

Resilience and adaptation in gentrifying urban industrial districts: The experience of cultural manufacturers in San Francisco and Melbourne

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Recent urban scholarship shows how zoning and real estate dynamics shape ongoing processes of gentrification and deindustrialization. While studies demonstrate the impact of planning and property market pressures on the arts, less research has examined their effect on urban manufacturers in gentrifying industrial districts. Given the differential impact of zoning and real estate pressures, our research focuses specifically on how “cultural manufacturers” negotiate changing land use patterns in gentrifying urban industrial areas in San Francisco and Melbourne. Our findings show how cultural manufacturers develop flexible workspace arrangements, business models, and professional networks to negotiate urban restructuring and avoid displacement. Though innovative, these survival strategies possess a limited ability to navigate structural barriers. Here, the presence of intermediary organizations can help coordinate a strategic response to industrial gentrification and indifferent planning policy. Our research highlights the everyday practices of adaptation and collective action in an under-researched cultural sector, providing a counterweight to macro-scale transitional narratives. While cities have deindustrialized due to technological and competitive pressures, to focus exclusively on this misses a range of resilience practices that have sustained manufacturers in restructuring cities.

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Introduction

Despite a loss of urban industrial zones to real estate speculation and post-industrial planning (Curran & Hanson, 2005; De Boeck & Ryckewaert, 2020; Ferm & Jones, 2016; Sprague & Rantisi, 2019), urban manufacturing has remained in high-cost cities. This includes legacy firms that have endured the last four decades of deindustrialization and gentrification, alongside new small-scale enterprises that have emerged to meet a growing demand for design-driven and customizable products (Curran, 2010; Grodach, O'Connor, & Gibson, 2017; Hatuka, Ben-Joseph, & Peterson, 2017; Wolf-Powers et al., 2017). As a consequence of the Global Financial Crisis and Covid-19 pandemic, there has been renewed interest in urban manufacturing as service- and real-estate dependent cities grapple with the frailties and inequalities of an unbalanced economy (Christopherson, et al., 2014; Grodach & Martin, 2020). While no longer a leading sector in high-cost cities, there is now a growing recognition that urban manufacturing contributes to a more equitable and diverse job mix (Chapple, 2014; Grodach & Guerra-Tao, 2022) and sustains social and cultural infrastructures for collaboration, innovation and inclusivity (Heying, 2010).

Though cities are beginning to confront the importance of a diverse industrial base, urban policy agendas still broadly support “post-industrial” forms of development that naturalize the deindustrialization process (Grodach & Gibson, 2019). In practice, this means that small manufacturers are forced to contend with urban policies that actively rezone industrial land for upscale residential development, consumption amenities, and studio space. While there is a wealth of literature that demonstrates the impact of these policies on arts and cultural activities (Hutton, 2008; Mathews, 2014; Pollio et al., 2021), less attention has been paid to their effect on urban manufacturers. The impact of planning and property market pressures varies between urban manufacturers and traditional arts organizations because of the particular spatial and regulatory requirements needed to manufacture in cities. Beyond this, urban policies often promote arts and creative activities over manufacturing in “under-utilized” industrial areas as a tool to rehabilitate property values and attract consumption (O'Connor & Gu, 2014; Grodach, 2017).

Given the differential impact of zoning policies and real estate pressures, our research focuses specifically on the survival strategies of “cultural manufacturers” in gentrifying urban industrial areas in San Francisco (United States) and Melbourne (Australia). We study cultural manufacturers because of their dependency on central city space. Cultural manufacturers produce material consumer products with high symbolic value (e.g., furniture, clothing, jewelry and crafts) and provide specialized services to arts and creative industries (e.g., specialty printing, architectural interiors, set building, event installations) (Grodach et al., 2017; Scott, 2004). As a result of these close contractor and client relationships, this type of manufacturing tends to value similar inner-urban locations to traditional arts and creative industries (Gibson et al., 2017; Martin & Grodach, 2022; Wolf-Powers et al., 2017). Working against this, however, are a set of functional space requirements – such as zoning, buffering distances from residential uses, loading docks, noise and odor attenuation – that create additional sensitivities to land use change and property development (Curran, 2010; Sprague & Rantisi, 2019).

Yet, rather than simply displacing cultural manufacturers, we contend that land use planning and real estate pressures play a decisive yet overlooked role in shaping their form and function. Our research is informed by Andres and Round’s (2015a, 2015b) concept of “micro-resilience”, a framework designed to capture the resourcefulness and adaptive capacities of marginalized households and small businesses in response to structural pressures (see also DeVerteuil & Golubchikov, 2016). Using this framework, we identify innovative business models, workspace arrangements, and production networks that have developed in response to changing land use patterns and industrial gentrification. However, our research also indicates that “micro-resilience” in itself is largely a temporary stop-gap response and faces inherent limits in navigating key structural barriers. Here, the presence of supportive intermediary organizations can help coordinate a more strategic and collective response to industrial gentrification and indifferent or even hostile planning policy (Clark, 2014; Grodach, 2022; Wolf-Powers et al., 2017).

To conclude, we discuss the three main contributions of our research. First, we explain the adaptive capacities of an under-researched cultural sector and counter simplistic “replacement narratives” that position the arts and creative industries as successors to a declining manufacturing sector (Grodach et al., 2017; O’Connor & Gu, 2014). Second, we extend theory on “micro-resilience” by examining the

interplay between adaptive business practices at the “micro-scale” and collective intermediation at the “meso-scale” (Clark, 2014). Last, our focus on vernacular, every day practices of ingenuity, resourcefulness, and collective action provides an important counterweight to macro-scale narratives of post-industrial transition. Undeniably, large parts of the manufacturing sector have collapsed as a result of competitive pressures, technological change, and real estate pressures. However, to focus exclusively on this response misses a range of resilience practices that have sustained contemporary manufacturing in restructuring cities.

