



FALL 2020

CHAPTER 6

DEPARTURES FROM THE NORM: INNOVATIVE PLANNING FOR CREATIVE MANUFACTURING

By: Adam Nolan & Ashleigh Williams

INTRODUCTION

Planning for urban industry and transit-oriented development (TOD) has been viewed historically as an attempt to mix oil and water. Community planners and urban scholars have closely linked TOD to the Smart Growth movement, which emphasizes walkable, transit-oriented, mixed-use and green urban spaces. TOD and smart growth planning aim to protect residential uses by promoting mixed residential and commercial developments, viewing industrial land as incompatible with its goals. Manufacturing and industrial land use considerations and protective policies have not been adequately factored into planning discourse, initiatives, and studies, especially within TOD and Smart Growth. This has led to high levels of industrial land conversion and the displacement of manufacturing businesses in urban areas. As noted by Leigh & Hoelzel (2012), planners have a duty to recognize the changing patterns of development and types of urban industry.

INTRODUCTION (CONTINUED)

“To expand the smart growth dialogue,” they argue, “planners should focus greater attention on the impacts of smart growth policies on productive urban industrial land and on developing local measures to protect urban industry while pursuing smart growth” (p. 97). Current literature on TOD and industrial displacement suggests that planners need to further explore the reasoning behind industrial land conversion and how to strengthen preservation policies. Industrial/manufacturing companies can and should have a place in urban, green spaces and thus need to be preserved and enhanced.

This chapter examines how innovative planning can maintain, and possibly expand, space for creative manufacturing businesses in urban areas. Our research covers the history of zoning and its effects on industrial lands as well as examples of how innovative planning has been used across the United States in ways that depart from traditional urban industrial planning norms. Leigh and Hoelzel’s (2012) claim that “urban industrial development and smart growth should not be an either/or proposition” is a centerpiece in our research as planners have often taken the either/or approach to industrial development. Industrial businesses and manufacturing firms provide a wealth of benefits to a city’s workforce and economy. The preservation of urban industry is also the preservation of blue collar jobs that serve “important and urban niche markets and [provide] employment for a less-educated and largely immigrant and minority workforce” (Curran, 2007, p. 1428). Urban industry is needed to combat displacement while also economically uplifting workers and businesses in urban areas.

This chapter examines how innovative planning can maintain, and possibly expand, space for creative manufacturing businesses in urban areas. Our research covers the history of zoning and its effects on industrial lands as well as examples of how innovative planning has been used across the United States in ways that depart from traditional urban industrial planning norms.

RESEARCH OVERVIEW

Seeing industry as undesirable or antiquated has facilitated the conversion and continued squeezing of industrial lands and opportunities. However, modern light manufacturing can fit with other uses and is worthwhile in providing means to bolster equitable opportunities and local economic developments (Lester, Kaza, & Kirk; 2013; Leigh & Hoelzel, 2012; Curran, 2007). Considering the argument that “providing a space and place for urban manufacturing is essential for equitable jobs, sustainable economies, and diverse vital cities,” it is necessary to explore examples of planners enhanced in different levels of creative industrial land use planning intended to preserve and expand industrial space and opportunities (Rappaport, 2020, p. 190).

Land-use control and zoning play an important role in our everyday lives. Municipalities use land use ordinances and zoning to govern how land is to be used. The 1926 Supreme Court case *Euclid v. Ambler and the Standard Zoning Enabling Act* set powerful regulatory standards in legalizing land use separation through single-use zoning, especially in protecting residential landowners’ investments from undesirable uses, including industry (Hirt, 2007, p. 439). Manufacturing became an incompatible use for residential and commercial districts, leading to standalone facilities or industrial parks (Smart Growth America, 2017, p. 3).

Despite separation by zoning districts, industry has had an important place in urban economies. Unfortunately, deindustrialization, suburbanization, and offshoring in the second-half of the twentieth century have gradually eroded urban industrial land in cities (Sugrue, 2005). This was not inevitable. Dierwechter and Pendras (2020) note that “deindustrialization was never a neutral response to the natural workings of the market, but rather instead a deeply political process with clear winners (real estate investors and corporate elites) and losers (traditionally industrial workers, cities, and neighborhoods)” (p. 2). Cities have come to prioritize post-material spaces that privilege and prioritize forms of consumption (services, entertainment, etc.) over the production of material goods (ibid.).

