

Manufacturing under Pressure

Manufacturing is not enjoying the heyday it once did, but in America's industrial heartland, it is still very much alive. The industry faces many challenges, and one is finding and retaining its next generation of workers. Solving the problem promises benefits to people, companies, and entire communities. Falling short means missed opportunities: undiscovered careers, firms that can't grow as much or as fast, and communities constrained by the weakening of the sector.





PART I:

Change in the Heartland

They're not on land yet, but the sailors approaching from Lake Erie smell it already, the oil of John D. Rockefeller's Standard Oil Company. Ashore in Cleveland, they smell, too, burning coal and the sour of steel mills. It's the turn of the 20th century, and the chug and rumble of locomotives, loaded with goods, is nearly constant, and factory whistles signal the start of a shift and, hours later, the time to go home. Some buildings belch black smoke—dirtying laundry hung clean on the line and compelling workers to change detachable collars midday to relieve their gritty necks. The smoke sticks even now, many decades later, to old stone buildings that haven't been washed, markers of an industrial past.

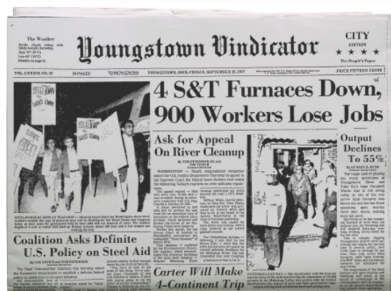
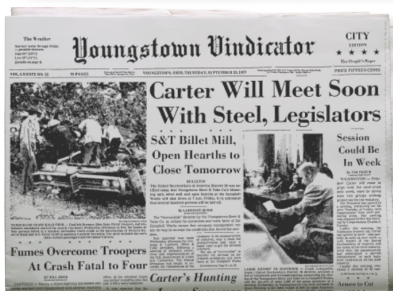
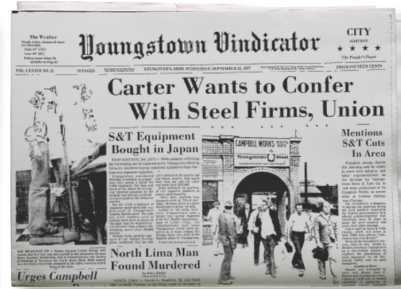
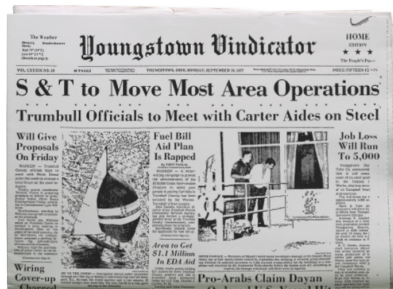
In those days, people in industrial centers such as Pittsburgh and Cincinnati may have moved up the hillsides to live away from the smoke that settled in the basins of their cities, but they knew: Smoke meant jobs. Industry. Prosperity.

For a century, roughly 1870 to 1970, these odors and sights and sounds shaped life across the industrial heartland as US manufacturing there grew rapidly, fueled in the earlier years by the nation's growing access to electricity and in the fifties and sixties by the work of rebuilding foreign industrial powers after World War II. It's not an exaggeration to describe Cleveland as the Silicon Valley of the era. The city has the advantage of hugging Lake Erie and in the early



Historically, the nation's industrial heartland has been heavily reliant on manufacturing for its economic success—and, to a lesser degree, it still is today. Map credit: Chris Dellamea

1900s it stood at the cutting edge of industrial tooling technology. Competitors to the industrial heartland's manufacturing dominance emerged in many forms beginning in 1970. Machines, particularly CNC machines, came online, reducing the number of people needed to control tools and rendering some workers' skills obsolete. Americans point often to foreign competition as the culprit of the heartland's job losses, and while it did ramp up then, domestic competition dealt its blows, too, says Cleveland Fed senior vice president Mark Schweitzer. As the interstate highway system expanded in the seventies and eighties, it connected more places to the southern United States, where manufacturers opened more plants, drawn to the South's iron and its lower-cost workers (the South was and still is less unionized). As transportation became cheaper, it further fueled moves down south.



