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Urban Planning (ISSN: 2183–7635)
2023, Volume 8, Issue 4, Pages 225–235
https://doi.org/10.17645/up.v8i4.7255

Article

Departures From the Norm: Innovative Planning for Inclusive Manufacturing

Mark Pendras *, Adam Nolan, and Ashleigh Williams

School of Urban Studies, University of Washington Tacoma, USA

* Corresponding author (pendras@uw.edu)

Submitted: 30 May 2023 | Accepted: 2 August 2023 | Published: 21 November 2023

Abstract
For decades, urban development strategies that privilege narrowly defined "creative" sectors, and anachronistic zoning policies have been the norm in US cities, bringing persistent displacement pressures to manufacturing businesses. However, as cities have faced mounting concerns over inequality, affordability, and diversity, recent scholarship has begun to revisit the importance of urban industry, identifying key contributions that industrial enterprises make to cities. The challenge is finding the right strategies that can preserve, enhance, and potentially expand existing urban industrial space. This article takes up that challenge in three ways: (a) by calling attention to long-standing industrial planning norms that have simultaneously disadvantaged communities of color and undermined awareness of and support for urban manufacturing, (b) by exploring "innovations" that depart from those norms by prioritizing "inclusion" and "visibility" in their planning efforts, and (c) by taking an expansive approach to "planning" that seeks lessons from beyond the formal planning establishment. Drawing from emerging scholarship, research and policy reports, program documents, and interviews with key participants, this article gathers lessons from two industrial planning examples—in San Francisco, CA and Buffalo, NY—that help reveal existing barriers to industrial retention, help reimagine the role and place of manufacturing in the city, and ultimately help to foster more inclusive urban development in the US.

Keywords
advanced manufacturing; inclusion; industrial planning; urban manufacturing

Issue
This article is part of the issue "Planning, Manufacturing, and Sustainability: Towards Green(er) Cities Through Conspicuous Production" edited by Yonn Dierwechter (University of Washington Tacoma) and Mark Pendras (University of Washington Tacoma).

1. Introduction

Urban manufacturing has long faced ambivalence from the urban planning community. It is an ambivalence rooted in the tension between desire for the money, jobs, and vitality that industry brings to cities and concerns over the consequences that industrial activity might have for urban environments and conditions. That ambivalence gained strength after the 1970s, as deindustrialization seemed to imply that cities no longer needed—or wanted—urban manufacturing and that cities were better suited to *post*-industrial activity (Bluestone & Harrison, 1982; Sugrue, 1996). Yet, as cities have faced mounting concerns over inequality, affordability, and diversity, recent scholarship has begun to revisit the importance of urban industry, identifying key contributions that industrial enterprises make to cities, including good jobs that provide workers with relatively high salaries and benefits, low entry barriers to employment, opportunities for career advancement, and broadly balanced and inclusive urban economies. The challenge is finding the right strategies and approaches to create industrial jobs to fit contemporary urban contexts.

This article takes up that challenge by examining how emerging planning innovations can maintain, and possibly expand, space for manufacturing businesses in urban areas. Emphasis is placed here specifically on "innovative" planning in order to call attention to the need to

depart from long-standing industrial planning norms that have both contributed to existing problems and failed to generate inclusive new developments. In particular, we emphasize the role that industrial zoning and land uses have played in the production of racial exclusion and segregation in the US and we consider why recognizing that history is important to improving industrial futures and the lives of marginalized urban residents. Despite the problematic history that created them, existing industrial zones and land uses remain important to current and future social and economic diversity in cities and thus cannot simply be abandoned. Instead, strategies are needed to help activate those spaces in ways that bring new benefits to new populations. While it may be possible to pursue such strategies through traditional planning mechanisms—updated zoning categories or new land use designations—here we take a more expansive approach to "planning" to gather lessons from industrial advocates, community groups, and others outside of the formal planning system about how to better engage the industrial spaces that currently exist in US cities. After a brief engagement with zoning history, this expansive understanding of planning is used to explore new ways to support and advance urban industry and economic inclusion, drawing from emerging literature and interviews with key participants from promising examples in San Francisco, CA and Buffalo, NY. The argument developed here is that these examples provide lessons that can extend beyond their immediate contexts, demonstrating how intentional programming that actively prioritizes *inclusion* and *visibility* can help planners (broadly conceived) work within their inherited industrial landscapes to improve and expand industrial retention efforts. We conclude by reflecting on the importance of industrial planning innovations that confront historical practices in order to reimagine the place of manufacturing in the city.

