

RESEARCH REPORT

Centering Workers and Advancing Business Needs

Nine Case Studies of Partnerships in the
Manufacturing Sector

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WorkRise connects workers, employers, researchers and advocates to generate ideas that can be turned into policies and practices that bring economic stability and upward mobility for all US workers—opening new opportunities for workers to thrive at work and in life.

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Executive Summary

The United States is investing heavily in its manufacturing economy, with a particular focus on the workforce as the key to long-term national success. Worker involvement is essential for an innovative, resilient, and inclusive manufacturing future. Manufacturing workers help improve production processes, update technologies, reduce waste, and ensure organizational survival through succession planning. However, to effectively engage workers, employers must value and nurture worker contributions and offer purposeful jobs with ongoing learning opportunities, good pay, predictable schedules, workplace safety, and comprehensive benefits.

This report examines how to support the relationship between employers and workers through case studies of local intermediaries working with 10 manufacturing companies across the United States. In these examples, manufacturing companies partnered with intermediaries who center worker voice to advance positive reforms in technological upgrading, business succession, and environmental sustainability. The case studies demonstrate how involvement from these intermediaries encouraged businesses to consider the value of worker collaboration on their business outcomes, and how worker-centered practices can also result in increased worker earnings, ownership, and empowerment.

Intermediaries in the manufacturing sector have a mission to support manufacturing and their primary role is to connect smaller manufacturers with financial, network, informational, or other resources to enable strategic transitions. Many intermediary organizations are nonprofit, public, or quasi-public organizations that are typically funded through regional government or philanthropic sources. We use a deliberately broad definition of intermediary to encourage readers to think creatively when considering how to promote business competitiveness and job quality.

Small- and medium-sized manufacturers (SMMs) face significant challenges in enacting workplace changes that improve business performance and job quality. Compared with larger manufacturers, they typically have fewer resources to build internal training systems or to rapidly promote and reward employees. Additionally, they tend to have less

market or supply chain power, also meaning thinner profit margins for paying higher wages. These challenges also limit national manufacturing capacity, since SMMs make up majority of manufacturing firms in the US. Fortunately, various organizations are ready to assist SMMs in making transformative changes. This paper focuses on these intermediaries through case studies that illustrate their generative role in supporting SMMs. Featured intermediaries include the US Manufacturing Extension Partnership (MEP), community colleges, financial institutions, and labor unions, among others.

Summary of Key Themes and Takeaways

- 1. Intermediaries help businesses create shared purpose with workers:** Intermediaries in our case studies help SMMs think and act strategically by ensuring diverse voices and perspectives are included in decision-making. They align the goals and interests of business leaders and workers, creating a shared vision for improvement and actionable steps for achieving it.
- 2. Intermediaries encourage businesses to take training seriously:** The intermediaries we feature in this report emphasize the importance of comprehensive training for both managers and workers that goes beyond technical skills to include business fundamentals and leadership skills. They help firms integrate training into broader work redesign efforts, promoting worker engagement and aligning training with strategic transitions.
- 3. Intermediaries focus on place-based assets and community investment:** Our case study intermediaries leverage place-based assets and community resources to work toward equitable and sustainable benefits. They help SMMs tap into resources in their community for work redesign and to support regional economic development goals. By addressing structural issues of disenfranchisement and disinvestment, intermediaries foster a more inclusive and resilient manufacturing economy.

Summary of Recommendations for Action

Recommendations for Businesses:

1. **Work with intermediaries to center worker input and spur business growth.** Business leaders should see worker input as essential for identifying competitive strategies and driving innovation. Involving workers in new ways to upgrade technology, be a part of ownership transitions, and identify business practices that advance environmental sustainability, such as new recycling techniques, can address immediate business challenges and make workers valuable leaders and beneficiaries.
2. **Start with small engagements and changes alongside intermediaries that build worker trust.** Firms should start small projects and partnerships with intermediaries and workers to establish trust and show workers that their input is valued. These small wins can pave the way for broader participation and continuous improvement.
3. **Tailor worker training with intermediaries to include leadership, business, and finance fundamentals.** For lasting change, worker training must go beyond technical skills to include leadership and business operations. Intermediaries can design and deliver tailored training programs, supporting workers across multiple manufacturers and alleviating the burden on resource-strapped small and medium-sized manufacturers (SMMs).

Recommendations for State and Local Policymakers:

1. **Partner with diverse types of intermediaries.** Successful intermediaries vary widely, from federally funded centers within the US Manufacturing Extension Partnership to unique nonprofit institutions—like the Industrial Commons, the Carolina Textile District, and Project Equity—to traditional unions—such as local affiliates with the IUE-CWA (International Union of Electronic, Electrical, Salaried, Machine and Furniture Workers) and the Communications Workers of America). Policymakers and funders should focus on supporting intermediaries with the right

reputation, resources, and interest in this work, rather than a specific type of organization.

2. **Foster connections between local intermediaries.** Building regional manufacturing capacity requires collaboration among educational institutions, technology vendors, suppliers, and public organizations. In Buffalo, New York, that partnership includes an advanced technology center, a Manufacturing Extension Partnership partner, and a workforce training center. In other cases, advancing manufacturing capacity involves collaboration between labor unions and community development financial institutions.
3. **Fund intermediaries with public resources.** Public workforce and economic development organizations can amplify intermediary efforts by providing funding directly to intermediaries and/or amplifying funding available to them, including helping to match funding for different business goals and types.
4. **Help intermediaries connect workforce investments with community economic development goals.** Workforce development investments made with intermediaries can build capacity, advance existing community economic development goals, and bring new funding to communities that experienced disenfranchisement and underinvestment. Addressing structural issues of disenfranchisement can enhance workforce participation, community development, business growth, and worker well-being.

Recommendations for Regions and National Policymakers:

1. **Create cross-regional opportunities for learning.** Policymakers on the local level can team up across regions, in partnership with employers and practitioners, to learn from successful partnerships in other parts of the country.
2. **Connect with and scale established intermediaries.** Nationally focused organizations can play a leading role in fostering cross-regional learning and coordination, leveraging existing networks to support equitable workplace and economic development. National institutions like the Manufacturing Extension Partnership's America Works and the Urban Manufacturing Alliance offer institutional starting points.

3. **Target intermediary help to communities that need it most.** Although some communities may have a diverse set of intermediaries to choose from, other communities—such as those within rural areas—may not have an obvious partner to work with in the manufacturing sector. Regional and national policymakers should conduct a needs assessment of where help is needed most and incentivize partnership in these underresourced communities.
4. **Coordinate across regions to advocate for state and federal policy change.** Regional decisionmakers should collaborate to identify funding and institutional gaps across and within their states, especially given new and historic federal investments in manufacturing. Coordinated action can ensure these investments reach SMMs and their frontline workforce, with intermediaries playing a key role in elevating worker voices and ensuring transformative investments reach smaller businesses.

Intermediaries play a vital role in supporting small and medium-sized manufacturers through strategic transitions in technology, ownership, and sustainability. By involving workers in these processes, intermediaries can help SMMs improve business performance, enhance job quality, and contribute to a more innovative, resilient, and inclusive manufacturing future. Strengthening and scaling the impact of intermediaries through both established and emergent institutional networks can further bolster the US manufacturing economy and ensure workers contribute to and gain from that ongoing transformation.

Summary of Methodology

Our conceptual framework analyzes workplace redesign, worker involvement, and the role of intermediaries in supporting smaller manufacturers. We focused case selection on three key drivers of work redesign: technological upgrading, business succession, and environmental sustainability. The case selection process began with qualitative data from our own prior research and that of our professional networks, followed by focus groups with industry experts to identify additional cases. We selected six primary case studies based on our selection criteria and on the availability of detailed information. We supplement these cases with three additional, shorter examples that did not meet all the selection criteria but demonstrate promising channels for further intermediation.

We analyzed each case to understand the roles of intermediaries and worker involvement in strategic transitions of work redesign, with follow-up conversations held as needed. Our cross-case analysis identified key themes about the roles that intermediaries play in work redesign transitions. We translate these lessons into implications for policy and practice, emphasizing the role of intermediaries in aligning interests and creating actionable steps for implementing strategic visions.

Table 1. Case Study Partnerships and Locations

Manufacturing Employer	Intermediary Partner(s)	Location
World Class Technology Corporation	Oregon Manufacturing Extension Partnership	Oregon
Astronics Luminescent Systems Inc.	Northland Workforce Training Center Buffalo Manufacturing Works Insyte Consulting	New York
MetalWorks	ProdTech	New England
Snow River Cooperative	University of Wisconsin’s Center for Cooperatives Shared Capital International Union of Electrical, Salaried, Machine & Furniture Workers- Communications Workers of America	Wisconsin
Hummingbird Wholesalers	Project Equity	Oregon
ShopBot	North Carolina Employee Ownership Center Broughton Consulting	North Carolina
Sew Co.	Carolina Textile District The Industrial Commons	North Carolina
Material Return	The Industrial Commons	North Carolina
Civilized Cycles	Bloom	New York; Michigan

Note: Company names of MetalWorks and ProdTech are pseudonyms due to prior research agreements.

Key Drivers of Work Redesign

Work Redesign Driver 1: Technological Upgrading

Technological advancements in manufacturing often raise concerns about job displacement. However, integrating technological changes with operational changes that involve frontline workers can lead to better outcomes than top-down approaches. This section highlights how intermediaries, including the Manufacturing Extension Partnership and regional training centers, support SMMs in incorporating worker involvement during technological upgrading. By leveraging continuous improvement and lean production methods, these intermediaries help SMMs navigate the complexities of new technology adoption, ensuring workforce preparedness, promoting worker retention and career growth, and achieving positive productivity outcomes.

Work Redesign Driver 2: Business Succession

Ownership transitions, particularly from private ownership to employee ownership models, are gaining national attention¹ for their potential to boost worker retention and connection to their work (Employee Ownership Foundation 2020). However, the success of these transitions depends heavily on how they are structured and managed. Intermediaries play a critical role in ensuring that workers are genuinely involved in the transition process, helping demystify the steps needed for successful ownership transfer and de-risking the process for both current owners and workers. This section provides examples of intermediaries facilitating transitions to employee ownership in smaller manufacturing firms.

Work Redesign Driver 3: Environmental Sustainability

SMMs can significantly reduce the manufacturing sector's environmental impact, as they are responsible for 77 percent of its carbon emissions (Thomas 2020).² Worker involvement is crucial for advancing sustainability goals within these firms, as workers are deeply familiar with everyday production practices, have inherent knowledge of industry, and understand where constraints and sticking points for system changes lie. Intermediaries help SMMs incorporate worker input and expertise into sustainability

transitions, aligning environmental improvements with operational and financial goals. This section showcases how intermediaries support SMMs in implementing sustainable practices and technologies, drawing on workers' deep knowledge of production processes and industry constraints.

BOX 1

Key Terms

- *Workplace redesign*: The process of restructuring operations and human resources practices to enhance organizational effectiveness. As we use the term, workplace redesign includes changes to three elements, either individually or in conjunction: (1) work processes, such as production processes and technologies; (2) job design, such as task allocation and workplace relations;³ and (3) decisionmaking, such as feedback structures and organizational governance mechanisms.
- *Worker involvement*: Practices that include workers as co-designers in the process of workplace redesign. This goes beyond informing workers of a workplace change or training workers after changes have been made. Instead, it includes practices that involve workers in envisioning, implementing, and sustaining changes, as well as ensuring that such changes result in positive effects on economic and non-economic indicators for workers.
- *Intermediaries*: Organizations that either have a manufacturing support mission or are key institutional partners that support that mission and whose primary role is to connect smaller manufacturers with financial, network, informational, or other resources to enable strategic transitions. Many intermediary organizations are non-profit, public, or quasi-public organizations that are primarily funded through state or local government sources. We use a deliberately broad definition (which includes labor unions) to encourage stakeholders to think creatively when considering how to promote business competitiveness and job quality.