Negotiating land use change, property development, and industrial gentrification

A growing literature calls attention to the revival of urban manufacturing in high-cost cities (Grodach et al., 2017; Hatuka et al., 2017; Wolf-Powers et al., 2017). This work highlights the intimate links between nascent urban manufacturing economies and the agglomeration benefits of cities. Unlike firms under Fordism, new urban manufacturers tend to be small, flexible and specialized (Gibson et al., 2017; Hatuka et al., 2017; Piore & Sabel, 1984). They rely on urban agglomerations to access a diverse labor force, to forge specialized linkages with other businesses, and to exchange knowledge and resources (Curran, 2010; Scott, 1988; Wolf-Powers et al., 2017).

The latter is particularly important for cultural manufacturers that combine “synthetic” (industrial) and “symbolic” (cultural/design) knowledge to produce niche, design-intensive products (Hatch, 2013). These knowledge sets are highly relational, contextual, and geographically “sticky” (Blundel & Smith, 2013; Fox Miller, 2017; Gertler, 2003). Cultural manufacturers develop synthetic knowledge by combining existing technologies and knowhow to design new products and processes. This involves learning by doing, using and collaborating with partners that have heterogenous yet complementary expertise (Hansen & Winther, 2014). As learning is a social and experiential process, face-to-face contact is often the most effective medium of exchange (Blundel & Smith, 2013; Hatch, 2013). Similarly, cultural manufacturers develop symbolic knowledge through social interaction but these interactions are more fluid and transient. Enterprises refine their creative and design capabilities through “exposure to a range of cultural currents ... facilitated through wide networks of relations” (Leslie &

Rantisi, 2017, p. 244). This involves working across different projects and social contexts to keep informed about changing styles and tastes (Scott, 2010).

While large firms are able to combine these capabilities within their organization, cultural manufacturers tend to be small enterprises and, therefore, depend on urban agglomerations to manage risk, increase capacity, and access the requisite skills and resources for particular projects (Doussard et al., 2018; Scott, 2010). This type of production lends itself to a central location in established industrial districts with ready access to production networks, clients, and social infrastructure (Curran, 2010; Gibson et al., 2017; Martin & Grodach, 2022; Wolf-Powers et al., 2017). In contrast to greenfield industrial precincts, older industrial districts comprise a mix of building types suitable for shared production spaces and smaller workshops (Ferm, Panayotopoulos-Tsiros, & Griffiths, 2021). Paradoxically, the factors that rendered these spaces obsolete for large manufacturers – small floor plates, multiple stories, large windows – create conducive work environments for newer forms of production (Wolf-Powers, 2015). In some instances, old industrial districts may serve as a signifier of locally distinct practices or connect new forms of production with past industrial specialisms (Heying, 2010).

These locational tendencies align closely with arts and cultural industries, which similarly value older industrial buildings for their flexibility, affordability, and distinctive aesthetic (Hutton, 2008; Martin & Grodach, 2022; Pollio et al., 2021). Spatial proximity is also driven by close client and contractor relationships across the cultural industries-manufacturing nexus, ranging from set construction for performing arts institutions (Gibson et al., 2017) to metal fabrication for industrial designers (Hutton, 2008, p. 214). Nonetheless, these similar location patterns also create tensions. Cultural manufacturers produce physical products with particular spatial requirements around loading, parking, noise, odor, waste, health and safety. Compared to arts, media and design-based industries, cultural manufacturing is relatively space intensive with lower profit margins. This creates rent-sensitivities and a higher likelihood of displacement without zoning protections (Curran, 2010; Gibson et al., 2017).

This acute sensitivity to land use change and regulation is under-researched in contemporary accounts of creative industry geographies. This largely stems from the positioning of creative industries as part of a new “post-industrial” economy in high-cost cities with the capacity to revitalize underutilized industrial areas (Curran & Hanson, 2005; Grodach et al., 2017; O'Connor & Gu, 2014). As a corollary, quotidian factors like zoning regulations have received scant attention in the creative industries literature despite their significance to urban industrial and cultural districts. Indeed, very little is known about how land use changes and property development rework the locational advantages of urban clustering or how manufacturing enterprises manage this process.

These factors require closer examination given structural shifts in city zoning practices and urban real estate markets that have accelerated industrial land redevelopment. As Savini and Aalbers (2016) argue, globalization and financialization have given rise to highly-capitalized real estate projects that are “decontextualized” from their local socio-economic context. This decontextualization drives the development of speculative residential and mixed-use projects on industrial lands, even in cities with high demand and low vacancy rates for older industrial properties (Ferm, 2016; Pratt, 2017). Operating under neoliberal visions of “creative” (Peck, 2005) and/or “green” urbanism (Curran & Hamilton, 2012), city governments often abet the development process through land use changes, tax abatements, and public-private partnerships. Creative urbanism policies use special zoning and incentives to encourage the redevelopment of old industrial buildings for artist studios and upscale consumption amenities (Mathews, 2014). The sanitized spaces that result offer little support for material production, instead prioritizing commercial creative enterprises that can afford higher rents or galleries and festivals that aestheticize industrial areas and enhance property values (Grodach, 2017; Sprague & Rantisi, 2019). Similarly, green urbanism policies target central industrial land but instead aim to increase housing supply, parks and consumption amenities around transit corridors (Curran & Hamilton, 2012; Leigh & Hoelzel, 2012). Though these measures appear to encourage sustainable land use patterns, they also displace blue-collar firms and jobs by encouraging property speculation on scarce employment land (Curran, 2007, 2021; Dierwechter & Pendras, 2020). For example, Curran (2007) shows how industrial land redevelopment is experienced by urban manufacturers in Williamsburg, New York City. She stresses the active role of developers and city governments in displacing small firms through

buyouts, lease refusals, zoning changes and increasing rents (p. 1427). Yet, she also cautions that this experience is not uniform (p. 1433).