While much has been made of the devastation resulting from deindustrialization, urban areas are still attractive for manufacturing for a number of reasons including proximity to markets, transport networks, and access to other goods and services that facilitate efficient operations (Lester et al., 2013). Manufacturing sectors help to create healthier, diversified urban economies; typically produce higher wages and more jobs than commercial counterparts; and hold potential for advancing urban equity goals and outcomes (Lester et al., 2013, p. 297; Leigh & Hoelzel, 2012, p. 89). Importantly, modern manufacturing activities have transcended traditional notions of “heavy” industrial development, being smaller in scale, more sustainable and environmentally-friendly, and generally less of a nuisance (Leigh, Hoelzel, Kraft, and Dempwolf, 2014).

Urban manufacturing futures hold promise but require proactive initiatives to break free from traditional zoning and planning trajectories that have helped to diminish industrial space and production opportunities.

Though moving beyond older industrial practices, modern manufacturing largely remains confined to industrial districts in traditional zoning areas that face intense conversion pressures, especially when competing against residential and commercial property interests that can command prices several times higher than industrial property (Rast, 2012, p. 22). Echoing these limitations, Rappaport (2020) states that “a twentieth-century zoning ordinance focused on strictly segregating uses will never be able to achieve the urban typologies that will define the twenty-first-century city” (p. 198). While effective in providing some protections for urban industrial activities, traditional zoning fails to ensure adequate surplus or the right kind of spaces for modern manufacturing.

As different priorities, trajectories, and challenges must be weighed, especially with population growth

RESEARCH OVERVIEW (CONTINUED)

and an expanding service economy, Howland (2011) suggests that cities must also determine where industrial land should be preserved and protected, or where it should be released for alternative uses; if industry is economically healthy, strategies to preserve industrial land should be pursued. Lack of regulatory enforcement can lead to non-industrial uses (service-sector, commercial, etc.) that crowd out of industrial uses. Rast (2012) stresses the importance of carefully planning, targeting, and permitting manufacturing uses in industrial districts, with quality jobs that serve local residents as a priority. As an example, innovation districts have gained attention with potentials to attract creative manufacturing firms, create new jobs, and drive economic growth, but “for cities already confronting the loss of middle-wage jobs and widening economic and racial disparities, they have failed to reach low-income communities and communities of color,” (Equitable Innovation Economies, 2014, p.3) and could actually be a “harbinger of industrial displacement through market-driven mixed-use redevelopment” (Lane, 2020, p. 37). Traditional zoning has largely limited manufacturing uses to industrial districts, but these districts currently face pressures that make it difficult for manufacturing businesses to find affordable space for potential expansion that could create more middle-class jobs and benefits for cities. Creative industrial land use policies that serve as departures from the norm are needed so that cities and residents can attract, maintain, and grow manufacturing industries.

Our research shows that despite these challenges, significant industrial planning experimentation is now occurring in a number of cities and regions. This work appears to range between the balancing of two intentions: first, efforts to preserve existing industrial zoned districts and, second, efforts to expand manufacturing opportunities into mixed-used or other zoning districts (Lane, 2020, p. 36). Lane and Rappaport (2020) suggest that the focus of industrial district planning and design (as seen in places like Chicago, New York City, and San Francisco) is on “redeveloping legacy manufacturing areas to

As an example, innovation districts have gained attention with potentials to attract creative manufacturing firms, create new jobs, and drive economic growth, but “for cities already confronting the loss of middle-wage jobs and widening economic and racial disparities, they have failed to reach low-income communities and communities of color,” (Equitable Innovation Economies, 2014, p.3)

protect, enhance, transform, or transition them into new modes of manufacturing” (p. 14). These efforts appear to be more successful when backed by strong regulatory zoning and enforcement, although conversion pressures and other challenges persist, especially in ensuring that industrial lands are being used for industrial purposes (Rast, 2012; Grodach & Gibson, 2019). Additionally, these industrial districts, which in many cases replicate low-rise suburban industrial parks, often fall short in providing access to affordable spaces for smaller-scale manufacturers and room for businesses to grow (Lane, 2020, p. 34).