2. Reflections on Industrial Planning Norms

Land-use control and zoning play an important role in the everyday lives of urban residents. Municipalities use land use ordinances and zoning designations to govern how land is to be used and to determine which activities will be permissible in different corners of the city. The 1926 Supreme Court Euclid case (*Euclid v. Ambler*, 1926) and the Standard Zoning Enabling Act that the Euclid case set into motion, established powerful regulatory norms and standards, legalizing land use separation through single-use zoning, especially in protecting residential landowners' investments from undesirable uses (Wolf, 2008). With the acceleration of industrialization and the waves of large-scale urbanization that accompanied that industrial surge, came pressures that cities were not prepared to manage. From building conditions and housing standards to sanitation and air quality, through political corruption and administrative incompetence, concerns over lives and living conditions in the industrial city inspired a panoply of reforms at the dawn of the 20th century that characterized the Progressive Era (Warner, 1972). Approached from this perspective, the zoning and land use controls that emerged over the subsequent decades take on the deserved shine of progress as we recognize that "the division of uses in early zoning regulations was a direct response to the desire to remove noxious uses, noise, and fumes from residential areas" (Rappaport, 2017, p. 74). In other words, the use of zoning to separate manufacturing from commercial and residential life was conceptualized as a just solution to mounting urban problems. We do not care to dispute that claim here. Instead, we want to call attention to two undesirable and overlapping patterns that have evolved in connection with normative approaches to zoning over the past century: "expulsive" zoning and "creative" displacement.

2.1. Protections and Expulsions

It is clear that the industrialization that brought jobs and investment to cities also brought environmental conditions and quality of life concerns that were then confronted, in part, through zoning and land use planning, insulating many residents from the accompanying industrial hazards. However, it is also clear that this type of land use separation was not simply a benevolent tool for protecting urban residents. While zoning may have spared "many" (mostly white) residents from direct exposure to these industrial nuisances, under the racist housing policies of the 20th century those same actions commonly left—and placed—neighborhoods of color in harm's way. Separating manufacturing activity from other aspects of urban life also served to make factories and workers less visible and symbolically less important in the city, enabling hazardous industrial practices to proliferate with minimal oversight (Rappaport, 2017, p. 74).

The instrumental use of industrial zoning deserves more attention. As Rothstein (2018) illustrates through his extensive interrogation of racial segregation in the US, another use for industrial zoning has been to reinforce and extend racial segregation and discrimination by placing industrial activities in or near designated Black neighborhoods. Once explicit racial zoning was ruled unconstitutional in 1917 (*Buchanan v. Warley*, 1917), some cities began using industrial zoning—among other strategies—to achieve the same end:

> [Local planners] designated land for future industrial development if it was in or adjacent to neighborhoods with substantial African American populations…or [they] changed an area's zoning from residential to industrial if African American families had begun to move into it. (Rothstein, 2018, pp. 49–50)

Dubin (1993, p. 762) reinforces this connection, noting that:

> [I]ncompatible zoning was employed as a "subtler" device in pursuit of segregation as compared to the invalidated devices of racial zoning and restrictive covenants. City planners deliberately displaced black residences with industrial and commercial zoning or used incompatible zoning to confine black residents to particular portions of a city.

It is this active use of industrial zoning to create and enforce racial separation that brought Rabin (1989) to the concept of "expulsive zoning." In contrast to the more familiar concept of "exclusionary zoning," which utilizes local zoning powers to maintain and/or enhance existing property values and exclude "undesirable" residents (Schragger, 2021), expulsive zoning uses the threat of compromised health and safety conditions to expel and repel residents with alternative housing options and to trap in place those without such options. That has historically caused Black communities to bear the brunt not only of industrial hazards but also the consequences of restricted housing markets:

> Because whites who may have been similarly displaced were not subject to racially determined limitations in seeking alternative housing, the adverse impacts of expulsive zoning on blacks [sic] were far more severe and included, in addition to accelerated blight, increases in overcrowding and racial segregation. (Rabin, 1989, p. 102)

This type of expulsive zoning not only placed Black residents in harm's way but also failed to uphold the health and safety protections that had been used to justify the constitutionality of zoning in Euclid and subsequent cases (Dubin, 1993).

Viewed in this way, it becomes difficult to divorce industrial zoning and urban industrial planning from racial politics and the history of racial exclusion in the US. These patterns have been covered extensively for decades in the broad environmental justice literature, noting how the concentration of industrial hazards and other toxins have undermined the health, safety, and physical integrity of Black and brown neighborhoods in cities across the US (Agyeman, 2006; Boone & Modarres, 1999; Bullard, 1990; DiChiro, 1996; Pulido, 2000). But here we want to bring these aspects of racial discrimination more prominently into the *industrial planning* discussion for two primary reasons. First, reconnecting with Rothstein's (2018) work, the active participation of the US government, at multiple scales, in creating and enforcing this type of racial discrimination implies a degree of responsibility to remedy the negative consequences. The difficulty is that easy or obvious remedies are elusive. Existing industrial zones are linked with a problematic history of exclusion and damage, but it is neither possible nor desirable to "fix" the problem by simply rezoning those spaces out of existence. Thus, contemporary planners face real challenges as they pursue equity in the context of inherited industrial landscapes. Other innovations are needed in order to reimagine how industrial spaces can better fit within the city. Our emphasis on an expansive approach to industrial planning recognizes the importance of reaching beyond land use planning and zoning as carried out by formal planners to gather lessons from the broad array of projects, services, and partners that create and support the industrial ecosystem. Second, as the long arc of deindustrialization-to-urban redevelopment continues to unfold, it is often these historically marginalized and disadvantaged neighborhoods of color that hang in balance between abandonment and displacement. New approaches to industrial planning are needed to ensure that urban redevelopment politics depart from destructive historical norms and avoid reproducing patterns of exclusion.