Our research explores this variation by focusing on urban manufacturers that remain in gentrified industrial areas. While shifting land use patterns pose considerable challenges, they can also pressure small enterprises to adapt to higher cost environments. We use a “micro-resilience” framework to probe these adaptations (Andres & Round, 2015a, 2015b; DeVerteuil & Golubchikov, 2016). This concept emerged as a corrective to the regional economic resilience literature, which focused on the restructuring of regional or metropolitan economies in response to exogenous shocks (Christopherson et al., 2014). This emphasis on abstract regional systems overshadowed efforts to understand the “complex interactions of agents in the system which themselves adopt resilient behaviors” (Comunian & Jacobi, 2015, p. 163).

To this end, Andres and Round (2015a, 2015b) highlight three mechanisms deployed by small-scale enterprises to negotiate and rework acute disruptive events and longer-term structural pressures. The first two – *production* and *people* – pertain to the ways in which enterprises alter their business models, working arrangements and professional networks to improve their internal capacities and cope with increasing costs or economic downturns. This might involve developing a new product or service, hiring or retraining to meet emerging demands, or entering into a mutually beneficial collaboration with another enterprise. The third dimension – *place* or space – encompasses the material and immaterial resources embedded in particular localities. This includes functional resources like suitable built forms and proximity to clients and labor, as well as intangible resources that emerge through processes of “collective self-help” and community building (Merkel, 2019, p. 527; Pollio et al., 2021). The form, function, and regulation of *place* shapes businesses’ production decisions and professional networks, making it foundational to micro-resilience as a whole (Andres & Round, 2015a; Pollio et al., 2021). For instance, Pollio et al. (2021) demonstrate how creative enterprises established shared workspaces in Sydney’s remaining industrial areas to manage displacement pressures. In turn, businesses formed new networks and developed new skills in venue management, tenant curation and mentorship. From this example, the cumulative dynamics of micro-resilience are also apparent. As businesses navigate

external challenges, they may develop capacities that make them better equipped to manage similar pressures in the future (DeVerteuil & Golubchikov, 2016).

Though useful in reframing and rescaling debates about resilience, micro-resilience risks overestimating or even idealizing the capacities of marginalized actors and their communities to adapt to structural pressures (MacKinnon & Derickson, 2013). Avoiding this requires careful acknowledgement of the limits of micro-scale action, but also the possibilities it holds for collective intervention (DeVerteuil & Golubchikov, 2016). In the context of manufacturing economies, intermediary organizations may play a vital role in sustaining and scaling up micro-scale practices of resilience. Intermediaries possess the knowledge and capacity to navigate infrastructural gaps and regulatory obstacles beyond the limits of individual actors (Clark, 2014; Schrock & Wolf-Powers, 2019). This includes specialist functions such as brokering networks between businesses and policymakers, offering resources and expertise on planning law and community organizing, and providing access to capital, real estate, technology and training (Clark, 2014; Grodach, 2022; Wolf-Powers et al., 2017). Therefore, the interplay between “micro-scale” business adaptations and “meso-scale” capacity building through intermediary organizations may create possibilities for more inclusive outcomes in gentrifying urban industrial districts (Clark, 2014; Schrock & Wolf-Powers, 2019).

Research design

Site Selection

Our research asked: how do cultural manufacturers negotiate changing land use patterns in San Francisco and Melbourne? San Francisco and Melbourne share similar patterns of urban development and industrial land use planning aligned with a “post-industrial” vision of the city (Grodach & Gibson, 2019). In response to deep recessions and waning manufacturing employment in the second half of the 20th century, both cities turned to real estate capital as a fix for economic decline (Hartman, 2002; McLoughlin, 1992). Since then, planning authorities have rezoned a considerable amount of central industrial land for higher-return housing, office, and consumption space. As early as the 1960s, San Francisco’s central industrial zones were subject to large-scale redevelopment to expand the downtown

(Hartman, 2002). With the rise of the dot-com economy in the mid-1990s, this shifted to small-scale office and live-work developments enabled by ambiguously defined and poorly enforced zoning regulations (Solnit & Schwartzberg, 2000). Indeed, industrial lands lacked any real regulatory protection until the 2000s when “Production, Distribution, and Repair” (PDR) zoning was introduced (Grodach, 2022). Though PDR protections have stemmed redevelopment, industrial zones comprised just 3.9% of developed land in 2018 compared to 12.6% in the 1990s (San Francisco Planning Department, 2014, 2019).

Similarly, Melbourne’s city center was reshaped by massive public outlays and foreign direct investment from the 1980s (McLoughlin, 1992). This, in conjunction with a suite of planning reforms under the *Postcode 3000 strategic plan*, spurred an influx of office development, apartment towers, bars and cafes that spilled into surrounding industrial suburbs (Adams, 2008). From the 1990s, a lucrative market for “warehouse style” residential development was established in gentrifying inner suburbs following a protracted recession that devastated small-scale manufacturing (Dingle & O’Hanlon, 2009). Since the 2000s, the State Government has further supported residential redevelopment through transit-oriented development and permissive land use reforms (Victoria State Government, 2002, 2013). To this end, the State rezoned 2,423 hectares of industrial land between 2000 and 2018 to residential and commercial uses. Over 80% of this land consisted of small parcels (<5 hectares) mainly in inner and middle areas (Victoria State Government, 2019, p. 7).

These land use changes have created conflicts as new urban manufacturing activities have emerged in central industrial areas. San Francisco supports a diverse and growing manufacturing base of predominantly small, specialized enterprises. On average, firms employ 15 employees and tend to focus on lower-volume, custom manufacturing near contractors and end markets (SFMade et al., 2016, p. 14). Likewise, Inner Melbourne is home to around 16% of the metropolitan region’s cultural manufacturing jobs. Many of these enterprises cling to the remaining inner-urban industrial zones close to arts and design clusters (Martin & Grodach, 2022).