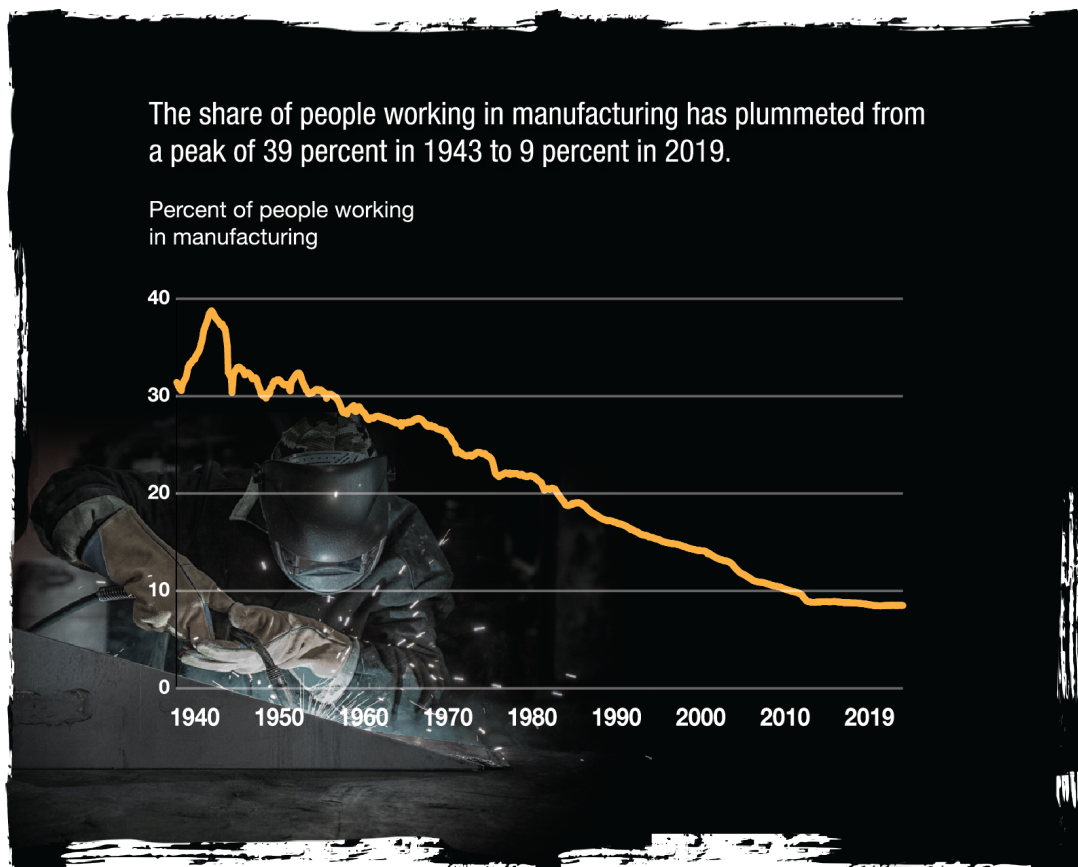
Front-page headlines of the Youngstown Vindicator© chronicle developments in 1977, the year Youngstown Sheet & Tube—the region's largest steel manufacturer—closed.

Reprinted from the Vindicator©, The Vindicator Printing Company, 1977.

The 1980s would see the first of two massive declines to US manufacturing and this bustling geographic center of the sector. During the decade, US manufacturing lost 1.4 million jobs, or about 7 percent of its workforce. Industries most decimated were textiles and apparel manufacturing, as companies relocated their operations overseas, and steel, as more countries began producing the metal, resulting in plummeting prices and tremendous cutbacks. The loss of steel jobs hit heartland communities such as Pittsburgh and Youngstown hard. Locals in the Mahoning Valley still speak of “Black Monday,” the day (September 19, 1977) when Youngstown Sheet & Tube, the region’s largest steel manufacturer, shuttered its doors, directly and indirectly pink-slipping thousands of workers.

Locals in the Mahoning Valley still speak of “Black Monday.”

The worst was yet to come. A historically unprecedented and more sweeping decline began in the early 2000s and deepened during the Great Recession of 2007–2009. The result was the loss of nearly 5 million US manufacturing jobs from 2000 to 2016.