Planners are therefore also now considering creative ways to expand manufacturing uses beyond traditional industrial zoning districts. Bingham and Shapiro (2020) note that many city planners are turning to mixed-use zoning, “believing that single-use zoning is not sustainable given that industry is often not able to compete financially or politically with alternative land uses”; it is also clear that attempts to create industrial mixed-use spaces face many of those same challenges (p. 204). Light manufacturing is already allowed in many mixed-use zoning districts, but without using ancillary measures like “mandatory inclusionary manufacturing” many industrial uses are at a spatial and development disadvantage when competing with residential and commercial uses in “highest and best use” trajectories (Chapple, 2014; Lane & Rappaport, 2020, p. 6; Becker & Friedman, 2020, p. 212).

Planners, officials, and communities must engage in deep interrogations to envision and craft sustainable urban futures that align appropriately with local contexts (Frug & Barron, 2008). Urban manufacturing futures hold promise but require proactive initiatives to break free from traditional zoning and planning trajectories that have helped to diminish industrial space and production opportunities. The literature supports the need for research on creative industrial planning aimed at preserving and expanding urban industry and the economic and social benefits it can offer to cities and regions.

Our research examined examples of cities that have “departed from the norm” of traditional zoning limitations in their efforts to preserve and expand industrial spaces, and identified potential patterns in how those departures were developed and/or implemented. These examples demonstrate

that other avenues are available for planners to consider creative industrial zoning and land use policies in urban areas. From these examples we selected two cities for more in-depth case studies to examine their creative industrial planning efforts; why and how they initiated these efforts; and what lessons could be learned. Through our research we have discovered that, contrary to common assumptions about ‘deindustrialization’, planners are making strides in the preservation of urban industrial lands while also attempting to integrate urban industry into smart growth planning. Our research demonstrates that as urban spaces and the economy evolve, so must the planning of cities. This includes consideration of how to preserve and expand industrial spatial opportunities and the jobs they create, people they employ, and urban spaces they can benefit.

FINDINGS

Planners are experimenting with and implementing creative approaches to urban manufacturing beyond traditional zoning norms. As noted above, this work could be understood as a balancing of two intentions: efforts to preserve existing industrial zoned districts and efforts to expand manufacturing opportunities into mixed-used or other zoning districts. Our research findings and case studies are organized with this overall theme in mind.

PRESERVATION OF INDUSTRIAL ZONED LAND

With large amounts of converted and rezoned industrial lands, planners have recognized the growing urgency of preserving what still remains. This recognition goes hand-in-hand with the acknowledgement that industry is more suitable for urban spaces than ever before as modern manufacturing now entails smaller, more environmentally friendly and technologically savvy firms. The preservation of industrial spaces in urban areas allows for the growth of manufacturing firms and the economic presence they provide. Grodach, O'Connor and Gibson (2017) discuss the detrimental economic and social effects of rezoning industrial zoned land to mixed-use zoning by stating it leads to “missed economic opportunities that stem from the revival in manufacturing and ‘making’ cultures, but also for the degree to which they intersect negatively with urban labor market characteristics, exacerbating social inequalities” (p. 18). Industrial zoned lands provide spaces for manufacturing firms to create jobs and incomes that contribute to the local residents and urban economy.

While many modernized manufacturing businesses have the ability to operate on land that isn't zoned for industrial use, we still need to preserve industrial lands, especially parcels with unique assets and large infrastructure investments for heavy industrial uses (Puget Sound Regional Council, 2015, p. E-4). Industrial uses are nuanced and must be treated and zoned as such to gain the maximum benefit from their presence.