Our research focused on gentrifying central industrial areas in San Francisco and Melbourne. Despite ongoing gentrification, these two areas have retained pockets of industrially zoned land. In San Francisco, we study a cluster of cultural manufacturers located at the intersection of the Mission District, South of Market Area (SoMA), and Potrero Hill. This falls within the Eastern Neighborhoods, an official City planning area that was the focus of a lengthy planning reform process through the 2000s. This culminated in protective PDR zoning to shelter existing industrial uses and to slow tech-led gentrification on roughly half of the City's industrial land (San Francisco Planning Department, 2007). In 2014, under guidance from intermediary organization SFMade, the City planning department amended PDR zones to incentivize multi-tenant and multi-use industrial developments to service small-scale manufacturers. Since then, the Eastern Neighborhoods have become a testing ground for higher-density industrial buildings subsidized by office and residential development (City and County of San Francisco, 2021).

In Melbourne, we study cultural manufacturers in Brunswick. Brunswick contains one of the few remaining pockets of industrial land within a six-kilometer (3.7 mile) radius of Melbourne's central business district following a rampant program of urban redevelopment. This stems from a longstanding policy of industrial land retention by the local government authority, Moreland City Council. Despite significant residential development in adjacent municipalities, Moreland lost just 15 hectares (or 5%) of its industrial land in the 1990s and quickly developed a comparative advantage in small-scale industry. By the early 2000s, approximately 60 percent of all businesses in Moreland's industrial zones occupied less than 500 square meters of floor space and most employed fewer than 10 people (City of Moreland, 2004, p. 12). However, over the last two decades, State Government policies have overridden local policy and encouraged residential and mixed-use development in industrial zones along Brunswick's train line. Moreland Council has nonetheless retained a 34-hectare "core industrial precinct" in central Brunswick (City of Moreland, 2016). Like the Eastern Neighborhoods, the redevelopment of industrial land has been incremental. In turn, this has created the conditions for in situ adaptation amongst urban manufacturers.

Though similar in their urban development and planning contexts, San Francisco and Melbourne contrast in important ways. Foremost, in San Francisco, development intensity is greater due to its history of tech-led gentrification. At the same time, a key intermediary organization has developed in San Francisco to support the urban manufacturing economy. In 2010, SFMade was founded to promote local manufacturing and broker networks between firms. The non-profit quickly gained influence in urban policy circles, helping to craft the 2014 PDR zoning amendments for small-scale manufacturers (Grodach, 2022). By contrast, similar intermediary institutions have failed to materialize in Melbourne and urban manufacturing remains a poorly understood and largely under-supported sector (Carter & Day, 2017).

Methods

To probe business adaptations, we drew on 26 in-depth interviews with cultural manufacturers conducted in 2018 and early 2020. Building on our past research (Grodach & Martin, 2021; Martin & Grodach, 2022), we defined cultural manufacturing as industries that directly produce material consumer products with high symbolic value and/or specialized production services for arts, media and design industries.

In San Francisco, we used SFMade's manufacturing directory to identify urban manufacturers in the Eastern Neighborhoods. The directory is a free listing service for San Francisco manufacturers provided by the organization. It is the most comprehensive available source for manufacturing business listings, containing over 600 firms with varied industry and firm characteristics. We selected a sample of 11 interview participants with diverse industry, workspace, and zoning attributes (Table 1). This was to ensure a range of social and organizational responses to land use change and urban restructuring. Using SFMade's directory also enabled us to discuss whether interview participants had received support from SFMade, as well as their general views on the intermediary organization. This was supplemented with interviews with key personnel at SFMade.

Table 1. Summary of interview participants

Industry	Eastern Neighborhoods, San Francisco	%	Brunswick, Melbourne	%
Clothing, textiles and screen printing	4	36%	3	20%
Printing and letterpress	3	27%	0	0%
Furniture, joinery and set building	2	18%	5	33%
Jewelry	1	9%	2	13%
Ceramics and sculpture	1	9%	2	13%
Metal	0	0%	2	13%
Leather	0	0%	1	7%
Business Type				
Manufactures own product	2	18%	4	27%
Contract production services	7	64%	4	27%
Hybrid	2	18%	7	47%
Workspace Type				
Shared	6	55%	9	60%
Single occupant	5	45%	6	40%
Zoning				
Industrial	6	55%	5	33%
Commercial	3	27%	6	40%
Mixed Use	2	18%	4	27%

Since comparable directories do not exist in Melbourne, we carried out our own audit of cultural manufacturing enterprises in Brunswick's core industrial precinct in early 2018 through site visits and street directories. We selected 15 interview participants that were broadly consistent with the types of industries recorded in the audit, ensuring a range of workspace and zoning types (Table 1).

In both cities, interview participants were contacted with a brief description of the project and a predefined questionnaire. Interviews were conducted with founders or senior managers and lasted between 30 and 90 minutes. The interview covered business models, professional and institutional networks, workspaces and localities, and strategies for managing land use and property market pressures. To mitigate bias or avoid inaccuracies, details provided by the interviewees were checked against other sources. For instance, if an interviewee reported relocating from another address due the rezoning or conversion of their previous factory, the previous address was noted and checked using Google's historical street views.

Interviews were recorded and transcribed. The coding process was guided by our conceptual framework discussed in Section 2, which included four coding categories: (1) *production* (i.e., manufacturing and making processes, the types of jobs undertaken, organisational structures, and working arrangements); (2) *people* (i.e., personal and professional networks used to develop new skills, monitor job opportunities, find new workspaces, and as source of mutual support); (3) *place* (i.e., technical space considerations, social or symbolic character of neighbourhoods); (4) *intermediary organisations* (i.e., interactions with public, private or non-profit organisations for support or representation).

Micro-resilience in gentrifying industrial areas

In the Eastern Neighborhoods and Brunswick, cultural manufacturers have reconfigured their production processes, business networks and workspace arrangements to negotiate the challenges of gentrification and the loss of industrial land. These strategies lean on existing capacities but assume particular forms and face particular limitations in restructuring industrial areas.

Production: Accessible, versatile and niche manufacturing

Cultural manufacturers in San Francisco and Melbourne produced niche products with an emphasis on sustainability, local production, and aesthetics. This included using alternative materials, developing relationships with local suppliers, and a focus on crafting distinctive styles. Overall, more cultural manufacturers in Brunswick produced their own products (74%) than those located in the Eastern Neighborhoods (36%). Yet, in both cities, contract production and other services had become an increasingly important source of revenue as gentrification opened new market opportunities (Table 1).