2.2. Urban Redevelopment and "Creative" Displacements

Linking industrial land use history with contemporary redevelopment politics is not difficult. The same expulsive zoning that placed industrial hazards in or near Black neighborhoods in the service of perpetuating segregation positioned those same neighborhoods for significant losses from the deindustrialization that unfolded during the second half of the 20th century. Sugrue (1996, pp. 176–177) makes these connections explicit: "[A]s jobs left, the city's black population remained behind. Black workers remained to a great extent confined to decaying center-city neighborhoods, trapped by invisible barriers of race." This is not to suggest that Black communities were the only ones impacted by deindustrialization; indeed, the suffering and challenges these processes brought to the white working class have been extensively documented and lamented (Bluestone & Harrison, 1982; Cowie, 2010; Linkon & Russo, 2002). But under the prevailing conditions of systemic racism, and the expulsive zoning practices discussed above, the residents of Black neighborhoods were often tied directly to the spaces of abandonment associated with urban crisis (Sugrue, 1996).

These linkages take on added significance when we recognize that many of those abandoned spaces subsequently became the focus of efforts that emerged in the 1990s to "regenerate" cities. Much has been written about the narrow and exclusionary qualities of neoliberal urban redevelopment in US cities since the 1990s (Hackworth, 2007; Harvey, 1989). From FIRE sector investments to urban entertainment landscapes, through upscale residential developments, the vision that emerged and began to take hold of the collective imagination in the early 1990s presented the city as a post-industrial wonderland, packed with young urban professionals, corporate offices, funscapes, and consumption opportunities (Florida, 2002; Jonas & Wilson, 1999; Logan & Moloch, 1987; Peck, 2005). Whether cities sought "global city" status (Sassen, 1991) or rebranded

themselves to fit the new "creative city" model (Florida, 2002), traditional industrial spaces came to be seen as obstructions to the best (most profitable) use of urban land—literally, by occupying desirable real estate, and figuratively, by symbolizing economic priorities that had fallen out of fashion (Ferm & Jones, 2017). Consequently, property values for spaces that could reasonably be repurposed and/or redeveloped to feed the growing demand for offices, housing, entertainment, and other forms of consumption climbed precipitously (Curran, 2007; Ferm & Jones, 2017), while neighborhoods not as well-located or not as endowed with easily repurposed infrastructure faced additional struggles against neglect and abandonment.

In the context of rising inequalities from these feast/famine development dynamics, industrial revival and the prospect of "the productive city" (Novy, 2022) has attracted new attention as a potentially stabilizing force. Successful urban industrial revival, however, faces some significant challenges. Beyond the obvious struggles over competing priorities and land uses, new investments in industrial sectors are not immune to the same concerns about exclusion, gentrification, and displacement that plague other (neoliberal) urban development efforts. Competing expressions of industrial revival have thus generated new debates among advocates about how the future of the urban industry can/should look and whose interests are served by which visions. Some see the future of manufacturing in urban areas as inextricably tied to the rapid adoption of technological innovations connected with the "fourth industrial revolution" (Industry 4.0) and other smart-cities innovations—3D printing, CNC machines, additive manufacturing, and IoT (Hatuka & Ben-Joseph, 2017; Hatuka et al., 2017; Rappaport, 2020). From this perspective, embracing these technologies will make modern manufacturing firms more compatible with other urban land uses (commercial, residential) and more efficient and competitive, allowing them to take advantage of the proximity benefits in cities "where highly skilled talent and synergies among creative fields facilitate rapid prototyping and the creation of customized high-value products" (Rappaport, 2020, p. 161). Whether expressed through the entrepreneurial "maker movement" (Doussard et al., 2018; Wolf-Powers et al., 2016) or more traditionally organized advanced manufacturing firms (Reynolds, 2017), this perspective envisions the use of "innovation districts," "vertical factories," and other design advancements to close the perception gap between the "creative" knowledge economy and "traditional" manufacturing (Lane & Rappaport, 2020; Rappaport, 2017). With its energetic embrace of new technologies that offer a corrective to decades worth of post-industrial thinking and anti-industrial sentiment, this perspective offers a pragmatic vision for taking advantage of the opportunities that are newly available.