For expanded definitions of terms and methodology, see the appendix.

Introduction

Cities and communities throughout the United States are betting big on the growth of the manufacturing economy, which means the manufacturing workforce will play a key role in ensuring this investment results in lasting national success. Manufacturing workers know which production processes and technologies can be improved and updated. They know which materials and inputs get excessively used, which are discarded, and which go to waste. They can get involved in succession planning to ensure the organization stays strong, connected, and relevant. Worker involvement is therefore essential if this nation is to enjoy an innovative, resilient, and inclusive manufacturing future.

Yet, for existing workers to lend their support, they also need to be employed in manufacturing workplaces that value and nurture their continued involvement. This means having jobs with a “purpose” that provide ample space for workers to communicate, coordinate, and act on their ideas; with ongoing and accessible learning opportunities within and outside the workplace that allow them to hone their skills while also advancing in their careers; and with the guarantee of good pay, predictable schedules, and workplace safety, along with a suite of employee benefits to allow them to focus their creative energy, knowing they can care for themselves and their loved ones.⁴

Many manufacturing businesses already support and empower their workers through ongoing investments in workplace development and redesign.⁵ But there are many more that do not, and they will need help getting there.

Small and medium sized manufacturers (SMMs) struggle most to enact and sustain workplace changes that concurrently improve business performance and enhance the quality of manufacturing jobs. They also make up the majority of manufacturing firms and establishments in the United States,⁶ meaning the obstacles they face in implementing workplace changes also create a significant drag on national manufacturing capacity (Berger 2013; Forbes 2018; Helper et al. 2022; Lowe 2021; Theodore and Weber 2001).

Fortunately, there are institutions at-the-ready to provide SMMs with targeted and ongoing assistance to make transformative changes that address dual employment-performance concerns. It is here where we focus our attention.

In this landscape paper, we introduce readers to manufacturing workplace redesign processes through a series of SMM-centered case studies that illuminate the generative role of their institutional partners, which we refer to as intermediaries. The institutions that support manufacturing workplaces are varied and diverse, suggesting an opportunity for others to join their ranks and strengthen the manufacturing economy through partnerships with SMMs in their own regions. In some cases, intermediaries have a specific mission to support smaller local manufacturers—as we see with providers in the US Manufacturing Extension Partnership (MEP). In other cases, we find a different mix of leading institutions, including state-funded community colleges, community development financial institutions, and labor unions, which also contribute resources and work to align multiple perspectives and interests.

The body of this paper is organized into three substantive sections that each provides illustrative examples of actions taken by intermediaries to help smaller firms center workers in workplace redesign. Each section focuses on one important driver for change: technological upgrading; business succession; and environmental sustainability. Although there are certainly other motivations for workplace redesign, these three stand out as critical for enabling national manufacturing capacity and resilience. Each of these drivers generates pressures and opportunities for US-based manufacturers. However, because of their long-term nature, each can often be ignored in the nearer term—especially by resource-constrained smaller manufacturing firms.

In turn, each section contains two featured cases that fully illustrate the capacity of intermediaries working with SMMs to elevate worker voice during strategic transitions. Each section also contains a shorter, third case that highlights early-stage initiatives or specific actions worth noting. Afterwards, we distill a set of transferable lessons from the three drivers and conclude with actionable recommendations for strengthening and scaling intermediation, including through state- and federally funded networks, like the MEP.⁷

Work Redesign Driver 1: Technological Upgrading

The history of automation in manufacturing provides ample evidence to support concerns that technological change will result in decreased employment and degraded jobs. It is therefore fitting that our first driver for change is technological upgrading. Automated assembly lines introduced in the early 20th century did reduce the demand for manual work, and economic theories posit that the routine, physical tasks that constitute many manufacturing jobs remain most at risk of displacement (Goldin and Katz 1998; Acemoglu and Autor 2011). However, technological developments have yielded complex effects on manufacturing employment over the last century. There are persuasive arguments that technologies can have either augmenting, degrading, or replacing effects on manufacturing jobs, depending on the social and political contexts of their development and implementation (Noble 2011). In the continuation of a pattern that has existed since the dawn of the Industrial Revolution, today's advancements in production and information technologies are generating opportunities and threats for manufacturers that require a response.

A deep body of research—originating in studies of manufacturing settings (MacDuffie 1995; MacDuffie and Krafcik 1992)—shows that integrating technological changes with operational changes that leverage frontline workers produces better results than top-down changes that rely on technological advances alone to improve productivity. Continuous improvement and lean production methods have now diffused throughout the manufacturing sector. When implemented with a true commitment to worker motivation and skill, these practices can help reduce worker resistance to new technologies, ensure workforce preparedness for change, promote worker retention and career growth, and yield positive productivity outcomes from new technologies.

Much of the foundational research on this topic was conducted in large automotive plants. Smaller manufacturers have often struggled to follow similar practices because they face specific challenges in redesigning technology and work processes.⁸ Leadership in small and medium-sized manufacturing may not be familiar with the full technological landscape, and they may have fewer available resources to experiment with new

technologies, redesign work processes, and upskill workers. The small batch production methods used by many SMMs may also require greater flexibility than can be achieved through traditional automation. For contemporary data-driven technologies, SMMs may lack integrated IT systems and sophisticated data management policies. However, these contemporary technologies also offer unique opportunities for SMMs, as they often involve lower upfront costs and simpler installation than traditional automation. These technologies can be a lynchpin in SMM growth strategies, especially for those companies that struggle to find skilled labor. SMMs may also require new technologies when expanding into new product markets or responding to competitive threats.

Given these complexities, networks of well-established intermediaries have long provided critical support to SMMs in the area of technological upgrading. These include the US Manufacturing Extension Partnership (MEP), a distributed network of publicly funded outreach centers established in 1988 by the National Institute of Standards and Technology (NIST), as well as Manufacturing USA, a network of innovation-supporting institutes established in 2014 to catalyze development and investment in emerging technologies. The cases in this section provide illustrative examples of how these intermediaries and others, such as regional training centers, support SMMs in incorporating worker involvement during technological upgrading.

World Class Technology Corp.

World Class Technology Corporation (WCT) is a medium-sized manufacturer with expertise in metal injection molding located in McMinnville, a small town near Portland, Oregon (Kelmenson, Lowe, and Schrock, forthcoming). The manufacturing process involves bending and molding wires, brackets, and braces in a multitude of client-specific configurations. As a result, workers strongly rely on proper equipment maintenance and calibration.

In 2020, WCT contacted the Oregon Manufacturing Extension Partnership (OMEPE) for assistance with exploring how technological upgrading could increase productivity and company growth by reducing manual tasks. For example, the manually updated maintenance system in WCT's molding department led to inconsistencies that caused equipment breakages and delays in production.

However, WCT leadership recognized that growing the company was not merely a matter of implementing the right technologies. The company culture set by previous WCT leadership did not prioritize worker involvement, and managers knew that it would be a challenge to implement technical and culture changes concurrently. Therefore, before implementing any changes, they worked with OMEP to lay the foundations for improving the organizational culture by enhancing worker engagement. When trust was established, workers could then identify continuous improvement opportunities and facilitate growth. OMEP helped WCT identify quick wins for fostering worker voice, including implementing “bright idea boards” for worker-submitted process and safety improvements, as well as company-wide conversations and training on continuous improvement.

With this foundation, worker engagement also became a core element to addressing the company’s maintenance challenge. To take this on, WCT acted on OMEP’s suggestion to create a maintenance department and then promoted a long-standing molding department worker to lead it and to select his own team. The worker selected coworkers with a range of calibration and maintenance experience from across the company, rewarding their informal development with formal promotions and higher pay. The OMEP consultant noted, “Yes, (the workers are) very excited ... (This) gives them the ability to then have this background of a maintenance operator/maintenance department rather than the guy who does everything and wears a million hats. They have the title and they’re promoted to this maintenance job” (Kelmenson, Lowe, and Schrock, forthcoming).

The team’s balance of electrical, mechanical, and facilities maintenance experience allowed them to act on OMEP’s next suggestion—implement a cloud-based software to track equipment utilization and schedule preventative maintenance. To lay the foundation for the software, the team formalized their knowledge in a shared online repository.

Workers then collaborated directly with the technology vendor to create maintenance schedules that built in worker breaks, lunchtimes, and equipment downtime—prioritizing worker needs while also limiting production disruptions. Direct engagement between workers and vendors of cloud-based software expands worker voice in new ways while leveraging worker expertise to improve operations (see box 2 for another example).

OMEP consultants and WCT leadership continue to learn from the maintenance department at meetings with supervisors and managers, deriving generalizable lessons that show what can be achieved when workers lead. To engage more workers in subsequent

organizational changes, OMEP also helped WCT elevate a long-time employee to oversee company-wide continuous improvement activities. This employee took the lead on a new automation project that, if successful, will enable him to shift workers from more repetitive roles, such as wire packaging, into more interesting and highly compensated roles like bracket assembly. He said, “It’s an increase of wage for them ... but it also gives them another set of skills” that were previously unavailable (Kelmenson, Lowe, and Schrock, forthcoming). OMEP’s support was critical in instigating and sustaining these transitions. For instance, this employee worked with an OMEP consultant one day per week for six months to transition into the role of full-time continuous improvement manager.

The company continues to reap the rewards from its commitment to a culture of co-creation and empowerment among workers. In addition to strengthening the company’s strategic position and employee compensation, career pathways, and retention, WCT has encouraged workers to identify and implement innovations to support business expansion.

OMEP’s engagement with WCT involved extensive training in leadership for employees in new leadership positions, as well as some technical training supports. Often when SMMs consider technological upgrading, they require more specialized training for workers who need new skills to implement, oversee, and maintain new technologies. The next case focuses on how intermediaries can provide support for the critical area of worker upskilling.

Astronics Luminescent Systems Inc.

Astronics Luminescent Systems Inc. is a manufacturer of lighting products for the aircraft industry, including flight deck, exterior, and emergency lighting systems. Starting in 2018, Astronics faced rapidly increasing demand for aerospace products and hired 150 people over the next two years to reach a total of nearly 350 employees.⁹ In conjunction, company leadership realized they needed to leverage new technologies to improve productivity and efficiency, especially since finding enough skilled workers was proving challenging.

Astronics is located in Buffalo, New York, an area with a storied manufacturing history that has undergone a wave of new investments to reenergize the local manufacturing sector. In 2015, New York State invested \$45 million to create Buffalo Manufacturing Works, which opened as a local chapter of the technology and engineering nonprofit EWI.

This membership-based consulting organization fosters collaboration between industry, research, and academic partners to support a variety of technological solutions, from additive manufacturing and robotics to computed tomography. It also provides short, stackable training programs to incumbent workers in welding, automation, and additive manufacturing. Buffalo Manufacturing Works has a close relationship with another institutional partner, the Northland Workforce Training Center, which opened in 2018. The final leg of the regional stool is Insyte Consulting, a nonprofit corporation and regional MEP center for western New York. With Buffalo Manufacturing Works, Insyte Consulting created the Shift Program to expose small and medium-sized enterprises to relevant new technologies and innovations (Kelmenson, Lowe, and Kumar 2022).