Clients valued these services for their *accessibility* because they could easily interact with manufacturers in the design and conceptualization of a product. To illustrate, emerging fashion labels tend to produce high-end, one-off garments and lack experience with designing for the manufacturing process. In addition, they generally struggle to access offshore contractors due to their limited production runs and lack of knowledge about manufacturing supply chains (Doussard et al., 2018). All

three contract clothing manufacturers in our study (one in San Francisco and two in Melbourne) had pivoted toward this segment of the fashion industry by specializing in small batch orders and advising on how to plan and reassemble garment prototypes for the manufacturing process. Indeed, “translating” designs to material forms extended across industries (Rantisi, 2013), from furniture, architectural interiors and set building to metalwork, printing and letterpress:

Often, people don’t know what they need, or they don’t know how to articulate it ... Our job is to get to the crux of what is needed and find out how best we can make changes, design and create (Larisa, architectural interiors, San Francisco).

Cultural manufacturers also had to be *versatile*. This meant having flexible capabilities and attitudes toward different projects. Set builders and furniture makers in Brunswick expanded their client base by working on public art projects, custom kitchens and miniature golf courses. Metalworkers worked with builders, designers, bicycle shops, and other local manufacturers with tasks varying between prototyping, repairing, and installing. Over half of interview participants in the Eastern Neighborhoods and Brunswick also undertook ancillary functions alongside production. This included retailing their products, managing shared buildings, or administering classes and small schools. In San Francisco especially, the latter was noted as an astute strategy for inner-urban manufacturers given the growing demand for corporate teambuilding workshops centered on haptic skills and experiences:

The workshop and interactive element has been helpful to a lot of people staying in the city...Not only is it beneficial, it’s another income stream (Seth, custom fabrication, San Francisco).

In effect, cultural manufacturers negotiated their changing urban environments by adapting their products and services to new markets. However, this production strategy faced inherent limitations that complicated longer-term survival. Above all, this related to how clients perceived and valued material cultural products. Interview participants noted that clients were often drawn to their goods and services because of the increasing scarcity and marginality of production in central areas. As one ceramics

manufacturer put it, “there are not a lot of people that do this so you stand out a lot. It’s unique” (Robin, ceramics, San Francisco). Hence, maintaining operations in the city appeared to act as a signifier of quality in a way that helped sustain producers. Yet, this place-based signifier was at least partly predicated on the loss or lack of similar urban manufacturing, which may threaten their ongoing survival.

There are also limits to production strategies based on versatility. Although versatility can lead to experimentation and innovation when workers are challenged to apply their skills to solve new problems (Heying, 2010; Sennett, 2008), it can be counterproductive when workers or businesses become overextended. In many instances, the range of projects and responsibilities undertaken by cultural manufacturers detracted from their capacity to produce and specialize:

We thought that we could run beginners’ jewelry making classes and that could fund the other side of things that we wanted to do...We realized that we became administrators of a school rather than actually doing what we really wanted to do (Anna, jewelry, Melbourne).

Contemporary manufacturing in high-cost cities is now defined by a blend of physical production and related services. Nonetheless, this can lead to land use conflicts and increasing rents when the latter takes precedence.

People: Community-based networks

Specialist manufacturing and cultural production requires expert training and continual refinement of skills (Blundel & Smith, 2013; Sennett, 2008). Multiple interview participants confirmed their reliance on skilled labor. As a San Francisco-based bag manufacturer explained, “there is a lot of I.P. tied up in the crew back there ...They’re efficient because they’ve been doing it for so long and they understand our materials” (Mike, backpacks, San Francisco). Yet, in high-cost cities, the necessary skills and training has become increasingly difficult to obtain due to factory closures and longstanding offshoring practices. This has in turn led to waning apprenticeship opportunities and public disinvestment in vocational education.

To manage this, cultural manufacturers amalgamated knowledge from formal education with informal community-based networks. For older-generation workers, skills could be acquired through on-the-job training when apprenticeships in established factories and workshops were commonplace. In contrast, younger-generation cultural manufacturers had to be more agile, moving between university courses, vocational education and apprenticeships in adjacent trades. For instance, set designers and furniture makers undertook carpentry or cabinetmaking apprenticeships.

While formal education and traineeships provided a foundation for professional development, cultural manufacturers refined their skills through informal relationships and “community-based learning” (Capdevila, 2018). Since the quality of material cultural products tends to be embedded in long labor-intensive work processes, cultural manufacturers generally exhibited a willingness to share rather than conceal skills and techniques (Heying, 2010, p. 48). This involved informal interactions between producers as well as monetized teaching and consulting services to clients. Taken together, these exchanges at least partially filled gaps in formal education systems and created a sufficient pool of skilled personnel to anchor manufacturing businesses in place. As a representative from SFMade explained:

[Manufacturers] threaten to leave and move somewhere cheaper, even South San Francisco ...[where] the rents are at least half of what they are here, if not less. They threaten to move down there, but they just can't because their employees won't go that far (Gina, SFMade, San Francisco).

Although informal networks helped negotiate barriers to learning material skills and created a degree of fixity for manufacturing firms, they were also vulnerable in restructuring industrial neighborhoods. This relates to the displacement of collaborating businesses but also skilled material workers. Especially in San Francisco, rampant gentrification has led to soaring house prices and the displacement of lower-income residents in blue-collar jobs (Chapple, 2017). Across both cities, however, the slow process of skills acquisition and place-based network building clearly conflicted with the rapidity of urban change in central industrial areas:

I studied apparel and then in my final year of uni started experimenting with leather. I had a casual job in my final year working in a belt factory... it was good to get an insight into the manufacturing process in Australia. That factory is no longer open anymore (Simone, handbags, Melbourne).