Not everyone is so optimistic, however, that new design and production technologies provide the appropriate response to the long arc of industrial decline. Others approach this technology-centered vision with more skepticism, concerned that the reliance on complex technologies brings to the industrial sector the same patterns of exclusion and inaccessibility that have plagued professional services. For example, Checker (2017, p. 114), discussing the New York City Economic Development Corporation's Manufacturing 2.0 initiative to support a broadly defined maker movement, notes how the representation of "manufacturing" has changed:

> [T]he program targeted local crafters, artisans, food/drink manufacturers, technology startups, film studios, visual artists, and fashion designers….Clearly, these manufacturers were not the low-income or working-class New Yorkers who once populated the city's industrial labor force. Rather, they were exactly the highly educated, upper-middle-class creatives for whom Bloomberg built the "luxury city." In this way, Manufacturing 2.0 signaled the gentrification of industry itself.

That idea of "the gentrification of industry itself" resonates with recent critiques of the emergence of "innovation" and "creative" districts, and the implementation of "artisan zoning" that have carried the maker movement in new directions. The concern is that innovation zones and the like can become tools for *anti*-industrial interests to creatively convert existing industrial lands to new purposes without explicitly appearing to do so (Chapple, 2015). Critics thus argue that "absent a long-term commitment to manufacturing or control of real estate by a mission-driven organization, the innovation district 'brand' may simply be the harbinger of industrial displacement through market-driven mixed-use redevelopment" (Lane, 2020, p. 37).

Similar to the discussion of expulsive zoning, above, the message from the debates over Industry 4.0 is that new approaches are needed. The wave of interest in urban manufacturing is exciting, but great care is needed to ensure that investments and developments in the manufacturing sector do not reproduce the same exclusionary patterns of the tech-focused, "creative," and/or consumption-oriented projects that have dominated urban development in recent decades. Whether the activities take place in an "innovation zone," "creative district," or a more traditional industrial space, the challenge is to bring greater access to and inclusion in emerging opportunities. This can happen from within the formal planning infrastructure, through the exploration of new zoning categories and new ways to label and regulate the industrial practices allowed in the variously zoned urban spaces. However, those processes are famously time-consuming and politically contentious, opening room for complementary approaches from outside the formal planning establishment that can work with existing industrial spaces to improve how they fit

within the city and how benefits from those spaces can be extended to a wider share of the population. In the next section, we explore two such examples that offer innovations from the broader planning community.

3. Prioritizing Visibility and Inclusion

As the evolving and overlapping histories of expulsive zoning and creative displacement have directly contributed to the unequal landscapes that characterize contemporary US cities, we focus here on approaches that depart from those planning norms by prioritizing racial and spatial inclusion. As noted above, we connect with examples from outside the formal planning infrastructure in order to consider how inherited industrial landscapes might be approached in new ways that enhance and expand industrial retention. The two examples explored here—SFMade, in San Francisco, CA, and the Northland Workforce Training Center (NWTC), in Buffalo, NY—were selected after a review of extant urban and industrial planning literature, research and policy reports, news media, and web content, for their apparent prioritization of "inclusion" and "visibility" in their industrial development efforts. The selection of examples from markedly distinct contexts (tech-sector boomtown in Bay Area California vs. rustbelt city in Upstate New York), is also intended to provide some indication of the common challenges facing industrial advocates in the US and to suggest the possibility of shared remedies. The review of published materials was supplemented by eight semi-structured interviews intended to ground insights from published literature and to provide additional details about programmatic goals and motivations. The selection of interview subjects was guided by an initial targeting of key participants and subsequent snowball sampling. A site visit to San Francisco was included for additional contextualization. Interviews were transcribed and analyzed for important themes and patterns that can reveal lessons potentially applicable to other contexts and locations. We recognize that the small sample size limits the generalizability of the insights gained here and seek instead to reveal promising practices that demonstrate emerging possibilities and provide a foundation for additional exploration.

3.1. SFMade: San Francisco, CA

San Francisco and the non-profit manufacturing advocacy organization SFMade have attracted attention for some of the innovative and collaborative approaches they have developed to retain and expand upon the limited industrial land and manufacturing opportunities available in the city. The historical arc of policy, spatial conversion, and recent industrial retention efforts that have centered SFMade as an influential and effective intermediary have been extensively covered by others (Chapple, 2017; Grodach, 2022; Grodach & Martin, 2018; Martin & Grodach, 2023). Aspects of their work that have received less attention, and which we want to highlight here, are those that aim to provide inclusive opportunities for the structurally disadvantaged and systematically marginalized groups discussed above.