The Brooklyn Navy Yard serves as a successful example of planners taking this into consideration

Baltimore, Maryland has found a creative way to preserve and reinvigorate its industrial center that dates to 1850. The site was once home to Maryland's “largest and most productive machine manufacturing complex” (Philipsen, 2019) and is now home to Clipper Mill, a mixed-use community comprising of attached homes, apartments, office spaces, and 47,500 square feet of arts and craft studio space. The redevelopment was kicked off in 2002 when the Struever Brothers purchased the land with the intent to provide a residential community that also served as a hub for local artists.

when preserving industrial lands. The Brooklyn Navy Yard is a large industrial park amidst the urban area of Brooklyn, New York City, that provides spaces for a range of light to heavy and small to large manufacturing firms at affordable rates. Due to its proximity to residential areas, the Brooklyn Navy Yard also has retail spaces that attract patrons and provide spaces for employees to patronize.

Creative manufacturing firms also often prefer to locate in urban spaces as they are often highly specialized and reliant on adjacency to similar businesses, skilled laborers, and a large consumer market (Grodach et al., 2017, p. 21). However, one of the biggest and most destructive effects of integrating industrial spaces into urban areas is the looming threat of displacement and gentrification. While proximity to urban areas can lead to benefits for manufacturing businesses and residents in the neighborhoods in which they are located, it can also lead to the displacement of those businesses and residents as makers have the tendency to “contribute to gentrifying the places they seek to preserve for production” (Grodach et al., 2017, p. 22). While the preservation of industrial spaces can provide many benefits to urban areas, if not done in a manner that also preserves the surrounding neighborhood (including residents and businesses), it can also lead to destruction through displacement.

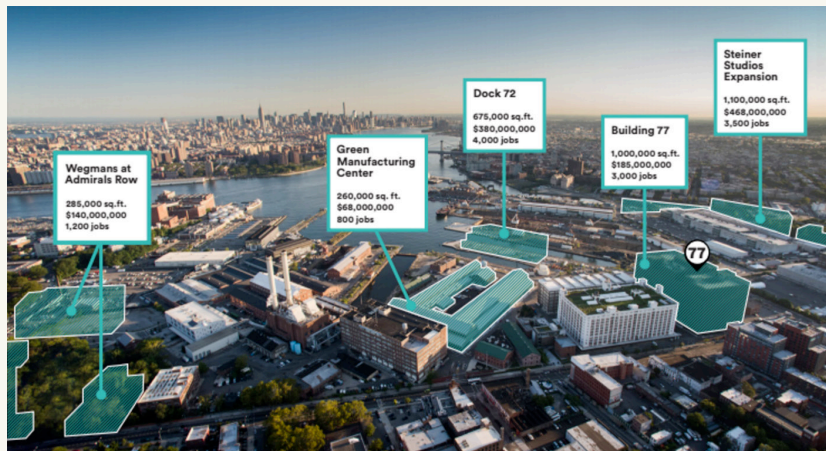
CASE STUDY: BROOKLYN NAVY YARD

The Brooklyn Navy Yard (BNY) is publicly owned property that supports protected and subsidized manufacturing spaces. Sitting upon 300 acres that span the East River, the Brooklyn Navy Yard is:

A mission-driven industrial park that is a nationally acclaimed model of the viability and positive impact of modern, urban industrial development. BNY is now home to more than 450 businesses employing more than 11,000 people and generating over \$2.5 billion per year in economic impact for the city. Building on BNY's history as the economic heart of Brooklyn, the 300-acre waterfront asset offers a critical pathway to the middle class for many New Yorkers (Brooklyn Navy Yard Development Corporation, n.d.).

While the land that the BNY is situated on is owned by the City of New York, BNY is operated by the Brooklyn Navy Yard Development Corporation (BNYDC)--a non-profit corporation which serves as a property manager and real estate developer for the BNY campus.