I've been here long enough, I have this network that I've built up ... [but] I feel like what I did when I came here wouldn't be possible now (Julia, jewelry, San Francisco).

Place: Adaptability and mobility amid a shrinking industrial building stock

Given the increasing scarcity of industrial space in the Eastern Neighbourhoods and Brunswick, cultural manufacturers had to be resourceful in finding workspaces. A common strategy amongst interview participants was to share space. Over half of interview participants occupied multi-tenanted buildings ranging from two manufacturers to over forty in a factory space. There were three overarching models: subletting space within an established subdivided warehouse, leasing an entire warehouse with the intention of subletting space to other businesses, and establishing cooperatives with other small businesses and apportioning rent and administrative responsibilities.

These shared space models enabled “social practices of collective self-help and self-organisation” as incumbent businesses pooled their production knowledge, networks and resources (Merkel, 2019, p. 527). Interview participants described how they collectively researched and shared knowledge about the management of their workspace (e.g., insurance, health and safety, negotiating commercial leases). Where tenants worked in the same field or produced similar products, shared spaces served as key sites for expanding networks and collaborating.

This space is really good for creating that community because their networks become your networks. Everyone is always introducing each other when there's visits (Simone, handbags, Melbourne).

Shared spaces also provided infrastructural advantages, enabling tenants to access or co-fund expensive machinery beyond their individual capacity.

We basically had full night-time access so we just kind of worked third shift in his workshop...If a tool wasn't being used to produce one of their many products at that exact moment, you could use it (Seth, custom fabrication, San Francisco).

Beyond cost savings and delegated responsibilities, shared spaces increased the availability of space and the diversity of industrial activity in inner-urban areas. This was especially important given the particular space requirements that exclude cultural manufacturers from traditional creative spaces:

It was difficult to find any existing spaces because they were mostly tailored to either more design-office-coworking type environments or more fine arts like painting...nothing that could be too messy or noisy. And they were very small spaces and quite expensive. So, I came across this place that had been vacant for a while and then negotiated with the landlord and we put together a cooperative to set up a creative space...The warehouse came about off the back of getting projects ... but not having a space to be able to realize it (Tim, furniture, Melbourne).

Inevitably, there were tensions within shared spaces that had to be negotiated. Across both case study sites, interview participants reported issues with equipment maintenance and reinvestment, conflicts around noise, pressures caused by commercial tenants bidding up rents, and obstacles to community building due to a mismatch of uses within a space. These issues pointed to the need for tenant curation to ensure compatibility and complementarity between different uses. In self-managed spaces, this role was undertaken by the tenants themselves, which could be time consuming and detract from their core production activities.

Similar issues occurred in multi-purpose spaces. Here, a single business would consolidate multiple uses in one building, including production, design, retail, education or living space. This strategy decreased rental costs and sometimes produced synergies between different streams of the business. For

example, a jewellery manufacturer decided to use gold mined in Australia in production after speaking with customers in her retail space and noticing a strong interest in the “pathways of materials” (Elinor, jewellery, Melbourne). Yet, multi-purpose spaces also created tensions between the time, resources and space dedicated to ancillary functions versus actual production – “I kind of see the shop as my part-time job” (ibid.).

Another common strategy, particularly amongst interview participants in their early stages, was to take up short-term leases in transitional spaces slated for redevelopment (Figure 1). Emerging businesses were able to secure favorable leases that allowed them a window to determine the viability of their business in a relatively low-cost, low-risk environment. As a Melbourne furniture maker explained, “there is a time limit but it is very reasonable rent in an amazing location. So, now's the time to work hard and build the business” (Ben, furniture, Brunswick).



Figure 1 – Transitional space slated for redevelopment, Brunswick



Figure 2 – Subdivided interior of transitional space with mobile fixtures, Brunswick

This required cultural manufacturers to be agile. Interview participants pursuing this strategy planned their spaces so that equipment and fixtures were mobile and could be moved without onerous financial burden (Figure 2). They also relied on local networks to keep informed about redevelopment timelines

and to make contingency plans in the case of eviction. As one ceramics producer in a recently rezoned industrial area explained:

There's a dialogue about the possibilities of shifting into shared spaces in the future if we were unable to secure some of the leases here. Because they're all dealing with leases as well. Everyone's feeling that this is not going to go on forever here. There's a lot of conversation about that and ways to work through that in the future (Kate, ceramics, Melbourne).

Of course, transitional space was not a viable option for all business types. For infrastructure-heavy mediums like letterpress, metalwork and ceramics, temporary space added additional cost and complexity to moving. Irrespective of manufacturing type, transitional spaces became less feasible as businesses established themselves and sought to invest in new capital and equipment. Even where redevelopment was anticipated and planned for, the process of moving and re-establishing elsewhere was still difficult to manage. In a follow up communication with one interview participant that had been evicted from a transitional space slated for redevelopment (Tim, furniture, Melbourne), they described the “blur of working and organizing” a new shared space in Coburg North with their co-tenants (two suburbs north of Brunswick). While they were optimistic that the “experience gained” from their previous shared workspace would help build a “better and more functional space” in Coburg North, the stress of relocation also damaged established networks as previous co-tenants were forced to “move elsewhere or pack up their studios”.

To mitigate disruptions to local networks, businesses tried to confine moves to their local area. For some, this involved transitioning between “pods” within the same building. More often though, businesses moved between buildings within the Eastern Neighborhoods or Melbourne’s northern suburbs. Older industrial neighborhoods have historically provided a diversity of industrial buildings that allowed businesses to grow or contract in place (Chapple, 2014; Ferm et al., 2021). However, in recent decades, interview participants noted a dramatic shift. In the Eastern Neighborhoods especially, almost all businesses raised concerns over the increasing scarcity of suitable locations:

For the larger spaces, it's a drawn-out process. It could take months to move in. But, in a lot of the smaller spaces, it's similar to the housing market around here. It's very competitive and they don't want it to sit empty so you've just got to be ready for that ... I'd say things that meet our criteria, they do come up. Like in any given month, I've seen two or three things that seem right pop up, but they go extremely fast (Seth, custom fabrication, San Francisco).