SFMade, located between two San Francisco neighborhoods (Mission and Potrero Hill) that have experienced extreme gentrification pressures, was established in 2010 with the intention of improving local economic resiliency and expanding economic opportunities by providing support for local manufacturing businesses and by working to "cultivate a vibrant workforce ecosystem" (SFMade, n.d.-a, para. 3). Working as an industrial advocate and workforce intermediary, SFMade has steadily grown its membership of manufacturers (over 600 members to date) and expanded their services in ways that have made them instrumental to bolstering the manufacturing ecosystem on a local and regional level (SFMade, n.d.-a). In viewing manufacturing as "an engine for equity," the organization provides a range of services to link low-income job seekers with targeted training and employment opportunities and informs policymakers on the conditions needed to create and expand manufacturing opportunities. Their broad suite of services—business development and real estate assistance, membership networking, branding, and general workforce development—is executed through the intentional development of collaborative partnerships across governments, and advocacy organizations, and in working with many community organizations to further carry out their mission (Interview 1, 2022; SFMade, n.d.-b). In this regard, SFMade is an excellent example of a successful workforce intermediary and industrial advocate that facilitates and supports new and existing industrial practices (Clark, 2014; Giloth, 2004; Grodach & Martin, 2018).

Despite their many successes, however, SFMade and their partners have faced challenges as they work against established norms to ensure that the emerging manufacturing ecosystem (and any accompanying industrial revival) is inclusive and equitable. In addition to the more obvious difficulties of operating in San Francisco's famously hot real estate market (Chapple, 2017), other institutional and knowledge gaps stymie progress, including limited manufacturing-focused career and technical education programs in the area, a lack of short-term, flexible training for working adults, and a K-12 education system that lacks attention to manufacturing occupations as viable career pathways (Interview 2, 2022; SFMade & Bay Area Council Economic Institute, 2021). More specific to the task of improving the racial diversity of the manufacturing workforce and ensuring the industrial sector as a whole is more inclusive, SFMade has found that many employers want to diversify their workforce but lack the knowledge and skills to do so (Interview 1, 2022):

> We hear it all the time that [manufacturers] want to diversify their workforce, they want to improve their DEI [Diversity, Equity, and Inclusion]. You start

> doing that by having systems in place to recognize that when you are bringing a more diverse workforce in, you need to be ready to support a more diverse workforce….It's fine to put a more diverse workforce in front of employers, but if employers aren't ready to meet people where they are at, support people through to success despite whatever challenges they may have as an individual, and use local resources to have that as a safety net, the job seeker and the employer are going to have a bad experience, and they are not going to work together anymore. The employer is going to say we can't do this; the reality is that they could, they just don't have the systems in place to do it in a meaningful way. So we are helping them do that….It's not only going to help you reach a more diverse workforce and hire them and retain them, it's also going to help you retain the people you currently have, and have them feel more enveloped in what you are doing.

From SFMade's perspective, it is not just that some individuals have barriers to employment; employers also put up barriers that make it difficult for those individuals to get connected to the jobs that are available (Interview 1, 2022). Put another way, while many manufacturing employers perceive a "skills gap" that keeps them from meeting their workforce needs, the SFMade team sees more of an "opportunity gap" that excludes some workers and keeps firms from achieving their inclusion goals. In the face of these challenges, SFMade has adapted to focus more intentionally on building clear pathways to inclusion by connecting employers with underrepresented populations and by helping firms develop support systems to improve how they recruit new workers and retain existing workers. One exemplary program in this regard is called Hiring With Purpose. Through this initiative, SFMade helps manufacturers build and implement more inclusive hiring processes and job opportunities, from assistance with developing job descriptions that focus more on skills and eliminating credentials when they are not necessary, to connecting employers with workforce organizations that serve more diverse communities that encounter various barriers to employment, including the reentry population and veterans (Interview 1, 2022). Establishing connections between employers and workforce organizations is especially important, as these organizations can provide valuable support services for job seekers after they are hired, and they can help employers develop deeper workforce partnerships and talent pipelines.

Beyond their own initiatives, SFMade has also developed partnerships with complementary agencies and organizations, locally and regionally, to reach additional underserved populations. For example, for the Next Generation Manufacturing Training program, SFMade partnered with the non-profit organization Humanmade, and the City of San Francisco, to provide a three-month manufacturing workforce development training program that prepares low-income Bay Area residents with no prior manufacturing experience for entry level, living-wage manufacturing jobs (Humanmade, 2023). In another partnership, SFMade has worked with organizations in the neighboring city of San Jose (MFG: SJ, Goodwill of Silicon Valley, and MetroEd) on a similar training program for machine operators. On a third project, in Oakland, SFMade has partnered with the organization Crucible to launch the Open for Business program that provides BIPOC individuals with support and services to build, launch, and scale artisanal goods manufacturing businesses (Interview 3, 2022; Crucible, 2021). Finally, SFMade has been a central force behind the Bay Area Manufacturing Initiative, started in 2016 to "galvanize city governments, economic development intermediaries, higher education partners, and private sector sponsors" around regional manufacturing investments (SFMade, 2016, para. 13). In these partnerships, SFMade typically plays a coordinating role, helping to boost overall industrial activity and link employers and service providers with marginalized populations to foster "a stronger, more resilient, inclusive, and interconnected local economy" (SFMade, 2016, para. 13).