The Brooklyn Navy Yard has preserved production and manufacturing spaces that serve a variety of industries, including, but not limited to, food, furniture, film, printing and engraving, arts and media, architecture, design, woodworking and transportation. As previously stated, industry and industrial jobs have moved away from the traditional conceptualization as dirty and incompatible with modern visions of urban areas as walkable, transit-oriented, and environmentally friendly spaces. The lighter and cleaner industry demonstrated throughout



Brooklyn Navy Yard, Photo Credit: NY Curbed (Leonhardt, 2017)

suggests that industry is compatible with modern approaches to urban space. In addition to industrial spaces, BNY has also incorporated retail spaces. Building 77, BNY's newest and largest building, is 1 million square feet and houses several food manufacturing businesses that plan to sell retail at the building's ground level. The integration of retail sales for manufacturing businesses sited at Building 77 shows how mixed-use development can aid in preserving and expanding industrial spaces. The Brooklyn Navy Yard has emerged "as a successful model for urban industrial development, with an emphasis on sustainability, that other cities can evaluate and use to inform their own efforts to retain and grow industrial jobs" (Pratt Center, 2013, p. vi).

The presence of the BNYDC helps to combat industrial displacement - a looming problem in the world of planning and redevelopment. Because BNYDC serves as the property manager, they control their tenant's rents and cultivate an alluring mix of manufacturers in the BNY campus. The Brooklyn Navy Yard also supports two centers of workforce development to help withstand the displacement of the immediate area's residents: the Albert C. Wiltshire Employment Center (the EC) and the Brooklyn STEAM Center. The EC helps to sustain a continuous flow of high-quality employment opportunities for local residents in and around the BNY campus. The Brooklyn STEAM Center starts to develop these relationships even earlier; it is a vocational education program that specializes in manufacturing, technology and creative fields for 11th and 12th grade students in eight local high schools (Brooklyn Steam Center, n.d.). The Brooklyn Navy Yard is an admirable example of a space that has worked to preserve industrial land while also developing the local workforce's skill set, growing businesses and fostering lasting relationships between local communities and business owners.

FINDINGS (CONTINUED)

EXPANDING SPACE FOR LIGHT MANUFACTURING

Planners and officials are also experimenting with creative land use and zoning as a way to expand spaces for urban manufacturing. A few of the ways they are doing this is through new land use and zoning designations, and “mandatory inclusionary manufacturing” tools, intended to permit and better incorporate light industrial uses into mixed-use spaces (Rappaport, 2020, p. 192).

Planners have used Artisan or Craft Manufacturing zoning and land use designations as tools that can break through negative associations with manufacturing, and the limitations of traditional zoning. Artisan zoning can be defined as “an approach to land use and development that provides space for small-scale manufacturers that produce little to no vibration, noise, fumes, or other nuisances, meaning they can fit within a wide variety of industrial, commercial, and even residential districts” (Local Progress, 2019, p. 4). Planners have approached artisan or craft manufacturing in different ways—reflecting localized contexts, needs, and strategies. For example, Somerville, MA transformed spatially-limited industrial districts into Fabrication Zones intended to be spaces for artisan manufacturing, makerspaces, “work/live,” and innovation (UMA, 2016). In addition, Nashville, TN, Bozeman, MT and Fairfax County (VA) have each adopted artisan manufacturing zoning, which permits artisan manufacturing uses in more zoning districts (Local Progress, 2019; Fairfax County, 2018). These examples (and especially the Indianapolis case study, discussed below) provide a glimpse into ways that planners may use artisan and craft manufacturing zoning strategies to make use of underutilized or vacant land, and to create jobs and other opportunities to boost economic development and the local tax base.

The key is strategically proactive rather than tactically reactive measures. Becker and Friedman (2020) note that in strong market cities “it will take deployment of a full array of public policy interventions including zoning, financial incentives (and disincentives), urban design, and strong, consistent communications to influence property

owners to resist market forces and preserve mixed use” (p. 212). Light manufacturing generally cannot compete in real estate markets driven by “highest and best” that privileges uses that can pay the most for space, rather than consideration of uses that may generate wider community benefits such as jobs, taxes, or other resources (Chapple, 2014; Pratt Center, 2015, p. 5). Industrial businesses face additional competition from non-industrial uses permitted under Light Industrial (M1) land uses (hotel, office, retail, and self-storage, etc.) (Pratt Center, 2015, p. 5). Setting limits or ratios to maintain a mix of land uses is also important to consider as demonstrated by the City of Philadelphia’s 2012 zoning revision that created Industrial Mixed-Use classifications; in this case, industrial uses were labeled as optional, resulting in many mixed-use development projects providing no space for manufacturers (Local Progress, 2019, p. 4).