This coincides with San Francisco's extremely low industrial vacancy rate and issues with illegal office conversions amid a booming commercial real estate market (Chapple, 2014; Dineen, 2016). In contrast, demand for office space in Brunswick has not kept pace with other parts of Melbourne (Woodland & DiNatale, 2018). Accordingly, interview participants in Brunswick were generally less apprehensive about the prospects of finding new spaces than their San Francisco counterparts (though concerns about displacement were still prevalent). This points to the intimate connections between micro-scale adaptations and local property market pressures. Agile workspace models may have enabled cultural manufacturers to carve out a place in gentrifying areas. Yet, their ongoing survival is ultimately dependent on collective action to maintain a diversity of industrial spaces.

Intermediary organizations: Addressing structural issues

In San Francisco, SFMade emerged to coordinate these collective efforts. Following the Global Financial Crisis, the non-profit was established to promote urban manufacturing in response to recessionary employment concerns and the rise of the maker movement (Grodach, 2022). Under the leadership of cofounder and executive director, Kate Sofis, the organization quickly expanded its membership to over 600 manufacturers (SFMade et al., 2016). Its remit includes networking and branding initiatives, workforce and hiring assistance, industrial policy advocacy, real estate services and industrial property development.

Several interview participants in the Eastern Neighborhoods discussed the assistance of SFMade in negotiating regulatory issues and space shortages. One prominent example included the foundation of Heath SF, the second production facility of a longstanding Bay Area dinnerware and tile manufacturer.

According to Heath's managing director, SFMade was a vital "connector" in facilitating a long-term lease and planning permission for the new factory (Robin, ceramics, San Francisco). In January 2011, Heath began working on an expansion plan with SFMade after outgrowing their Sausalito factory (Shaw, 2011). By September, SFMade had successfully brokered a lease with the owner of a vacant industrial laundry in the Mission District and connected Heath with the relevant planning and economic development agencies (Gina, SFMade, San Francisco; Sofis, 2013):

Trying to navigate all these agencies, you need an advocate, you need a close relationship ... It would certainly have been a lot harder for me to connect with all these people, especially since all those agencies, they're not necessarily connected. SFMade, and especially Kate Sofis, is really integral because she has all those personal connections (Robin, ceramics, San Francisco).

Heath committed to building a 20,000 ft² manufacturing and showroom facility, employing 34 people in its first year (Hernandez, 2011). The project was fast tracked through planning and opened in 2012. Heath SF quickly added jobs and expanded to 60,000 ft², creating several smaller spaces for their "Heath Collective". This was a curated group of small manufacturers that shared Heath's focus on design and quality. Interview participants in this collective observed a reciprocal benefit. On the one hand, it provided tenants with affordable rents, creative partnerships, and access to customers drawn to the area by Heath SF. On the other, it helped reinforce Heath's craft ethos and brand through collaboration and marketing:

It's part of what they're able to present to the world. It's like, we have a whole collective, there's a purpose behind this ... and that seems to read very clearly to everybody who shows up to see it (Julia, jewelry, San Francisco).



Figure 3 – Jewelry manufacturing space inside Heath SF, San Francisco

For SFMade, Heath SF represented proof that urban manufacturing firms and jobs could survive in San Francisco with the appropriate policy settings (Sofis, 2013). Similarly, the attraction of Heath SF buoyed the re-election campaign of Mayor Ed Lee. Making a speech at the opening, Mayor Lee pointed to his administration's role in attracting manufacturers and jobs for the city's diverse constituents (Hernandez, 2011). Following his re-election, a formal partnership developed between the San Francisco Mayor's Office, the Office of Economic and Workforce Development (SFOEWD), and SFMade. This led to a 2014 overhaul of PDR zoning designed to respond to the space needs of contemporary manufacturers. The amendments allowed limited ancillary retail space, revised size limits on multi-tenant industrial buildings, and incentives for new PDR space on underutilized sites. The latter permitted office and institutional uses provided the development devoted at least a third of its floor area to PDR (City and County of San Francisco, 2021, Sec. 210.3c).

While establishing a framework for new industrial space, projects pursued under the new code were still dependent on commercial developers seeking to maximize property values and rental returns. This created a de facto bias toward high-end maker-manufacturers that could afford higher rent (Grodach, 2022). It also meant that mixed-use PDR developments tended to "defer to the higher-paying renters" and ignore the specific needs of industrial tenants (Gina, SFMade, San Francisco). For this reason, SFMade developed 100-150 Hooper Street, the first project under the new code through its real estate

subsidiary PlaceMade. PlaceMade were actively involved in the financing, design, construction and management of the new facility, creating 56,000 square feet of purpose-built PDR space at below-market rents (O'Meara, 2018).

These examples – Heath SF and Hooper Street – illustrate how specialist intermediary organizations shape the potential for urban manufacturers to remain in gentrifying urban environments, but also the tensions in this process. By brokering connections with landowners and government agencies, SFMade were able to secure Heath SF a vacant space at below-market rent (Gina, SFMade, San Francisco; Sofis, 2013). As a larger organization, Heath had the capacity to manage and curate spaces for other small-scale producers. Similarly, the development of Hooper Street provided multi-tenant, affordable space in close proximity to urban manufacturers' client base and support structures. At the same time, however, Hooper Street was subsidized in part by giving over existing industrial space to higher paying uses (in this case, software development firm Adobe). The longer-term consequences of this model remain to be seen; however, without proper oversight the new planning code could induce further real estate speculation and gentrification in industrial zones (Ferm, 2016; Grodach, 2022).