It is the Shift Program that supported Astronics in its plans for automation. After joining the program, Astronics representatives attended a series of workshops including Change Management, Robotics 101, Lean Manufacturing, and Options Testing to envision how automation might be implemented at the company. Through the Shift Innovation Audit, which involved a factory tour and discussions with assembly line workers, Astronics engineers identified one key task that was ripe for automation: filter installation. This task involved installing tiny strips into holes that fit in cockpit paneling in order to produce the right brightness and color lighting as required by the Federal Aviation Administration. Performing this task manually was fastidious and time-consuming work, as it involved using tweezers and glue to install up to 90 filters per panel.¹⁰ To complicate matters, the company makes a low volume of a large variety of cockpit lighting panels (over 100 different versions), which meant that automation needed to be flexible and reprogrammable.

With input from assembly line workers, Astronics leadership and Buffalo Manufacturing Works staff identified an appropriate solution involving a bespoke, small, video camera-equipped robotic arm that could correctly pick and place the tiny light filters. According to Pat Pierce, a manufacturing engineering manager, the goal was to free up assembly line workers for less tedious, more value-added work: “We can reduce demanding or repetitive tasks to more productively employ our manufacturing staff, ramp up throughput to meet customer demands, and improve quality.”¹¹

Buffalo Manufacturing Works continued to support Astronics’ transition after helping identify a technology solution. It offers a five-day intensive course to teach incumbent workers how to program and operate robots, as well as other training offerings to enable

workers to move into new occupational and organizational roles. As Astronics assembly line workers were now responsible for supervising the robotic arm that was integrated into the workflow, this training was critical.

Astronics continues to view technological upgrading as an opportunity to supplement its investment in workers. Other automation processes include investments in both product quality (a forced displacement testing machine that determines how hard it is to push buttons on a cockpit panel keyboard) and job quality (a mobile robot to cart parts around the 125,000 square-foot facility).¹² Many of the companies in the Buffalo Niagara Manufacturing Alliance, a group of over 180 small and medium-sized manufacturers in Western New York, have similarly benefitted from the extensive support in technological upgrading provided by Buffalo Manufacturing Works and other institutional partners.

BOX 2

Scaling Worker Voice with Technology Vendors

Many contemporary technologies, like the maintenance software implemented at WCT, offer distinct opportunities and challenges compared to traditional technological upgrading in manufacturing. Contemporary technologies are networked beyond the bounds of the firms that use them, unlike traditional industrial automation. External vendors are active hosts of these systems and often offer them “as a service” to firms, providing personalized and long-term customer support, as well as continually modifying user interfaces and technical capabilities.

Connecting workers and technology vendors can provide a voice channel for workers that is novel in both timing and scale. Regarding timing, it is notoriously rare for workers to be engaged in upfront decisions about technology selection, design, and implementation. Notably, these decisions are not mandatory topics of collective bargaining. However, vendor-worker voice channels can be leveraged throughout the software lifecycle. Because significant upgrades can be made long after implementation, this voice channel offers multiple bites at the apple for workers to contribute to technology design. Regarding scale, worker voice in technology decisions has typically impacted only the focal firm, given that technologies must be tailored to individual firms during implementation and use. However, vendor-worker voice channels allow vendors to incorporate worker input and perspectives across their customer base. Although vendors may only be put into contact with workers at select firms, these workers can have an outsized input in the technology ecosystem as upgrades are pushed out to all customers. In this way, vendors (and technology integrators and consultants) can act as nontraditional intermediaries to support worker voice in technological upgrading.

These dynamics occurred when MetalWorks, a machine tool shop in New England, implemented a cloud-based software for machine production monitoring with ProdTech, the technology vendor. Although leadership at MetalWorks had solicited worker input before selecting and implementing the software system, workers had never used a similar system and had a very limited sense of what issues might arise. After implementation, some workers raised issues with the technology, including inaccuracies in production tracking, limitations in recording machine downtime events, and a general dislike of the bright colors of tablets that were installed next to each machine to indicate its progress toward a production goal. As one worker said, “You feel like you’re under the magnifying glass ... It puts pressure on you.” Although MetalWorks leadership could address some of these issues, real breakthroughs came when ProdTech designers visited the shop floor to speak with workers. Over time, these designers added new interfaces and features to the technology, directly responding to workers’ requests to tone down the tracking colors on the tablet and to add tabs that displayed historical (in addition to real-time) production information. Workers requested historical information to better understand what happened in the shift before theirs, which helped them identify and resolve production problems. Thus, due to this vendor–worker voice channel, the technology was redesigned in ways that improved the experience for workers and supported technology use in ways that furthered valued business objectives.

Work Redesign Driver 2: Business Succession

Our second driver of change involves ownership transitions and specifically, the move by manufacturing workers into a business ownership role. Employee ownership is gaining national attention, and there is hope that this could lead to future growth in the number of employee-owned businesses in the United States.¹³ Some of this increased interest is driven by the fast-approaching retirement age of current manufacturing business owners. Also in play is the recognition—supported by extensive research—that giving workers an ownership stake in a company can boost retention by giving workers a greater sense of purpose and connection to their daily work (Blasi, Freeman, and Kruse 2016).

Still, as with all other forms of organizational governance, employee-ownership structures are highly varied and institutionally diverse. Although the simple addition of the word “employee” implies a certain degree of worker involvement, the actual role that individual workers play in these transitions, including their level of influence and power, very much depends on how the ownership hand-off gets structured and managed.

Just as technology-focused decisions can be made without any meaningful worker input or say, decisions that involve a significant shift in ownership claim can also marginalize, obscure or even harm the incumbent workforce. As one example, ownership transitions through a standard ESOP option (employee stock ownership plan) need not involve any advance employee notification—in fact, business consultants that facilitate ESOP transitions often recommend keeping employees “in the dark” until the structure is finalized. And there are several notable examples that involve well-meaning employers using the element of surprise to presumably capture and channel employee enthusiasm, though closer inspection indicates a top-down decision made with little regard for workplace democracy.¹⁴ Even though workers might eventually receive financial benefits from these top-down decisions, their exclusion from the start suggests that company leaders will be less inclined to turn to these same workers for input on later, equally consequential decisions.

It is for this very reason that intermediary organizations with deep expertise in employee ownership models, along with a dedicated commitment to genuine and inclusive frontline worker engagement, are most critical for elevating workers as true decision-makers—ensuring they are involved in how the transition gets structured and what that means for them as new owners. Active intermediary involvement not only helps to demystify the many steps needed to successfully move ownership into the hands of frontline workers (or to handle succession planning with workers in mind)—it can also be essential for de-risking that process for current owners and workers alike.

What follows are some promising examples that we have identified where intermediaries, often as part of a multiorganizational partnership, have stepped up to help workers at smaller manufacturing firms navigate the legal, financial, and organizational complexities associated with an ownership transition.

Snow River

Snow River Cooperative is a unionized wood products manufacturer based in the small rural town of Crandon, Wisconsin. The employee-owned company has long-standing roots in its heavily forested region of Northern Wisconsin, though it originated as a branch operation of Bemis Woodworking, which had established elsewhere in Wisconsin in 1901. In 2002, the plant was sold to Columbian Home Products, another wood-making business that specializes in kitchenware.¹⁵

Snow River Cooperative produces high quality wood products, specializing in cutting boards and wooden serving bowls that can be customized for a single client or business event. In addition to offering customers the choice of different shapes and sizes, clients also have the option to add marketing logos or commemorative phrases or images. The company produces around 200,000 products a year and by keeping individual order size to a low minimum (25 pieces), they are leaving space in the market for other, smaller companies.¹⁶

The move to become a worker-owned enterprise was initiated in response to the previous owner's decision to exit the business. That former owner—Dick Ryan—proposed a relatively quick wind down of the Crandon-based manufacturing facility. Although Ryan budgeted a few months for workers to prepare for the factory closing, even with this advanced notice the closure would still be a devastating loss of well-paid union jobs and a strain on the economic security of rural manufacturing workers and their families. One employee candidly expressed what was at stake for the workforce if the factory were to shutter, noting “there weren't a lot of other places to work.”¹⁷

A group of incumbent workers, some with over 30 years of experience with the company, proposed an alternative solution: that the workers band together to acquire the Crandon-based facility, which they had long taken pride in supporting. The company's plant manager, Brian Sinclair, led that effort, initially representing the group during discussions with their local labor union representative, exploring options for preventing a business closure. The labor union—a local affiliate with the International Union of Electronic, Electrical, Salaried, Machine and Furniture Workers—Communications Workers of America (IUECWA)—connected the workers to an Ohio based co-op incubator and through them, to the University of Wisconsin's Center for Cooperatives. The institutional support network expanded to include Shared Capital, a Community Development Financial

Institution with roots in Minneapolis and experience supporting cooperative businesses, including smaller manufacturers.¹⁸

University of Wisconsin staff with extensive cooperative development expertise provided the group with remote and in-person technical assistance for how to structure their new governance and create the foundations for a strong union cooperative. The University team included individuals with prior experience as worker-owners in manufacturing operations, also providing an opportunity for peer-to-peer knowledge sharing.¹⁹ Staff of UWCC and Shared Capital Cooperative helped the workers and the company's outgoing owner determine how best to structure the ownership change and deal. Loan officers from Shared Capital, in partnership with another lending specialist, provided a loan for the sale to make the transaction work in everyone's financial interest.²⁰ Shared Capital also provided a credit line for ongoing working capital needs to promote stability.

Snow River incorporated as a worker-owned cooperative in April 2020. All former Columbian Home Products workers—eight in total—transitioned into new roles as co-owners, “saving ... union jobs and retaining (a) successful manufacturing business in rural Wisconsin.”²¹

The institutions involved in this transition created an enduring scaffold, and they continue to support the cooperative today. They have helped workers-turned-owners design and implement new governance structures, along with creating a new business plan. The union, for its part, has worked with the cooperative to ensure they continue to support high quality, family-sustaining wages, including helping the organization identify cost-savings through strategic partnerships around health care insurance and other employee benefits. University-based advisers have enabled the company's worker-owners to harness their deep knowledge of wood products to develop complementary product lines, such as the sale of specialized mineral oil. Institutional partners also helped worker-owners act on their strong desire to support a wider range of smaller businesses, taking what they had learned from when the company once depended on a single major client and translating that earlier experience into a less risky and less volatile business plan.²²

More recently, these same institutional partners have provided critical support during the COVID-19 pandemic, enabling worker-owners to reconfigure the shop-floor in order to maintain production schedules, while keeping the workforce healthy and safe.²³ The result

is a successful strategic transition that gives manufacturing workers an opportunity to prosper by focusing their combined talent and attention on the next phase of a 100-plus year old manufacturing enterprise.

Although intermediaries gave manufacturing workers at Snow River the chance to craft a very different manufacturing future to that once envisioned by the original owner, those working with our next case study example, Hummingbird Wholesalers, were instead focused on extending a long-standing commitment to environmental responsibility and workplace transparency—a commitment shared by frontline workers and owners alike.

Hummingbird Wholesalers

As with Snow River, the owners of Hummingbird Wholesalers, Charlie and Julie Tilt, were looking to exit from a firm they had spent several decades building into a viable business enterprise. But as owners of this small-sized manufacturing business, they wanted to extend the transition timeline over the course of six years (from 2022 to 2028), giving them breathing room to co-create enduring structures that would guarantee workplace democracy, while bolstering the company's core environmental mission (Kemp 2024).