While there are clear challenges in this work, different strategies of “mandatory inclusionary zoning” are being explored as ways to ensure Industrial-Mixed Use zoning creates sufficient space for manufacturing. Some of these strategies include use of tax credits or subsidies (high density residential, etc.), transfers of development rights, requiring a specific percentage of industrial uses in buildings, amortizing the cost of constructing new industrial space, or providing lower industrial rents necessary for emerging manufacturers (Rappaport, 2020, p. 192; Becker & Friedman, 2020). The use of cross subsidy mechanisms is increasingly viewed as an important potential resource to promote light manufacturing within mixed-use districts (Pratt Center, 2016; Becker & Friedman, 2020).

Cross subsidy policies incentivize developers to build light manufacturing space alongside high rent-generating uses like residential, commercial, or office space (UMA, 2018, p. 16). These policies can help keep light manufacturing jobs within mixed-use areas and subsidize rents, but need to be matched with enforcement measures (UMA, 2018, p. 16). San Francisco is one example of how this has worked because planners effectively used cross-subsidy as a means to leverage market demand for higher paying

office uses in creating new affordable manufacturing space with the developments of 100 and 150 Hooper (Grodach & Martin, 2019, p. 172).

These findings demonstrate that some cities, their planners, and industrially-oriented community organizations, are proactively working to expand spaces for manufacturing. Manufacturing can and does have an important place in urban areas and

economies, yet simply relying on traditional zoning is not nearly enough. Though cities and regions will have obvious localized contextual differences to consider in this work, these findings suggest that with imagination and political will, departures from the norm are possible and can expand manufacturing opportunities and their benefits to communities.

CASE STUDY: INDIANAPOLIS ARTISAN ZONING

In 2012, the City of Indianapolis began a comprehensive zoning code overhaul with the intention to make the city more livable and sustainable, arguing that “there’s not a community in the country that is sustainable without jobs” (UMA, 2016). In looking at the local context, Indianapolis planners determined that urban manufacturing had a lot of important benefits for the city and region. Out of these considerations and needs, planners created the new and creative land use categories of Artisan Manufacturing and Artisan Food and Beverage.

City planners considered new urban manufacturing strategies for several reasons. The perceived benefits of manufacturing included potentials for job creation, reducing crime and opportunities for crime, and providing job opportunities closer to residents’ homes (UMA, 2016). In monitoring the local job environment, planners grew concerned that they did not have enough of “the higher-end jobs” and viewed manufacturing as “a way to allow the creation of good jobs that could potentially take off and be something phenomenal” (T. Tracy, personal communication, May 9, 2020). Manufacturing uses could also be paired well with realities of the city’s built environment.

Indianapolis had a surplus of vacant rustbelt-era buildings in the core of many neighborhoods; by allowing manufacturing uses into vacant buildings, they could generate tax revenue (UMA, 2016). With respect to sustainability, the city prioritized the reuse of legacy industrial buildings rather than demolition and potential redevelopment that involved greater expense; “the greenest building is the one that is already there” (UMA, 2016). This also allowed the city to make use of existing infrastructure (roads, utilities, etc.) (UMA, 2016). By repurposing buildings and efficiently using existing infrastructure, the city could better ensure that spaces could be kept affordable for manufacturing businesses to get off the ground.

In order to expand manufacturing uses, planners determined and defined what it was that they wanted to do and how this served as a departure from traditional industrial use limitations (UMA, 2016). The city adopted Artisan Manufacturing and Artisan Food and Beverage as land-use categories, specifically defining their smaller scale manufacturing intensities (minimal automation, space limitations, etc.) and including opportunities for direct sales to the consumer as an accessory use (UMA, 2016). These artisan uses then could be allowed in more districts (commercial, mixed-use, central business district) beyond industrial districts with the intention that the expansion of these uses “enable good paying urban manufacturing jobs in and close to our existing neighborhoods” (UMA, 2016).