A key challenge that runs through their various efforts is raising the level of awareness and understanding of contemporary manufacturing. After a long generation of anti-industrial imagery, cultural celebration of non-industrial sectors, and the displacement of manufacturing from urban areas, most urban residents have very little exposure to current manufacturing facilities or practices (Interview 7, 2023). Formal planning efforts in the City of San Francisco have attempted to improve the image of manufacturing through a shift in language from "industrial" to "Production, Distribution, and Repair" (PDR) and have prioritized the protection of existing land use boundaries, but as Grodach and Martin (2018) discuss, the work of connecting with and advocating for these spaces has been taken up by SFMade. By focusing efforts on improving visibility and broadening access, SFMade raises awareness of manufacturing as a desirable career pathway. In other words, though the boundaries of industrial/PDR zones and land uses are relatively fixed, especially in a hot-market city like San Francisco, various other efforts can connect with and "activate" those spaces in new ways. Through a variety of programming—educational outreach, internship and apprenticeship programs, career fairs, and demonstration events like Manufacturing Week, classroom-to-career pipeline development with community colleges—SFMade and its partners combat outdated perceptions and generate a sense of energy and excitement about future manufacturing possibilities (Interview 1):

> We're helping these young people understand this is a much safer, more efficient industry. We introduce people to local manufacturing and how it looks. We try to bring in local manufacturers to speak to them about their experience, what their trajectory

> was, how they developed their ideas, how they operate here in SF….[We] take all sorts of people on tours of all the manufacturers to see how it's made, where it's made, who is making it. That piece is critical because there is a massive disconnect between the communities, jobseekers, business owners, neighbors, and the manufacturers that are making what we rely on and what the future is.

Importantly, much of this educational outreach also involves making manufacturing more visible to urban planners, developers, and public officials who are unfamiliar with how to think about and plan for industrial inclusion. This is a sentiment echoed across the interviews conducted for this research: Significant effort is needed to teach planners not just how to protect existing industrial zone boundaries but how to make those spaces and their important industrial activities more accessible, more visible, and more inclusive.

The central component of SFMade's work that we want to emphasize here is intentionality. SFMade has attracted attention for its efforts to revive the manufacturing ecosystem of a city famous for tech investments and creative class cultivations. But ensuring that the revived manufacturing ecosystem reaches populations marginalized by historic planning and development practices has required programming innovations that intentionally prioritize inclusion and make manufacturing more visible in the lives of urban residents. In essence, SFMade has engaged in the task of reimagining and "rebranding" how manufacturing fits in the city. The gains are nascent and partial, but they signal growing recognition that breaking patterns of exclusion requires new priorities and new strategies.

3.2. Northland Workforce Training Center: Buffalo, NY

SFMade built a foundation of success by reviving aspects of the city's industrial ecosystem; it then innovated to reach new populations by developing programming that prioritizes racial inclusion. For the NWTC, in Buffalo, NY, racial inclusion has occupied the center of its programming from the beginning. Created in 2018 with the mission "to advance the economic well-being of Western New York by developing and maintaining a skilled and diverse workforce to meet the needs of the advanced manufacturing and energy sectors," the NWTC seeks to "increase the number and quality of local candidates prepared for energy and advanced manufacturing careers" (NWTC, 2023, para. 3). The emphasis on "advanced manufacturing" is important in the context of the present discussion as it directly confronts the debate among industrial advocates over the role of technology in industrial futures. The NWTC example is unique in the way that it embraces the pragmatic tech-centered vision for manufacturing that advocates represent as necessary (and critics view as threatening) but does so in a way that centers and prioritizes the inclusion of historically marginalized populations. Kelmenson et al. (2022, p. 7) characterize this approach in Buffalo as one of "inclusive innovation" for its simultaneous commitment to manufacturing innovations and "an explicit goal of promoting racial and economic inclusion."

Understanding how and why the NWTC pursues the inclusive innovation strategy requires additional context. In Buffalo, the industrialization/deindustrialization/redevelopment dynamic discussed above produced pockets of abandonment around the city from the decline of the historically vibrant manufacturing sector. That abandonment, part of a pattern of racial division throughout the city (University at Buffalo Regional Institute, 2016), was especially pronounced in the city's East Side, the manufacturing district where the Northland neighborhood and the NWTC are located. As various industrial properties lay fallow well into the 2010s, the area came to be "characterized by vacant lots, underutilized commercial and industrial parcels, insufficient housing and outdated infrastructure" (The Buffalo Billion II, 2019, p. 18). Meanwhile, a large-scale state-level initiative called the Buffalo Billion, launched in 2012 by then-Governor Andrew Cuomo, for the purpose of investing more than a billion dollars in economic revitalization throughout the city of Buffalo, was gathering attention through high-profile development projects. But, as one of our respondents notes, these investments were not reaching the East Side neighborhoods (Interview 5, 2023):