The company is a food products manufacturer based in Eugene, Oregon. Founded in the early 1970s as a specialty honey shop, Hummingbird Wholesalers has expanded to become a critical manufacturing and distribution node in the local food system by “offering high-quality nutritious foods grown locally and as sustainable as possible” (Kemp 2024). The Tilts purchased the company back in 2003, growing it to nearly 50 employees. Since their early days running the company, the Tilts have sought to foster an open working environment, giving frontline workers the resources and support to understand and contribute to business success in a way that is also environmentally and socially sustainable.

In 2022, Julie and Charlie turned to Project Equity for help—a national nonprofit that was started in 2013 and has extensive experience helping smaller, privately owned businesses transition into employee ownership. With input from Project Equity and a team of legal and accounting experts, the Tilts opted for an Employee Ownership Trust (EOT). They turned next to present the idea to their employees and, after receiving an

overwhelmingly positive response, moved forward with the plan to transition the company to an EOT in two stages over a five-year period.

Unlike the more familiar worker cooperative structure that requires individual employees to buy and control shares in the company, a registered trust holds all or some shares on “behalf of the employees.”²⁴ According to the Aspen Institute, the EOT model has long been used in the United Kingdom, but is a newer business model in the United States, aided by federal legislation that now permits the formation of a managed trust in support of an idea or concept²⁵—in this case, the protection of quality jobs and employment security.

Although worker-owned cooperatives must involve employees in strategic decisionmaking processes, EOTs make that preferred practice optional. It is for this reason and others that EOTs are considered the most flexible models of ownership transition today. Still, the Tilts valued the participatory attributes of worker-owned cooperatives, and although it was not a requirement of the EOT structure, worked with institutional partners to establish systems for broad-based worker involvement in the company. A transition team was created, composed of diverse coworkers, including some with supervisory experience. To support the transition to an EOT, Project Equity provided the team with assistance and training in creating representative governance structures as well as transparent and appropriate decisionmaking processes. We see similar assistance provided to workers and owners during an EOT transition at a smaller manufacturer called ShopBot in North Carolina (see box 3). These supports ensured workers on the team had the knowledge and capacity to co-create enduring systems that would also encourage diverse voices to be heard.

Project Equity has continued to support the company through their transition. They have helped company leaders implement the EOT in a way that allowed them to move forward with various commitments to job quality, ensuring workers continue to receive living wages, career advancement opportunities, and secure added benefits like time off for family and self-care.²⁶ Additionally, through their Thrive program, Project Equity has helped newly created employee-owned businesses like Hummingbird “live in” to more inclusive governance systems²⁷—this entails helping companies, including Hummingbird, implement a range of processes that involve workers, from setting up formal election and grievance procedures to establishing channels for employee involvement in tracking key performance indicators and conducting CEO reviews.

Reflecting on the significance of this worker-centered approach to governance, Charlie Tilt is quoted as saying, ‘it was important to us that the people who do the work to make Hummingbird successful, our coworkers, are entrusted to carry the company forward and reap the rewards of their efforts.’²⁸

What makes the EOT structure especially attractive for worker-empowering companies like Hummingbird are the limits placed on a trust being sold in the future, a provision that can be baked into the unique EOT legal framework. It is for this reason that EOTs are more commonly referred to as Perpetual Purpose Trusts (Rosen et al. 2024). Longevity is the primary goal, enabling workers to continue to care for the good of the business and with it, protect their contribution to that ongoing effort.

BOX 3

Employee Ownership Trust at ShopBot

North Carolina-based ShopBot transitioned to employee ownership in 2021 (Broughton et al. 2024).²⁹ They worked with consultant Anne-Claire Broughton, a national expert in employee engagement and ownership and the founder of the North Carolina Employee Ownership Center. Broughton helped the company tighten up its financial model, ensuring the eventual transition to an Employee Ownership Trust structure would be built on a secure financial foundation. The ultimate goal was to keep the company resilient and long-lived, also protecting current and future workers’ jobs and livelihoods. As with Hummingbird, ShopBot’s owner Ted Hall was committed to bringing all workers into the process—something that Broughton supported through the use of open-book management tools. Worker input proved crucial for identifying and implementing numerous cost-saving measures.

With Broughton’s help, ShopBot employees co-created an in-house training system about the EOT structure, ensuring future employees could learn about the model and play an on-going role in its continued success. She also collaborated with Hall to educate local attorneys and accountants on employee ownership under the trust model, helping to parlay the ShopBot case into an enduring resource for supporting future conversions in North Carolina and beyond. Finally, she helped ShopBot to establish an employee governance committee, ensuring workers have representation and a voice at the table, with the option to eventually cycle into ShopBot Trust’s board of directors.

Work Redesign Driver 3: Environmental Sustainability

The final driver for workplace redesign pertains to environmental sustainability: small and medium-sized manufacturers (SMMs) can play an important role in reducing the manufacturing sector's environmental impact, as they are responsible for 77 percent of its carbon emissions (Thomas 2020).³⁰ Some firms are already considering a range of environmental transitions to meet the moment—from manufacturing items to enable broadscale electrification (e.g., batteries), to installing equipment for renewable energy (e.g., rooftop solar panels), to using recycled production inputs.

Workers can be essential allies for implementing work redesign to advance sustainability goals. Workers are deeply familiar with everyday production practices, have inherent knowledge of industry, and understand where constraints and sticking points for system changes lie. Worker input and expertise are especially critical sources of innovation for small and medium-sized manufacturers with limited access to expert, technical, and financial resources (Schumacker et al. 2022). For example, SMMs sometimes prioritize operational investments that are perceived to be more closely tied to immediate cost savings (Escoto, Grebhewot, and Morris 2022). However, there is a business case to be made for sustainable transitions, such as reusing discarded materials in new production processes to reduce costs, increase supply chain reliability, and create new revenue streams (Escoto, Grebhewot, and Morris 2022; Schumacher et al. 2022; Thomas 2020).³¹ Worker insight about transitions to material circularity and energy decarbonization, including the implications for established work routines, can help connect sustainability efforts to operational and financial goals.

Still, workers are not automatically included in industry or company level efforts to transition work in response to sustainability drivers. As with technological and ownership transitions, treating worker involvement as unnecessary or irrelevant risks missing out on opportunities to improve. This risk is especially dire with respect to climate change, where excluding workers may stall an individual firm's ability to act, causing additional repercussions for regional and even national resilience. Research shows that intermediaries can ease these challenges by facilitating networks of partners to marshal

resources, expertise, and business support (Alayón, Säfsten, and Johansson 2022; Schumacher et al. 2022).

The cases we present showcase intermediaries uniting partner businesses in elevating frontline workers as co-creators of workplace changes that support environmental improvements within firms, supply chains, industries, and communities. Though the cases that follow are based in the textile industry, they generate lessons for sustainability generally (see box 4 about Civilized Cycles), and demonstrate how even established, traditional sectors can leverage sustainability transitions as a new competitive advantage, and that workers, including those with decades of knowledge and experience, can be at the forefront of these transformations.

Sew Co.

Sew Co. was founded by Libby O'Bryan as a triple-bottom line design studio and sewing factory to showcase the skill and creativity of domestic manufacturing workers in the textile industry. (The triple bottom line is a concept where businesses consider their environmental and social impacts as well as their financial performance.) Leveraging her expertise in fine art and fashion design, O'Bryan's Sew Co. is home to a retail clothing brand that espouses a "slow fashion" philosophy; clothes are designed artfully and skillfully, made with natural fibers and environmentally friendly practices to last a lifetime. The company also provides contract services to other design firms. A cornerstone of the Sew Co. approach has been providing living wages and a positive work environment. Unsurprisingly, the organization's ability to deepen its commitments to sustainability has been driven by engaging its own workforce.

Located in the historic textile and furniture-making region of Western North Carolina, Sew Co. benefitted from the support of an intermediary called the Carolina Textile District (CTD), a membership-governed organization of regional textile and furniture-making related businesses. Sew Co. was invited to join because of its commitment to workers and sustainability, two values espoused by the CTD.

O'Bryan enrolled Sew Co. as a founding member of the CTD because she was keenly interested in how the organization was trying to tackle industry problems on behalf of many smaller organizations. For example, the CTD provides a clearing house and funnel for

new contracts for its members. The CTD helped Sew Co. connect with clients aligned with its commitments to environmental sustainability and job quality. In turn, Sew Co. enhanced its branding around these issues and was able to support like-minded independent designers by offering low production minimums.

Building on O'Bryan's commitment to practices that are both worker- and environmentally responsive, Sew Co. put workers at the center of financial decisions. Here, another intermediary was key. The Industrial Commons (TIC) is a nonprofit that provides, among other things, workplace development services to support enterprises in implementing democratic governance systems that build community ownership and wealth. Sew Co.'s workers participated in two trainings provided by TIC: leadership training and financial training through the "Great Game of Business" framework. Both trainings prepared workers to actively take part in deciding the future of the business by creating collaborative decisionmaking structures.

As a result, Sew Co. workers decided to subscribe to a local recycling service in pursuit of becoming a zero-waste producer. Not only did this eliminate costs from their bottom line, it allowed the company to engage their clients more deeply in the value of their sustainable supply chain. Employees are now using the Great Game of Business framework to prepare the company financially to become a worker-owned enterprise.

Sew Co. also led the way in engaging the CTD membership and partners within TIC around enhanced training for incumbent workers across the industry who expressed a desire to enhance their skills. O'Bryan worked with other cut-and-sew operations to establish an industrial sewing course for basic skills that provide the foundation for workers to advance in their careers. The CTD brought in the region's community colleges to offer the course more broadly and on an ongoing basis. Today, one of Sew Co.'s employees coordinates the training and teaches new course instructors to implement the course within companies belonging to the CTD.

Sew Co. took its commitments to worker training one step further, designing and orchestrating North Carolina's first pattern-making apprenticeship for two incumbent workers interested in learning from one of the company's lead designers. "For Giovanni [the designer] to take the time to teach is a huge investment. Of course, we want to do it and we want to lift up the incumbent workers that've been on our team for three years and [who] want to grow professionally. So of course we took it on." With this apprenticeship, workers

have insight into how the company integrates sustainability into product designs and material sourcing that prioritize material longevity over high-waste “fast fashion.” The CTD is now discussing creating a sewing apprenticeship program for all of its members.

The next case is not a story of an existing manufacturer shifting its practices to become more sustainable and worker-centric, but rather the story of an entirely new firm that arose to engage supply chains in the textile and furniture-making sector with their own transitions.

Material Return

Material Return is a small manufacturer in Morganton, North Carolina, that created a state-of-the-art system for turning textile waste into high quality circular yarns, including socks and fabrics. Material Return is now a community-owned enterprise, with a worker-driven governance structure that provides living wages and, over time, shared profits, and its innovations have been led by workers from the beginning. As Material Return developed, it has also positioned itself to help other textile manufacturers advance their own environmental commitments. In this respect, Material Return not only draws together all three critical transitions featured in this report—it supports other smaller manufacturers in their own strategic transitions as well.