To further eliminate barriers to job creation and facilitate the reuse of buildings, the city also created a “permitted where vacant” or “V” option (UMA, 2016). This expands opportunities for Artisan Manufacturing and Artisan Food and Beverage to set up shop in commercial, mixed-use, and industrial district buildings that have been vacant for at least five consecutive years (UMA, 2016). This creative flexibility addresses the need for affordable start up spaces for artisan businesses.

Finally, Indianapolis planners and officials engaged with a comprehensive rezoning that included extensive community participation. Out of this the city and its residents could better define some of their pressing needs and consider how zoning could help accomplish overall livability and sustainability goals. The artisan zoning efforts of Indianapolis planners represent a second major example of creative planning that departs from the norm to expand spaces for manufacturing.

CONCLUSION

Our research demonstrates that planners are experimenting with creative land use and zoning for urban manufacturing. This has been carried out in different ways but can generally be understood as distinguishing between efforts of preserving existing industrial districts for industrial uses and expanding light industrial uses into other districts. In consequence, we conclude that the realities of modern manufacturing present the need to reevaluate the position of manufacturing in urban planning movements, a specific reiteration of Leigh and Hoelzel's (2012) suggestion that "urban industrial development and smart growth should not be an either/or proposition" (pp. 96-97).

Smart Growth and TOD developments have inadequately incorporated manufacturing concerns; this only contributes to views that these planning movements are too often a source of light manufacturing displacement, especially "as new transit can drive up property values, and make the spaces untenable for light manufacturers" (UMA, 2018, p. 21). Critically, this need not be the case: creative land use tools can support and integrate light manufacturing into sustainable planning objectives. Our research makes it clear that without creative land use tools, however, cities run the risk of diminishing space for light manufacturing as these uses face formidable barriers in "highest and best use" real estate scenarios; once industrial space is gone, it is very difficult, if not in most cases impossible, to get back (Chapple, 2014; Leigh & Hoelzel, 2012, p. 94).

Our research has also shown that planners need to consider the different angles of their local and regional contexts. Industrial land use studies are essential in helping determine industrial land inventory, what to retain or possibly rezone, and how it might best be utilized (Howland, 2011; Lester et al, 2014). Along with this, cities should consider what kinds of industries best fit with their local industrial landscape and then build strategic plans to maximize opportunities for successful industrial policy, business development and retention, and collaboration with mission-driven organizations.

Our research makes it clear that without creative land use tools, however, cities run the risk of diminishing space for light manufacturing as these uses face formidable barriers in "highest and best use" real estate scenarios; once industrial space is gone, it is very difficult, if not in most cases impossible, to get back (Chapple, 2014; Leigh & Hoelzel, 2012, p. 94).

This strategy should also include building coalitions and constituencies, as well as workforce development programs to suit local manufacturing needs, and to help cultivate and expand access to equitable and living-wage manufacturing job opportunities. Finally, cities need to assess the potential for gentrification for all development they pursue, including creative zoning for urban manufacturing and mixed-use projects.

We recognize that traditional zoning does have its place, is needed, and can be effective. This is especially true as some heavier industrial uses should logically continue to be located in districts not adjacent to residential and lower-intensity uses. However, as we have discussed, traditional zoning alone has not been effective in warding off conversion pressures or encroachment from non-industrial uses, so urban industrial lands continue to be squeezed. What space is available may not be suitable for the needs or price point of light manufacturing businesses. In some cases, this leaves industrial lands underutilized and underinvested, and this can further bolster political and development-backed pressures for conversion.

In recognizing some of these limitations presented by traditional zoning, and in believing manufacturing is necessary and beneficial to urban areas, planners in "manufacturing-aware" cities are choosing to depart from the norm in efforts to preserve and expand manufacturing space and opportunities (Leigh et al., 2014, p. 4). This is not a clean break from traditional zoning, nor should it be. Instead, it represents choosing to push the boundaries of possibility for planning urban manufacturing futures.