> So, to make a long story short, because of the significant investment in the Buffalo Billion, the community felt like they were not being a part of the renaissance in Buffalo. Most of those investments went to a place called the Medical campus, which is in an area in Buffalo that's now revitalized. Another place was Canal Side, which is the waterfront….[In contrast] I mentioned early on the Northland Beltline area: low income, high crime, high poverty, no investment industrial areas that are basically dormant sections of the community right next to residential neighborhoods primarily occupied by people of color and low-income residents. It was determined at that time to revitalize this area.

For the industrially zoned East Side, revitalizing the area meant reviving the manufacturing sector that could provide jobs for local residents. According to the Western New York Regional Economic Development Council, reviving the manufacturing sector meant investing in advanced manufacturing. Despite decades of industrial decline, in the early 2000s, the manufacturing sector in the greater Buffalo region remained relatively strong in comparison with other urban areas. However, maintaining that strength and pursuing new growth opportunities required new investment strategies to "help these firms and assets to innovate, update their business models, redeploy assets toward newer products and

emerging markets, and develop advanced manufacturing capabilities" (Western New York Regional Economic Development Council, 2013, p. 11). In other words, the political winds were blowing in the direction of "knowledge based sectors and innovation" (Western New York Regional Economic Development Council, 2013, p. 6), and investment dollars were lining up to apply that vision to the manufacturing sector. In that context, there was not much uncertainty about NWTC's purpose: to help realize the advanced manufacturing development strategy in Buffalo. As with the example of SFMade, the question was how to activate existing industrial spaces in ways that could reach and serve the desired population.

The two components of the inclusive innovation strategy pursued in Buffalo that we want to emphasize here are the siting of the NWTC building, and the programming that prioritized workforce pipelines, upskilling, and collaboration to broaden access to advanced manufacturing opportunities. In terms of location, the NWTC is housed in the former Niagara Machine and Tool Works building, a 100,000-square-foot facility that serves as the centerpiece of the Northland Beltline Corridor Redevelopment Project. As Kelmenson et al. (2022, p. 16), note, the location choice is intentionally symbolic of the project's priorities: "This decision reflects the desire to strategically re-use former industrial land and infrastructure, and to include the East Side of Buffalo residents in a vision for shared prosperity." That type of inclusion makes important resources more accessible to local residents, while the high-profile investment in a state-of-the-art facility in the manufacturing sector combats decades of negative imagery associated with isolation, neglect, abandonment, and loss. Tangible, street-level visibility thus weaves manufacturing into the daily lives of residents and infuses the sector with a new degree of vitality and positivity.

The NWTC's workforce development programming builds on this physical accessibility to improve awareness of and readiness for emerging opportunities in the manufacturing sector by rebuilding workforce pipelines. Those pipelines serve two pressing tasks: (a) Educating potential employees about the realities of the sector (breaking outdated stereotypes of manufacturing as "dark, dirty, and dangerous"; Interview 7, 2023); and (b) making sure those pipelines reach marginalized groups, including "recent high school graduates, unemployed residents, single parents, and historically underrepresented populations such as women, people of color, veterans, refugees, immigrants, and those involved in the justice system" (Kelmenson et al., 2022, p. 12). The "inclusion" aspect of inclusive innovation thus targets specific populations, many of whom are residents of East Side neighborhoods, in an attempt to ensure that whatever investments are brought to the sector break from past patterns of exclusion.

The centrality of inclusion to their workforce pipeline development work is also reflected in NWTC's commitment to cooperation and collaboration with complementary manufacturing service providers. By including organizations such as the Buffalo Manufacturing Works (an advanced manufacturing research, consulting, and fee-based service provider located in the same building as NWTC), Insyte Consulting (a non-profit manufacturing business and process consulting organization and the Western New York region's Manufacturing Extension Partnership Center), the Buffalo Niagara Manufacturing Alliance (a non-profit industrial intermediary and advocacy organization for Western New York), local colleges and community colleges, and other service providers, NWTC helps coordinate a manufacturing ecosystem that offers comprehensive services to employers, employees, and those looking to enter the sector. Training focuses on building new skills for advanced manufacturing to bring new workers into the field, as well as ongoing training for existing workers to ensure professional mobility within the sector. That emphasis on up-skilling was a consistent theme across interviews, as respondents recognized the importance of pipelines that run not just to entry-level, but through various tiers of a manufacturing career (Interview 7, 2023):

> What we want to be doing is more intentional inclusion and upskilling of those machinists that are coming out of Northland [NWTC] to then be up-skilled into automation a few years down the road. So we can continue that career upward mobility of folks so that they cannot just become people that are making a living wage, but the ones that are becoming the innovators.