The impetus for Material Return came from seasoned workers in the textile industry who recognized a region-wide opportunity to recycle textile waste and who identified a way to take on the associated logistical and financial challenges. They leveraged decades of combined experience in North Carolina’s textile and furniture manufacturing industries, where they saw first-hand the volumes of potentially reusable fibers sent to the local landfill. These workers also knew that in order for recycling to be taken up by firms within the industry, it has to first be cost-effective.

As with the Sew Co. example mentioned above, The Industrial Commons was an essential partner in building out a viable business model. As a nonprofit, TIC builds on the region’s textile and furniture-making legacy to launch and scale textile-related cooperative enterprises and nonprofits that center environmental sustainability and community wealth-building. TIC incubated Material Return, providing the organization

with resources and the physical space needed to pilot the sorting and resale of unused or scrap material collected from neighboring textile and furniture manufacturers.

During this incubation period, Material Return figured out how to generate revenue by charging a comparable fee to what manufacturers were already paying to send their waste to the landfill. In partnership with Molly Hemstreet, co-founder of TIC, Material Return's first employee, Bob Carswell, developed a system that would allow textile manufacturers to track and certify their recycling impact, giving these firms the means to market their sustainability commitment to new and existing customers. As demand for recycling services grew, Material Return was able to recruit more workers with prior textile and furniture manufacturing experience, doubling the company's client base and expanding the types of materials the organization was able to accept.³²

At this point, Material Return's first employees were able to participate in building out the plan for mutual ownership. With TIC's guidance, workers at Material Return wrote their bylaws and established a democratic governance system with a leadership committee. They also helped Material Return apply the Great Game of Business framework, which included worker-led discussions about the company's finances. Reflecting on the value of this learning, one worker said, "I know what money Material Return has, what our profit margins are." Reiterating that this effort is also collective, they noted, "Everyone has a line of the P and L that they influence. They take care of that line, report on it, project it, and then we work on it."

It was Material Return's team of workers that also collaborated with industry veteran workers to discover a new way to recycle textile waste into yarn, rather than selling it "for pennies on the dollar" to the insulation industry. TIC connected Material Return with other support institutions to accomplish this, including a state-funded business assistance center called the Manufacturing Solutions Center (MSC) and the Textile Technology Center at Gaston Community College. Through that partnership, Material Return was able to secure funding from the Appalachian Regional Commission to acquire equipment from several large, shuttered manufacturers. This funding enabled Material Return workers to also collaborate with experienced textile workers to repurpose those retired technologies to disentangle textile waste fibers and re-spin them into recycled yarns. This research and development process reflects TIC's approach to empowering workers to create transformative innovations based on their experience, perspectives, and networks.

Material Return’s yarn also allowed workers to take on research and development contracts to support other established manufacturers in their own sustainability transitions. Distributed knowledge from incumbent spinners, weavers, knitters, and designers across the supply chain was a crucial source of product development advice in these efforts. Material Return’s workers also used these conversations to discuss employee-ownership options and environmental stewardship with a diverse mix of makers and manufacturers.

The first product made from Material Return’s recycled yarn was a dog bed, which also served as a prototype to demonstrate that Material Return’s local supply chain could create high-quality products faster, and more sustainably, than international supply chains. Two Carolina Textile District members, Valdese Weavers and Diamond Ring, were essential local partners in this effort. Sock-making giant Smartwool® was also involved from the start, partnering with Material Return on its Second Cut Initiative. This ongoing consumer takeback program collected more than 725,000 socks between 2021 and 2023, diverting 54,200 pounds of socks from landfills,³³ also allowing Material Return to create a high-quality circular yard that Smartwool® uses for its Second Cut Hike Sock.

The ongoing relationship between TIC and Material Return demonstrates the broad-based effects that intermediaries can have in building out an ecosystem of worker-centered businesses. For example, Material Return’s need for a reliable bookkeeper led TIC to incubate Good Books, a cooperative that provides bookkeeping, notary, and translation services for TIC’s affiliated organizations and outside clients.^{34, 35} By hosting and facilitating a network of mutually supportive programs and partners, the ecosystem builds on the region’s historic textile and furniture-making legacy while reorganizing systems of production to be environmentally and socially enhancing, rather than extracting. TIC’s recent announcement that it is creating a green textile manufacturing hub as part of its new, federally funded Innovation Campus suggests these positive outcomes are just the beginning.³⁶

BOX 4

Decarbonizing Transportation with Civilized Cycles

Environmentally friendly transportation solutions, including electric cars and trucks, often use similar production techniques and manufactured parts as highly polluting vehicles. This means there is a potential role to play for the incumbent manufacturing workforce in

transitioning society away from fossil fuel-dependent mobility options. We see this opportunity play out in the case of Civilized Cycles, an innovative e-bike firm headquartered in Brooklyn, NY.^{37, 38, 39}

Rather than manufacture their own products, Civilized opted to work with contract manufacturing firm, Bloom, that is based in Detroit, Michigan. The choice of a Detroit-based contractor is not an accident—the region was selected precisely because of its deep roots in automotive manufacturing and its highly skilled local workforce with tremendous manufacturing expertise.

Civilized Cycles depends on Bloom workers' transferable knowledge, leveraging their insights from more commonplace automotive technologies and product parts to implement a unique suspension system for e-bikes—one that uses a patented technology that is similar in form to the automatic and adjustable suspension systems of a “big rig” commercial truck. Although the technology is used in all Civilized e-bikes, the longer-term plan is to harness it to support a distributed, lower-carbon urban cargo network through mass production of a lightweight, bicycle-class electric commercial vehicle, called the Semi-Trike.⁴⁰

Bloom's contract production workforce is an essential contributor to Civilized's ability to commercialize this state-of-the-art technology. Frontline manufacturing workers work side-by-side with the product design team at Civilized, treated as equal partners in all stages of product development and testing. This inclusive arrangement represents a scalable model for how more environmentally oriented firms can support a “just transition” by engaging and empowering manufacturing workers from more traditionally and environmentally damaging sectors and industries. The involvement of a place-based contract manufacturing firm—one with its own plans for expansion in support of US-based e-bike manufacturing—means this same Detroit-based workforce has developed the ability to improve design and production practices at other e-bike firms, while also helping industry newcomers recognize the value in treating all manufacturing workers as essential creative talent. It is for this reason that Bloom is on the radar of several community-based organizations, including Detroit Future City,⁴¹ suggesting opportunities for worker- and community-supporting partnerships to take root.

Key Themes and Takeaways

Intermediaries Help Businesses Create Shared Purpose with Workers

When it comes to small and medium-sized manufacturers (SMMs), there is a common refrain that business owners too often work *in*, not *on*, their business. The implication is that they are too distracted with day-to-day tasks to contemplate the future, much less anticipate imminent or forthcoming business challenges or opportunities. But expanding the focus to envision future possibilities comes with its own challenge: deciding what steps to take, who to engage within and outside the organization to support these decisions, and how to conduct them in ways that improve daily business operations and performance.

The intermediaries featured in our case studies help SMMs think and act strategically. But they do so by first ensuring many voices and perspectives are in the mix. With inclusion in mind, these intermediaries help business leaders recognize and value the contextual and tacit knowledge within the workplace and the role of workers as generative agents in co-creating a shared strategic vision. They help create shared spaces that foster a sense of belonging for multiple individuals within the business, especially frontline workers, so they can also contribute to an ongoing conversation about where to take the business next.

Still, creating spaces for collective and creative interpretation is not always easy. It sometimes requires intermediaries to first identify and then align different, potentially competing perspectives and interests. In the case of ownership transition, for example, that has meant helping workers recognize the need for the original owners to receive a “fair exit” given the time and effort they spent in building the business, while also helping exiting owners realize the additional steps that are needed to support a transition that strengthens and sustains their legacy in creating a high-quality work environment. With technological upgrading, intermediaries have helped reconcile the desires of business leaders to reduce unnecessary waste (material or temporal) with worker desires for a more meaningful and expansive career trajectory. To align these varied goals, intermediaries helped workers and owners see the value in turning revenue gains from cost-saving measures into an investment source for driving business expansion and talent development.

This alignment work by intermediaries is equally critical for creating and implementing a shared vision for bettering the business and the workplace—one that supports bold thinking and iterative action. The intermediaries in these cases do not impose their own creative or reimagined vision—rather, they work with a mix of actors within a manufacturing business to come up with the strategic plan and to then consider what is needed to make that happen.

The intermediaries in our cases facilitate that process by helping to distill a shared vision into a sequence of reinforcing tasks. That means helping multiple actors within the business parse the plan into actionable, even tactical, steps. It is certainly true that a strategic vision is much more than a sum of individual parts. Still, by unpacking things, intermediaries create a more manageable process, focusing owner and worker attention on immediate actions, while still keeping the bigger picture in mind. We see this clearly in cases of employee ownership transition, with intermediaries focusing initially on getting the business to a place of financial stability. If that step were overlooked or minimized, the business would transition on shaky ground, deepening the risk for new owners and the remaining workforce alike. A similar stepwise process is used by intermediaries to support technological innovation; we see partner institutions helping manufacturers like WCT and Material Return initiate work-impacting technological change through a series of smaller, iterated steps—what one intermediary fittingly described as “practical innovation.”

In summary then, our mix of cases speak to the ongoing contribution of intermediaries in fostering a sense of shared purpose and direction for guiding work, while also creating actionable steps for solidifying frontline worker involvement within SMMs. They also point to a wide range of institutional types and partnerships, suggesting that while labor unions have been at the forefront of worker advocacy in this nation, they are now joined by many others in raising and protecting channels for worker involvement. Together, these efforts can strengthen labor market institutions in the United States, a point we return to in the concluding section. But what is also clear from these cases is the importance of formal and comprehensive training for democratizing workplace decisionmaking within SMMs, a second cross-cutting theme we turn to next.

Intermediaries Encourage Businesses to Take Training Seriously

Today's manufacturing leaders, especially at smaller firms, recognize that strategic transitions often rely on retraining and upskilling workers. Although larger manufacturers have a tendency to reorganize work in ways that degrade jobs or displace workers, SMMs with informal routines, small-batch production, and tight-knit work cultures know that flexibility and customization are essential when implementing work redesign. Accordingly, the firms and intermediaries in our cases recognize that training requires far more than upgrading workers' technical skills. Instead, they take an expansive view of both the content and process of training to strategically engage workers.

The intermediaries in our cases encourage training to go beyond the focal transition to include information about business fundamentals. When workers understand the broad context of strategic changes, they can work hand-in-hand with business leaders to generate ideas to improve business competitiveness. This is especially critical during succession planning to ensure that transitions to employee ownership are built on a secure financial foundation while also protecting workers' livelihoods. For example, our cases discuss approaches like open-book management and the Great Game of Business, which aim to equalize knowledge about business operations and financing between workers and owners. Including information about business fundamentals in workforce training is equally important in other types of transitions.

Intermediaries also promote leadership skills training that helps workers learn how to manage their peers and direct continuous improvement. Our cases include examples of workers who were tapped for direct technological upgrading, such as the newly promoted employees at World Class Technology Corporation. With the support of leadership training, these workers pinpointed specific use cases for automation and advanced software. They then built and led teams responsible for implementation and technology oversight. In general, leadership training makes work more rewarding, and supports talented workers in directing their career paths. It also aligns the interests of workers and firms by ensuring that work redesign benefits from workers' knowledge and continued commitment.