Notwithstanding these potential issues, the institutional assistance available in San Francisco contrasts starkly with Melbourne. Brunswick interview participants across the board reported little interaction with government bodies or institutional actors. This difference partly emanates from a lack of understanding from policymakers about the changing shape of manufacturing. Melbourne's urban industrial policy still broadly positions manufacturing as a sector in decline or celebrates the potential of R&D-intensive, high-tech industries (Grodach & Gibson, 2019). This ignores the wide inter-industry composition of urban manufacturing and precludes support for "low-tech" subsectors, including cultural manufacturing industries. Correcting this policy bias has also been hampered by a lack of data. Indeed, a recent collaboration between the University of Melbourne and five inner-city local governments pointed to the paucity of data sources "for understanding what and who makers are, why makers locate where they do and what makers contribute to the broader urban economy" (Carter and Day, 2017, p. 9). Attempts to address this – such as the now-defunct *Maker.Melbourne* directory – have proved largely unsuccessful, rendering urban manufacturing an abstract policy target.

This has translated to narrow land use planning and property development dynamics. In Melbourne, zoning and property development have maintained a traditional focus on greenfield projects for large-scale production, warehousing and logistics (Grodach & Gibson, 2019). Planning authorities have recently introduced a new mixed-use employment zone designed in part for higher-density industrial development in central areas. Nonetheless, the private sector has shown little appetite given the high cost of central industrial land that pre-empts residential zoning changes (Woodland & DiNatale, 2018). In Brunswick, a recent feasibility study found that rental returns for offices, light industry and small-scale specialist manufacturing had not matched rising land values and, as a result, developers could not feasibly redevelop sites for these uses in mixed employment zones (Woodland & DiNatale, 2018, p. 73), a factor 150 Hooper Street was able to address. These economic realities are unlikely to change without institutional actors with the ability to assemble finance, oversee construction, and manage industrial tenants. In their absence, Brunswick cultural manufacturers are forced to rely on flexible production arrangements and workspace models that are invariably limited in the longer-term.

Conclusion

Despite decades of urban and economic restructuring, material production remains in high-cost, gentrifying cities. We contributed to understandings of the dynamics behind this endurance. This was not to obscure the uneven power relations and politics behind gentrification, nor to idealize the capacity for low-income businesses to withstand this process. Rather, our intention was to challenge entrenched transitional narratives deployed to justify zoning changes and industrial property redevelopment. Though large segments of manufacturing industry have disappeared as a result of competitive pressures and technological change, it is erroneous to think of this as part of a “natural” progression to a “post-industrial” economy.

As a corollary, we critique crude “replacement narratives” that position arts and design-based creative industries as successors to a defunct manufacturing sector. Instead, our research indicates that contemporary manufacturing in high-cost cities has become increasingly *integrated with* rather than

supplanted by the “new economy of the inner-city” (Hutton, 2008). This integration reflects broader structural changes in advanced urban economies that have placed demands on firms to be more networked, flexible, specialized, and attuned to fragmenting consumer markets (Scott, 1988, 2010; Piore & Sabel, 1984). Yet, we contend that it is also an outcome of disruptive property market dynamics and antagonistic planning policies. In response to land use pressures, we found that cultural manufacturers adapted their production strategies, professional networks and workplace models. Collectively, these strategies enabled businesses to carve out new spaces and market opportunities in changing urban environments. They also created synergies as different activities and people were brought into closer contact, leading to new networks and support structures. In short, there was a recursive dynamic to these strategies. Cultural manufacturers leant on existing resources and networks to manage land use change and, in the process, developed new capacities that bolstered their capacity to survive in gentrifying urban industrial districts.

Nonetheless, it is important not to overstate or idealize the ability of low-income businesses to withstand structural pressures, especially those most susceptible to displacement. Unlike some arts and cultural industries that can be accommodated in studios and office-based creative spaces, cultural manufacturers need industrial space to remain in the city. Urban industrial districts allow for noise and mess with a built form still largely amenable to physical production; large-floor plates, high ceilings, loading docks, and the like. While producers have been resourceful in creating space through cooperatives, subdivisions and transitional lease arrangements, their efforts are circumscribed by a shrinking supply of industrial buildings and land in central areas.

To address this requires coordinated and strategic interventions to shift land use policy and property development models. While individual manufacturers may lack the capacity to force this shift, their resilience and ability to “stay put” in gentrifying industrial areas has nonetheless provided a foundation for collective intervention. Comparisons between our two case studies highlight the vital role that intermediary organisations can play in reshaping policy, negotiating real estate markets, and building local capacity. In Melbourne where these organisations have not materialized as an urban manufacturing advocate, policymakers still largely overlook the diversity of the sector and its needs, resulting in

ineffective and uncoordinated land use policy and planning. Meanwhile, real estate models remain locked into delivering single-storey suburban factories while redeveloping central industrial buildings for residential uses. By contrast, SFMade successfully leveraged the ongoing presence of urban manufacturing in San Francisco, alongside the emergence of the maker movement and recessionary employment concerns, to build support for a new PDR land use policy (Grodach, 2022). This policy overhaul protected existing industrial land and introduced amendments designed to respond to the space needs of contemporary manufacturers through revised floor area limits on multi-tenant industrial buildings and incentives for new PDR space on underutilized sites. Under the new code, SFMade were instrumental in financing, designing, constructing and managing San Francisco's first purpose-built industrial space for urban manufacturers near their client base and support structures.

Despite success in promoting the value of urban manufacturing, SFMade's interventions were limited by San Francisco's tight property market, the need to cooperate with commercial partners, and a resultant focus on more cost-competitive craft manufacturing. These limitations open future avenues for research into non-market interventions, such as public or cooperative forms of ownership in strategic industrial zones, as well as the conditions under which these institutions develop. Still, our research sheds light on the limits and potentials of intermediary organizations, and how they can embed and expand the increasingly scarce resources necessary for urban manufacturers' ongoing adaptation and survival (Clark, 2014; Wolf-Powers et al., 2017; Grodach, 2022). Ultimately, our research shows that the evacuation of manufacturing from high-cost cities is, at least in part, a policy choice. With intermediaries and policymakers that are sensitized to both the resourcefulness and vulnerabilities of their urban manufacturing constituencies, productive and diverse industrial districts are possible in so-called post-industrial cities.

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