There is much more to learn about NWTC's approach to inclusive innovation that falls outside the scope of the present discussion (see Kelmenson et al., 2022, for more details specific to Buffalo; Lowe et al., 2021 and Lowe & Wolf-Powers, 2018, for examples in North Carolina and Illinois, respectively; and the Urban Manufacturing Alliance, 2023, for additional examples). What we have covered here is intended to capture the intentionality needed to break from a history of exclusion and highlight the role organizations like NWTC can play to broaden access to emerging opportunities in existing industrial spaces. Investments in raising the visibility of manufacturing help build awareness of and support for the sector's viability, while innovative and collaborative programming helps ensure that manufacturing investments prioritize inclusion of populations that were excluded in the past and are too often forgotten or displaced by new initiatives.

4. Conclusion

Our intention here has been to make connections between emerging interest in industrial revival and historic patterns of industrial planning in order to make the case for departures from traditional planning norms. The convention of separating industrial activities from other land uses in urban areas has protected many urban

residents from the worst of industrial pollution over the past century, but the history of expulsive zoning reminds us that those protections were extended inequitably, contributing to the segregation and marginalization of Black communities. More recently, the hard lines of zoning have provided defense against industrial displacement and some hope for industrial retention and revival, but competitive urban real estate markets have also weakened those defenses and ongoing urban redevelopment politics have complicated industrial revival strategies. The examples of industrial planning, broadly defined, explored here offer some promise of improved industrial futures by departing from those traditional norms and working to achieve more equitable gains within the boundaries of inherited industrial landscapes.

The two examples we explore here prioritize "visibility" and "inclusion" to enhance and extend manufacturing opportunities that are already emerging in response to evolving urban social and economic conditions. In terms of visibility, industrial advocates recognize that generations of anti-industrial attitudes and development practices have contributed to a general loss of industrial awareness. As Baker (2017, p. 120) has argued, confronting that invisibility can help strengthen urban industrial revival efforts:

> Against this invisibility, a built environment that explicitly prioritizes public connections to industry can bring benefits in raising awareness of production processes, enabling social engagement between producers and the public and enriching everyday experiences of being in the public spaces of the city….This visual presence of production can prompt understanding of the human labor, mechanical processes and energy required to produce the often taken-for-granted material goods of our industrial society.

As discussed above, while the intentionally "conspicuous" siting of new production and support facilities in urban areas is important, raising the visibility of manufacturing also involves outreach to bring awareness of already existing manufacturing activities to new groups. Both SFMade and NWTC have actively sought to attract attention to developments and opportunities in the field and to activate existing spaces through a variety of efforts: hosting demonstration events, building internship and apprenticeship programs, developing new skills training programs, and collaborating with a wide variety of complementary service providers.

When paired with a commitment to racial inclusion, those efforts can help ensure that new investments in the manufacturing sector reach historically marginalized groups and that the expected benefits are more equitably shared. That intentionality is essential; as Checker (2017) has demonstrated, urban development approaches that fail to center new priorities can reproduce patterns of exclusion and reinforce displacement pressures.

There is clearly much more to say about these and other examples of manufacturing retention and revival, particularly with regard to the specific actions taken, the organizing involved, and the coalitions needed to achieve the gains discussed here (see Doussard & Schrock, 2022, on the evolving struggle for work-related justice). And we make no grand claims about these examples overcoming the many barriers faced by the manufacturing sector more generally, or ultimately "fixing" the historic problems of exclusion linked with the industrial sector. In many ways, these examples reveal the many challenges that manufacturing support-oriented organizations face in trying to create more inclusive manufacturing systems. But these departures from destructive industrial planning norms offer a kind of "proof of concept" to demonstrate that prioritizing improved visibility and inclusion in the manufacturing sector can make important contributions to more positive industrial futures.

Acknowledgments

Special thanks to the reviewers and Editor for helpful feedback and suggested revisions.

Conflict of Interests

The authors declare no conflict of interests.

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About the Authors

Mark Pendras is an associate professor in the School of Urban Studies at the University of Washington Tacoma. His research explores secondary cities, relational urbanism, urban and regional development, and planning for urban industry. Recent publications include "Secondary Cities" (Policy Press, 2021), "The Metropolitan Production of 'Urban' Sustainability" (*Frontiers in Sustainable Cities*, 2022), and "Keeping Blue Collars in Green Cities" (*Frontiers in Sustainable Cities*, 2020).

Adam Nolan is an associate planner with the long-range planning team at the City of Tacoma. His background ranges from work in production and distribution industries to project management roles and social service case management. He graduated from the University of Washington Tacoma with a MA in community planning program in June 2020.

Ashleigh Williams is a planner with the City of Burien in Washington. She graduated from the University of Washington Tacoma with a MA in community planning program in June 2020.