Carefully considering the process of implementing training is as important as the content of training. The intermediaries in our cases integrate worker involvement into the broader change management process from the start by helping business leaders identify talented and interested workers to co-lead work redesign. For example, intermediaries in

Buffalo provide extensive training for all stages of work redesign, but they first work with firms like Astronics to lay the foundation for culture change and worker empowerment. Nor does training stop after initial workplace redesign changes are implemented. Ongoing training is a core value for the firms featured in our cases, setting them up for future successful adaptation to changing conditions.

Our cases make clear that intermediaries play a critical role in helping firms take training seriously as an integrated aspect of work redesign. Intermediaries centralize training resources, including curricular tools, instructors, and learning spaces, relieving resource-strapped SMMs. Intermediaries also distribute valuable knowledge about training processes—what training is needed, when, and how it should be integrated into broader work redesign. This personalizes training to individual firms and promotes broader regional competitiveness. We turn to regional and community-wide considerations next.

Intermediaries Focus on Place-Based Assets and Community Investment

One narrative of the US manufacturing sector highlights its reliance on low-wage work that eventually moved overseas, leaving behind struggling communities. Our cases show the other side of this narrative. With the help of intermediaries, SMMs can use place-based assets, including existing infrastructure, business networks, supply chains, and incumbent worker expertise, in novel ways to produce equitable and sustainable benefits for their communities.

The organizations in our cases leverage their historical context, whether for textiles or wood manufacturing, to rebuild and repurpose infrastructure and to use local industry expertise to produce new competitive advantages. Although workers are essential in drawing out and applying these resources, intermediaries are essential in creating spaces for workers' expertise to come to light. In the case of Snow River, intermediaries help retain family supporting jobs in rural communities. In contrast, in the case of Material Return, they help workers resuscitate and improve manufacturing jobs in a legacy textile region hit hard by decades of global outsourcing. In these cases and others, intermediaries

build on existing assets in novel ways, rather than expend precious resources starting from scratch.

Intermediaries also help companies recognize their communities as a resource for improved work redesign. In Buffalo, New York, the work of intermediaries goes beyond individual firms like Astronics, the company featured in our case. Buffalo intermediaries connect workforce investments with community economic development goals. For example, intermediaries advocated to place a new workforce development center for advanced manufacturing and clean energy occupations in a historic manufacturing neighborhood. The center is available by public transit and co-located with access to affordable healthy food, equitable banking, accessible child care, substance abuse help, mental health support, and affordable housing. It has become a reason for manufacturers to locate nearby and to invest further in the community. By helping employers see structural issues of disenfranchisement and disinvestment as barriers to workforce participation, the intermediaries support an approach that recognizes that the community, workers, and businesses are interdependent.

Intermediaries also help seed deeper place-based connections by enabling workers to drive community change. For example, workers within The Industrial Commons ecosystem spend several hours a month of paid time participating in civic activities, like attending school board meetings, to create opportunities for workers to influence their communities. Transitions to worker- and community-ownership are another compelling avenue where intermediaries help advance worker interests by maintaining high quality jobs and building community-owned assets that have the potential to disrupt intergenerational poverty. Through efforts like this, intermediaries help workers generate changes in their communities, such as improved access to child care, which shapes their ability to work and build wealth over the long term.

Finally, strategic engagement by intermediaries enhances worker involvement along entire supply chains and industries. In the cases of MetalWorks and WCT, technology vendors collaborate with frontline manufacturing workers to align technologies with worker needs, improving worker well-being alongside company output. This also generates benefits for workers at any future clients the technology vendors take on. For Sew Co, establishing incumbent training and apprenticeships for its own workers has meant orchestrating region-wide training, some of which is led by workers. In the case of Material Return, the enterprise is predicated on workers across a supply chain creating

sustainable yarns collaboratively and starting conversations about cooperative ownership and sustainability along the way. The intermediaries in our cases foster these distributed models of worker involvement by engaging worker input within suppliers or anchor companies that connect with workers at partner firms.

By connecting communities, industries, and supply chains, intermediaries demonstrate how worker involvement can generate broad benefits that go beyond individual manufacturing businesses.

Recommendations for Action

We showcase a mix of inspiring cases that involve intermediaries supporting smaller manufacturers to center workers as co-creators of workplace change. The possibility for elevating manufacturing workers as key actors in strategic transitions is endless and with plenty of room for institutional and industry partners to work together. Yet, we must also acknowledge that this institutional work is neither easy nor commonplace. In this respect, our examples read more as a “proof of concept” rather than a representative sample. They prove that intermediaries can support worker involvement by helping small and medium-sized manufacturers see the value of engaging their creativity and commitment. As exceptions to the norm, these cases also suggest the need for additional support to enable more intermediaries to move into this influential role.

We therefore end this report with some high-level recommendations for action. Our cases show that multiple actors can work together to take action at every level. For instance, both intermediaries and business leaders can craft opportunities for workers to lead strategic change. Both business leaders and nonprofit leaders can take on organizing roles within their regions to build local and cross-regional manufacturing capacity. Our recommendations reflect positive actions that will generate broad benefits no matter who is at the helm.

Recommendations for Businesses

1. **Work with intermediaries to center worker input and spur business growth.** Our case studies demonstrate that worker input can be crucial in identifying new

competitive strategies, driving innovative operations, and saving businesses. Worker involvement and growth need not be equal priorities at the outset of a strategic transition. Some SMMs may initially be motivated to engage intermediaries to solve pressing business problems, such as automation to expand product lines, roll out of new software, reconfiguration of shop floors for worker safety, identification of new recycling techniques, business succession to prevent closure, owners need for early exit, and company resiliency. In these cases, intermediaries can take the lead in suggesting ways that workers can be involved as the front-line experts in solving these challenges, including anticipating customer response.

Similarly, intermediaries can advance worker voice and involvement in the business through gradual changes such as getting worker input before implementing new technology and making upgrades throughout that respond to worker feedback. At the same time, intermediaries can play a larger role in ensuring financial success and stability for workers, especially for ownership transitions. This assistance can include: helping workers navigate the legal, financial, and organizational complexities associated with an ownership transition, providing remote and in-person technical assistance for how to structure governance, building teams with individuals with prior experience as worker-owners in manufacturing operations, providing peer-to-peer knowledge-sharing, identifying lenders who can make the transaction work in everyone's financial interest, promoting quality assurance of manufactured products, achieving family sustaining wages and cost-savings through strategic partnerships around health care insurance and other employee benefits, and creating a trained transition team, composed of diverse coworkers—among many other strategies.

2. **Start with small engagements that build worker trust.** Many firms embark on strategic transitions without having a foundation for voice and trust in their workplace. Workers are unlikely to support ambitious changes without this foundation, which can threaten the viability of leaders' efforts. Small engagements lay the foundation for bigger worker participation efforts once workers know their input will be valued. As illustrated through the World Class Technology Corporation case, quick wins can come by implementing worker-submitted ideas for process and safety improvements, which can foster company-wide conversations and

training for continuous improvement.

3. **Tailor worker training with the intermediary to include leadership, business, and finance fundamentals.** Lasting change requires crafting and embracing new roles within the business. The Material Return example discussed veteran industry workers moving into process redesign roles, while the World Class Technology Corporation case discussed incumbent workers moving into supervisory roles. For these transitions to be successful, workers need training beyond technical skills, including leadership and business fundamentals. For example, our cases discuss approaches like open-book management and the Great Game of Business framework, which aim to equalize knowledge about business operations and financing between workers and owners. Intermediaries can lead in designing and delivering such training, supporting workers across multiple manufacturers while tailoring content to individual firms' needs. This alleviates the burden on resource-strapped SMMs while building regional capacity.

Recommendations for State and Local Policymakers

1. **Partner with diverse types of intermediaries.** Intermediaries come in various shapes and sizes. In some regions, local centers within the US Manufacturing Extension Partnership take on a leadership role. In other regions, unique institutions are created to respond to regional needs, such as the Carolina Textile District (CTD) and The Industrial Commons (TIC), which supported Sew Co and Material Return. Both organizations were established to bring together a wide range of businesses within the textile industry to support high-road production values. And in other cases, the best intermediary is one workers already know and trust, as was the case with the local labor union representative from the International Union of Electronic, Electrical, Salaried, Machine and Furniture Workers—Communications Workers of America (IUE-CWA) at Snow River Cooperative. In an effort to prevent business closure, the representative connected workers to an Ohio-based co-op incubator and, through them, to the University of Wisconsin's Center for Cooperatives. The institutional support network then expanded to include Shared Capital, a Community Development Financial Institution with roots in Minneapolis and experience supporting cooperative businesses, including

smaller manufacturers. Regardless of their background or structure, the most successful intermediaries are those with the reputation, resources, and interest in intermediary work. Policymakers, funders, and manufacturers should remember this rather than focusing on a specific type of organization.

2. **Foster connections between local intermediaries.** In most cases, even the most well-resourced intermediaries cannot act alone. Building regional manufacturing capacity may involve a wide network of education institutions, technology vendors, suppliers, public organizations, and more. For example, the Astronics case highlighted the close partnership across multiple Buffalo organizations, including Buffalo Manufacturing Works, the Northland Workforce Training Center, and Insyte Consulting. Each of these organizations has unique strengths, from incumbent workforce training to strategic planning to robotics testing, and individual firms will likely need resources from each.
3. **Fund intermediaries with public resources.** Regardless of the institutions involved, public workforce and economic development organizations can play a key funding role for intermediaries, as they are key recipients of federal and state funds. These organizations, as well as regional foundations, can directly fund or amplify funding support available to intermediaries and help match funding for different business goals and types. One example not featured in our cases is The Genesis project by IMEC (Jain et al. 2019), which leveraged federal money through the Manufacturing Extension Partnership along with the funding they received from the Chicagoland Workforce Funders Alliance.
4. **Help intermediaries connect workforce investments with community economic development goals.** Workforce development investments made with intermediaries can build capacity and advance existing community economic development goals as well as serve as a tool to bring new funding to communities that may have previously been disenfranchised and underinvested. For example, investments in workforce development or manufacturing infrastructure can be located in

neighborhoods with legacy infrastructure and planned with an eye toward other community needs such as public transit, banking institutions, substance abuse help, mental health support, and affordable child care, housing, and food. Addressing these structural issues of disenfranchisement and disinvestment as barriers to workforce participation will yield multiplicative opportunities for equitable community development, business growth, and worker well-being.

Recommendations for Regions and National Policymakers

1. **Create cross-regional opportunities for learning.** Policymakers across regions, in partnership with employers and practitioners, looking to join a national effort to support SMMs and their workforce can learn from organizations in other states and localities that have already made substantial progress, even if they do not yet have the capacity to support local manufacturers. In this respect, newcomer regions do not need to reinvent the wheel or go it alone. They can adapt what is already in place elsewhere, modifying structures and practices to reflect local conditions and assets within their respective communities and industries. Additionally, they can avoid common mistakes by learning from institutions that have already worked through initial challenges and become stronger. Our cases point to just a few pioneering communities in the US that can be a focal point for cross-regional learning, suggesting an opportunity to map who these communities are and what challenges they are tackling.
2. **Connect with and scale established intermediaries.** Nationally focused institutions that care about creating equitable workplaces and economies can play a leading role in fostering cross-regional learning and coordination. Many well-networked organizations provide valuable resources for employers seeking to learn and collaborate, including labor unions, suggesting a further opportunity to build and scale institutions. One promising example is America Works,⁴² a national initiative that helps smaller US-based manufacturers develop workforce strategies, including training programs, by engaging multiple centers within the national Manufacturing Extension Partnership network. Another resource is the Urban Manufacturing

Alliance (UMA),⁴³ a national coalition that builds support for more equitable and inclusive manufacturing economies. Through their ongoing Industry and Inclusion initiative (Burris et al. 2023), UMA has brought together dozens of support institutions, including publicly funded community colleges that wish to play a stronger role in helping cities and communities continue to be places where “things get made.” The Aspen Institute’s Economic Opportunities Program is another national pioneer in this space, supporting practitioner education and empowerment through programs such as their long-standing Job Quality Fellowship.⁴⁴ These and numerous other national initiatives offer a well-tested platform for broadening and broadcasting institutional influence and impact.

