Times*, July 1, 2010.

⁹⁹ See National Skills Coalition, <http://www.workforcealliance.org/federal-policies/sector-partnerships/>

¹⁰⁰ Goldrick-Rab, "Transforming America's Community Colleges: A Federal Policy Proposal to Expand" (Washington: Brookings Institution, 2009).

¹⁰¹ Emilia Istrate, Jonathan Rothwell, Bruce Katz, "Export Nation: How U.S. Metros Lead National Export Growth and Boost Competitiveness" (Washington: Brookings Institution, 2010).

¹⁰² "Small Business: Driving America's Economy," http://archive.sba.gov/idc/groups/public/documents/sba_homepage/mills_remarks_nsbw_03-24-10.pdf.

¹⁰³ Fred Hochberg. "Small Business Administration: Supporting America's Engines of Growth." (Washington: Center for American Progress, 2009).