3. **Direct the help of intermediaries to communities that need it most.** Although some communities may have a diverse set of intermediaries to choose from, other communities—such as those within rural areas—may not have an obvious partner to work with in the manufacturing sector. Regional and national policymakers should conduct a needs assessment of where help is needed most and incentivize partnership in these underresourced communities.

4. **Coordinate across regions to advocate for state and federal policy change.** Finally, regions within the same state or those in bordering states can come together to identify and resolve funding and institutional gaps in manufacturing. This is a critical time for coordinated action given historic federal investments in manufacturing regeneration and expansion through the federal Investing in America Agenda.⁴⁵ Substantial funding is now available—topping more than \$3 trillion US dollars—for clean energy transition, resilient infrastructure, and semiconductor supply chain integration, with the potential to reach tens of thousands of SMMs and the sizable share of the US manufacturing workforce that they currently employ. For this funding to reach SMMs, manufacturing support organizations and their allies need to work together to shine a brighter spotlight on these historic investments, ensuring they reach further down into established industrial networks and communities to engage smaller businesses and their frontline workforce. In the past, federally funded manufacturing institutions have faced difficulties making good on these commitments (Clark and Doussard 2019), but there is greater potential for that to shift based on the Investing in America

Agenda and other large investments in US manufacturing.⁴⁶ Intermediaries and their institutional partners can play a leading role in ensuring these transformative federal investments reach more SMMs by elevating frontline worker voices.

Appendix. Methodology and Definition of Terms

This report aims to document ways that manufacturing support organizations and other intermediaries in the United States can help smaller manufacturing firms elevate frontline worker involvement in manufacturing job design. The purpose of this report is not to offer a representative sample of practices or firms but to identify illustrative case studies that offer lessons for practices and policy, enhancing the awareness of and appreciation for path-breaking work that is already in motion.

We focused our case selection on three key drivers of work redesign that hold an opportunity to enhance domestic manufacturing capacity and resilience. The first driver, technological upgrading, is a long-standing driver of workplace redesign. The second, business succession through employee ownership, is an increasingly appealing tool to contend with an aging workforce and disparities in worker power. The third driver is toward a more environmentally sustainable manufacturing sector, which may engage directly with decarbonization and energy transition efforts or simply involve more sustainable production processes. For each of these drivers, our working assumption—backed by research on employee involvement and high-performance work systems (Appelbaum et al. 2001; Litwin 2011; MacDuffie and Krafcik 1992)—was that frontline worker involvement can enhance the performance of the business and also generate better quality and more meaningful jobs. We conceptualized three key terms to identify relevant cases.

Workplace redesign is understood as the process of restructuring operations and human resources practices to enhance organizational effectiveness. As we use the term, workplace redesign includes changes to three elements, either individually or in conjunction: (1) work processes, such as production processes and technologies; (2) job design, such as task allocation and workplace relations;⁴⁷ and (3) decisionmaking, such as feedback structures and organizational governance mechanisms. We recognize that workplace redesign can have positive, negative, mixed, or neutral effects on workers, though our report argues for workplace redesign to be conducted in ways that generate positive outcomes for both workers and businesses.

We use the term *worker involvement* to refer to practices that include workers as codesigners in the process of workplace redesign. This goes beyond informing workers of a workplace change or training workers after changes have been made. Instead, it includes practices that involve workers in envisioning, implementing, and sustaining changes, as well as ensuring that such changes result in positive effects on economic and non-economic indicators for workers. We use the term *worker involvement* rather than *worker voice*, as the latter is sometimes narrowly associated with a specific form of worker representation, namely through labor union participation.

Finally, the term *intermediaries* refers to organizations that either have a manufacturing support mission or are key institutional partners that support that mission and whose primary role is to connect smaller manufacturers with financial, network, informational, or other resources to enable strategic transitions. We recognize that this term has been used more narrowly in other settings. For instance, workforce intermediaries are a subset of intermediaries that serve both employers and employees in region- or sector-specific clusters and implement strategies that focus on job readiness, skill training, and post-employment support (Conway and Giloth 2014). Financial intermediaries, including Community Development Financial Institutions (CDFIs), are another subset of organizations that provide assistance to smaller manufacturers and can support their journey through multiple strategic transitions (Greer and Gonzales 2017). Many intermediary organizations are nonprofit, public, or quasi-public organizations that are primarily funded through state or local government sources. In some instances, for-profit enterprises can act to support smaller manufacturers and their workers in an intermediary-like role (see box 2 about technology vendors). We use a deliberately broad definition (which includes labor unions) to encourage stakeholders to think creatively when considering how to promote business competitiveness and job quality.

These terms provided the boundary conditions for our case selection. We first looked for supporting examples from our own prior research on smaller manufacturing firms. We included several cases from a research collaboration between Nichola Lowe, Sophie Kelmenson, Greg Schrock, and the Urban Manufacturing Alliance that is funded by the Siegel Family Endowment. Jenna Myers also leveraged primary research on technological upgrading in US manufacturing from her dissertation. To round out these case options, we next held focus groups with industry experts that we identified through our professional networks and our past research on the manufacturing sector. For each of our three

strategic drivers, we invited a subset of these experts to attend an hour-long conversation focused on generating examples of specific cases.

Through this process, we identified four technology upgrading cases, eleven business succession cases, and ten sustainability cases for potential inclusion. We narrowed this list based on our ability to gather the necessary information to detail the case study and confirm its fit with our criteria. We selected six primary case studies, with approximately half based on our earlier case study research, the rest drawing on published writings by other scholars, practitioners, or journalists. We prioritized cases for which strategic changes of work redesign were already completed or well underway, which eliminated some potential cases that were in the early stages of strategic planning. We then analyzed each case to understand the roles of intermediary organizations and worker involvement in helping the focal firm undertake its strategic transition. We also held follow up conversations with case study organizations as necessary to better understand the case. In addition, we include three shorter illustrative examples in callout boxes; while these cases did not meet all selection criteria to warrant a longer review, we include them as they suggest additional and promising channels for further intermediation.

All the final case studies included in this report were shared with the focal organizations for review. As a final step, we performed a cross-case analysis to identify cross-cutting themes of roles that intermediaries play in work redesign transitions. We translate these lessons into implications for policy and practice.

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Notes

- ¹ Mary Josephs, "Employee Ownership Gains Big Momentum," *Forbes*, June 21, 2024, <https://www.forbes.com/sites/maryjosephs/2024/06/21/employee-ownership-gains-big-momentum/>.
- ² US Bureau of Labor Statistics, "Number of Business Establishments by Size of Establishment in Selected Private Industries," accessed October 24, 2024, <https://www.bls.gov/charts/county-employment-and-wages/establishments-by-size.htm>.
- ³ Kate Gibson, "How to Design High-Performing Jobs," December 12, 2023, Harvard Business School Online, <https://online.hbs.edu/blog/post/what-is-job-design>.
- ⁴ Joshua Cohen. 2020. "Good Jobs." Research brief. Cambridge, MA: MIT Work of the Future. <https://workofthefuture-taskforce.mit.edu/research-post/good-jobs/>.
- ⁵ Tom Strong, "How to Redesign Jobs and Workplaces," May 13, 2024, National Fund for Workforce Solutions, <https://nationalfund.org/how-to-redesign-jobs-and-workplaces/>.
- ⁶ In 2021, 98.4 percent of manufacturing firms in the United States had fewer than 500 employees, and 99.7 percent of manufacturing firms had fewer than 5,000 employees. Source: U.S. Census Bureau, Statistics of U.S. Businesses, Table: U.S. and states, NAICS, detailed employment, 2021, <https://www.census.gov/data/tables/2021/econ/susb/2021-susb-annual.html>.
- ⁷ Manufacturing Extension Partnership (MEP), National Institute of Standards and Technology, US Department of Commerce, accessed October 24, 2024, <https://www.nist.gov/mep>.
- ⁸ Karla Yee Amezaga, Mohammad Al-Eidan, Nino Letteriello, and Soumyadeb Chowdhury, "How Can SMEs Become Data-Driven Enterprises?" World Economic Forum, June 25, 2023, <https://www.weforum.org/agenda/2023/06/how-can-smes-become-data-driven-enterprises>.
- ⁹ Katie Anderson, "Astronics in East Aurora Invests in Robots to Increase Production," *The Business Journals*, August 6, 2021, <https://www.bizjournals.com/buffalo/news/2021/08/06/astronics-automation.html>.
- ¹⁰ Rich Blake, "An Aerospace Company's First Foray into Robotics Takes Flight," *Forbes*, November 29, 2019, <https://www.forbes.com/sites/richblake1/2019/11/29/an-aerospace-companys-first-foray-into-robotics-takes-flight/?sh=953239960471>.
- ¹¹ "Shift Spotlight: Astronics LSI-NY," Shift 2.0, accessed October 24, 2024, <https://shiftnfg.com/news/shift-spotlight-lsi-ny>.
- ¹² Katie Anderson, "Astronics in East Aurora Invests in Robots to Increase Production."
- ¹³ Mary Josephs, "Experts Ponder, Why Aren't There More ESOPS?" *Forbes*, October 19, 2023, <https://www.forbes.com/sites/maryjosephs/2023/10/19/experts-ponder-why-arent-there-more-esops/>.
- ¹⁴ Darren Dahl, "Kim Jordan On Why Employee-Owned New Belgium Brewing Isn't Worried About A Craft Beer Bubble," *Forbes*, July 1, 2015, <https://www.forbes.com/sites/forbestreptalks/2015/05/05/kim-jordan-on-why-employee-owned-new-belgium-brewing-isnt-worried-about-a-craft-beer-bubble>.
- ¹⁵ Mike Monte, "Cutting Boards of All Shapes and Sizes," *Magazine for The Great Lakes Timber Professional Association* December 2022: 28-30.

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- ¹⁶ Mike Monte, "Cutting Boards of All Shapes and Sizes."
- ¹⁷ Adam Trott, Courtney Berner, Kevin Edberg, and Christine Jennings. "Snow River Cooperative: Rural Manufacturing Shows Resilience in Wisconsin," interview with Brian Sinclair, CooperationWorks! accessed October 24, 2024, https://cooperationworks.coop/success_stories/cooperative-developers-collaborate-to-convert-a-rural-manufacture-to-employee-ownership/.
- ¹⁸ Information based on email exchanges with Esther West related to her support for the conversion of Snow River to a worker-owned cooperative, June 2024.
- ¹⁹ Email correspondence with Esther West, June 2024.
- ²⁰ Mike Monte, "Co-op Development Spotlight: Snow River Cooperative."
- ²¹ UW Center for Cooperatives, "Co-op Development Spotlight: Snow River Cooperative," September 23, 2020, <https://uwcc.wisc.edu/2020/09/23/co-op-development-spotlight-snow-river-cooperative/>.
- ²² Email correspondence with Esther West, June 2024.
- ²³ Adam Trott, Courtney Berner, Kevin Edberg, and Christine Jennings. "Snow River Cooperative: Rural Manufacturing Shows Resilience in Wisconsin."
- ²⁴ Project Equity, "Employee Ownership Trusts," accessed October 24, 2024, <https://project-equity.org/learn/types-of-employee-ownership/employee-ownership-trusts/>.
- ²⁵ "Sustaining Ownership: The Promise of Employee Ownership Trusts," Economic Opportunities Program, Aspen Institute, October 25, 2023, <https://www.aspeninstitute.org/events/sustaining-ownership-the-promise-of-employee-ownership-trusts/>.
- ²⁶ "Hummingbird Wholesale Becomes One of the First Employee-Owned Purpose Trusts in Oregon, Elevating Their Mission and Their Employees," Project Equity, accessed October 28, 2024, <https://project-equity.org/press-releases/hummingbird-wholesale-becomes-one-of-the-first-employee-owned-purpose-trusts-in-oregon-elevating-their-mission-and-their-employees/>.
- ²⁷ Email correspondence with Courtney Kemp, June 2024.
- ²⁸ Project Equity, "Hummingbird Wholesale Becomes One of the First Employee-Owned Purpose Trusts in Oregon, Elevating Their Mission and Their Employees."
- ²⁹ Email correspondence with Anne-Claire Broughton and Ted Hall, 2024.
- ³⁰ US Bureau of Labor Statistics, "Number of Business Establishments by Size of Establishment in Selected Private Industries," accessed October 24, 2024, <https://www.bls.gov/charts/county-employment-and-wages/establishments-by-size.htm>.
- ³¹ "What Is the Circular Economy?" National Institute of Standards and Technology (NIST), US Department of Commerce, accessed October 24, 2024, <https://www.nist.gov/circular-economy>.
- ³² The Industrial Commons. *Annual Report 2022*.
- ³³ "Smartwool Launches Second Cut™ Hike Sock, a Sock Made from Your Old Socks," PRNewsWire press release, AP News, April 10, 2023, <https://apnews.com/press-release/pr-news-wire/business-pr-news-wire-9b0132535aa90acf4f01c1a8d1bf17ed>.

-
- ³⁴ “2023 Annual Report,” The Industrial Commons, accessed December 3, 2024, <https://static1.squarespace.com/static/64e37e015dad7a5cb778af4c/t/66b377890fdf783fe2c85e66/1723037593670/TIC+Annual+Report+2023+Digital+FINAL.pdf>.
- ³⁵ “Nonprofit Receives \$10 Million to Build Textile Facility in Burke County,” *Business North Carolina*, October 11, 2023, <https://businessnc.com/nonprofit-textile-hub-receives-10-million-to/>.
- ³⁶ “NSF Engines: North Carolina Textile Innovation and Sustainability Engine,” US National Science Foundation, accessed October 24, 2024, <https://nctise.org/>.
- ³⁷ “Light Electric Commercial Vehicles,” Civilized Cycles, accessed November 6, 2024, <https://commercial.civilizedcycles.com/>.
- ³⁸ Email and in-person correspondence with Marc Liu, May–June 2024.
- ³⁹ Marc Liu. 2024. MURP Speaker Series. Presentation. Hubert H. Humphrey School of Public Affairs, University of Minnesota. February 20.
- ⁴⁰ “Civilized Cargo,” accessed October 24, 2024, <https://www.civilizedcargo.com/>.
- ⁴¹ Email correspondence with Ashley Williams Clark and Cortnie Squirewell at Detroit Future City.
- ⁴² Matt Feldman, “America Works—An Innovative Approach to Workforce Development,” Manufacturing Innovation (blog), National Institute of Standards and Technology (NIST), March 9, 2021, <https://www.nist.gov/blogs/manufacturing-innovation-blog/america-works-innovative-approach-workforce-development>.
- ⁴³ Learn more about the Urban Manufacturing Alliance at <https://www.urbanmfg.org/>.
- ⁴⁴ “Job Quality Fellowship,” Aspen Institute, accessed <https://www.aspeninstitute.org/programs/job-quality-fellowship>.
- ⁴⁵ “President Joe Biden—Investing in America,” Invest.gov, The White House, accessed October 25, 2024, <https://www.whitehouse.gov/invest/>.
- ⁴⁶ “President Joe Biden—Investing in America,” Invest.gov, The White House.
- ⁴⁷ Kate Gibson, “How to Design High-Performing Jobs,” Business Insights, Harvard Business School Online, December 12, 2023, <https://online.hbs.edu/blog/post/what-is-job-design>.

References

- Acemoglu, Daron, and Autor, David. 2011. "Skills, Tasks and Technologies: Implications for Employment and Earnings." *Handbook of Labor Economics* 4: 1043–1171. NLD: Elsevier.
- Alayón, Claudia Lood, Kristina Säfsten, and Glenn Johansson. 2022. "Barriers and Enablers for the Adoption of Sustainable Manufacturing by Manufacturing SMMs." *Sustainability* 2022 14 (4): 2364. <https://doi.org/10.3390/su14042364>.
- Appelbaum, Eileen, Thomas R. Bailey, Peter Berg, and Arne L. Kalleberg. 2001. "Manufacturing Advantage: Why High-Performance Work Systems Pay Off." *Academy of Management Review* 26 (3). Ithaca, NY: Cornell University Press. <http://dx.doi.org/10.2307/259189>.
- Berger, Suzanne. 2013. *Making in America: From Innovation to Market*. Cambridge, MA: MIT Press. <https://doi.org/10.7551/mitpress/9791.003.0013>.
- Blasi, Joseph, Richard Freeman, and Douglas Kruse. 2016. "Do Broad-Based Employee Ownership, Profit Sharing and Stock Options Help the Best Firms Do Even Better?" *British Journal of Industrial Relations* 54 (1): 55–82. <http://dx.doi.org/10.1111/bjir.12135>.
- Broughton, Anne-Claire, Courtney Kemp, Alison Lingane, Christopher Michael, Corey Rosen, Stacey Smith, and Steve Virgil. 2024. *Using an Employee Ownership Trust for Business Transition*. Oakland, CA: National Center for Employee Ownership (NCEO).
- Burris, Michelle, Tanu Kumar, Laura Valle-Gutierrez, and Emily McGrath. 2023. *Industry and Inclusion: Highlights from Community Colleges*. New York: The Century Foundation (TCF).
- Clark, Jennifer, and Marc Doussard. 2019. "Devolution, Disinvestment and Uneven Development: US Industrial Policy and Evolution of the National Network for Manufacturing Innovation." *Cambridge Journal of Regions, Economy and Society* 12 (2): 251–70. <https://doi.org/10.1093/cjres/rsz009>.
- Conway, Maureen, and Robert P. Giloth, eds. 2014. *Connecting People to Work: Workforce Intermediaries and Sector Strategies*. New York: The American Assembly, Columbia University; Washington, DC: Aspen Institute.
- The Employee Ownership Foundation. 2020. "Employee-Owned Firms in the COVID-19 Pandemic: How Majority-Owned ESOP & Other Companies Have Responded to the COVID-19 Health and Economic Crises," <https://cleo.rutgers.edu/articles/employee-owned-firms-in-the-covid-19-pandemic-how-majority-owned-esop-other-companies-have-responded-to-the-covid-19-health-and-economic-crises>.
- Goldin, Claudia, and Lawrence F. Katz. 1998. "The Origins of Technology—Skill Complementarity." *The Quarterly Journal of Economics* 113 (3): 693–732. <https://doi.org/10.1162/00335398555720>.
- Greer, James L., and Oscar Gonzales. 2017. *Community Economic Development in the United States: The CDFI Industry and America's Distressed Communities*. New York: Palgrave Macmillan. <https://doi.org/10.1057/978-1-349-69810-3>.
- Helper, Susan., Kyoung Won Park, Jennifer Kuan, Timothy, Krueger, Alex Warofka, Joy, Zhu, William Eisenmenger, and Brian Peshek. 2011. *The US Auto Supply Chain at a Crossroads: Implications of an Industry in Transformation*. Cleveland, OH: Case Western Reserve University.
- Jain, Ranita, Nichola Lowe, Greg Schrock, and Maureen Conway. 2019. *Genesis at Work: Evaluating the Effects of Manufacturing Extension on Business Success and Job Quality*. Washington, DC: Aspen Institute.

- Kelmenson, Sophie, Nichola Lowe, and Tanu Kumar. 2022. *Inclusive Innovation in Advanced Manufacturing: Moving Forward with Shared Gains*. New York: Urban Manufacturing Alliance.
- Kelmenson, Sophie, Nichola Lowe, and Greg Schrock. Forthcoming. "Working with Technology: A Case Study in Inclusive Innovation."
- Kemp, Courtney. 2024. "Hummingbird Wholesalers." In *Using an Employee Ownership Trust for Business Transition* by Corey Rosen, Anne-Claire Broughton, Courtney Kemp, Alison Lingane, Christopher Michael, Stacey Smith, and Steve Virgil. Oakland, CA: National Center for Employee Ownership.
- Litwin, Adam Seth. 2011. "Technological Change at Work: The Impact of Employee Involvement on the Effectiveness of Health Information Technology." *ILR Review* 64 5: 863–88. Ithaca, NY: Cornell University ILR School. <https://doi.org/10.1177/001979391106400502>.
- Lowe, Nichola. 2021. *Putting Skill to Work: How to Create Good Jobs in Uncertain Times*. Cambridge, MA: MIT Press.
- MacDuffie, John Paul. 1995. "Human Resource Bundles and Manufacturing Performance: Organizational Logic and Flexible Production Systems in the World Auto Industry." *ILR Review* 48 (2): 197–221. <https://doi.org/10.1177/001979399504800201>.
- MacDuffie, John Paul, and John F. Krafcik. 1992. "Integrating Technology and Human Resources for High Performance Manufacturing: Evidence from the International Auto Industry." In *Transforming Organizations* ed. by Thomas A. Kochan and Michael Useem: 209–25. <https://doi.org/10.1093/oso/9780195065046.003.0013>.
- Noble, David. 2011. *Forces of Production: A Social History of Industrial Automation*. GBR: Routledge Taylor & Francis Group.
- Rosen, Corey, Anne-Claire Broughton, Courtney Kemp, Alison Lingane, Christopher Michael, Stacey Smith, and Steve Virgil. 2024. *Using an Employee Ownership Trust for Business Transition*. Oakland, CA: National Center for Employee Ownership.
- Schumacher, Kelsea, KC Morris, Noah Last, Vincenzo Ferrero, Buddhika Hapuwatte, Nehika Mathur, and Maya Reslan. 2022. *Fostering a Circular Economy of Manufacturing Materials Workshop Report 2022*. Gaithersburg, MD: National Institute of Standards and Technology; West Conshohocken, PA: ASTM International. <https://doi.org/10.1520/amcoe-economy-of-manufacturing-materials>.
- Theodore, Nik, and Rachel Weber. 2001. "Changing Work Organization in Small Manufacturers: Challenges for Economic Development." *Economic Development Quarterly* 15 (4): 367–79. <https://doi.org/10.1177/089124240101500410>.
- Thomas, Douglas. 2020. *The Manufacturing Cost Guide: A Primer – Version 1.0*. NIST Advanced Manufacturing Series 200–9. Washington, DC: US Department of Commerce; National Institute of Standards and Technology. <https://doi.org/10.6028/NIST.AMS.200-9>.

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