Data accessed April 2019
Source: Bureau of Labor Statistics

“Manufacturing employment dropped by nearly 30 percent nationwide,” says Susan Houseman, vice president and director of research for the W.E. Upjohn Institute for Employment Research in Kalamazoo, Michigan. “That’s huge. There was no manufacturing that didn’t lose employment over that period of time.”

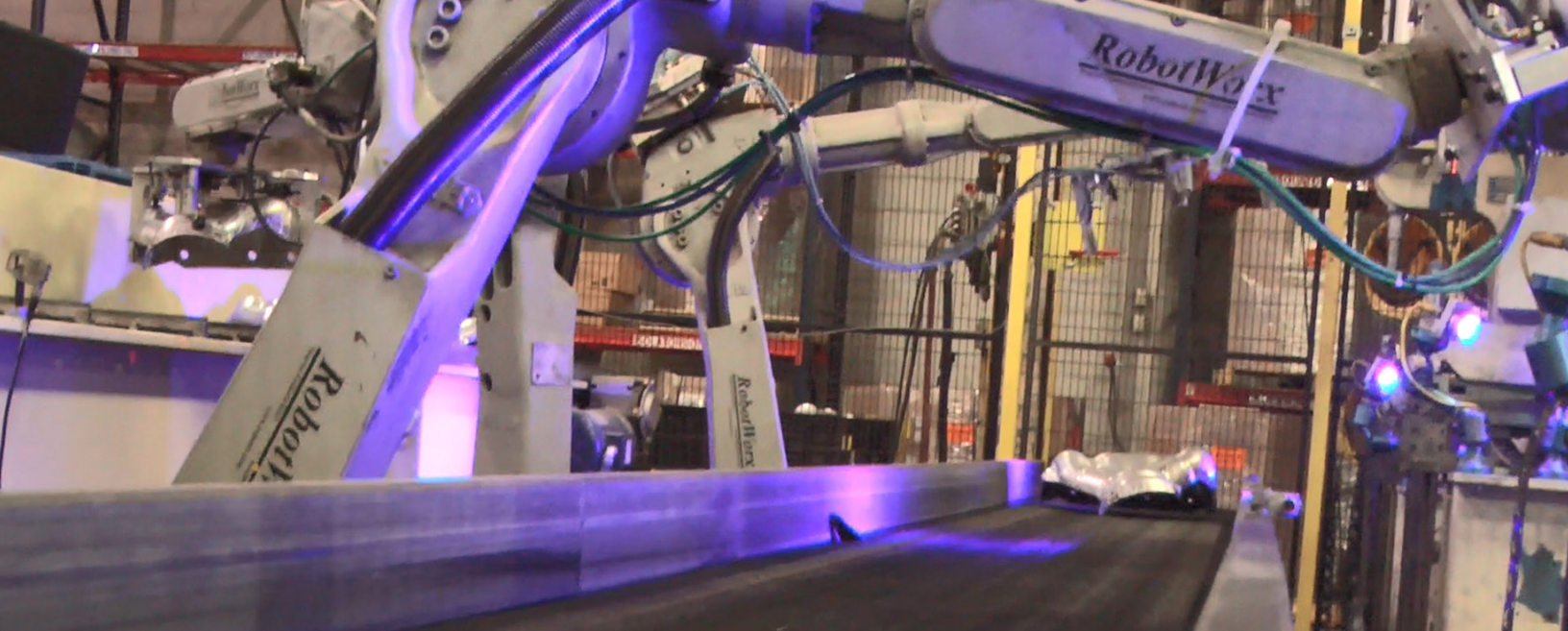
In the early 2000s, Congress guaranteed lower tariffs to Chinese goods permanently, says Tim Bartik, a senior economist with the Upjohn Institute. That meant that companies thinking about offshoring could do so with greater certainty that tariffs wouldn’t go up on the goods they’d produce there.

It takes a generation or more for communities to adjust. Some local economies never do.

The early 2000s was also a time when the US dollar appreciated and many considered it to be overvalued (because of a variety of factors), a situation that made US exports more expensive and imported manufactured goods cheaper, Bartik and Houseman explain.

Despite the stark decline of manufacturing jobs in the 2000s, Houseman rejects the notion that manufacturing is going away. The data on manufacturing workers are misleading, she asserts. Work such as transportation and warehousing, maintenance and repair, even R and D, can be contracted out, and for that reason and others, many jobs connected to manufacturing are counted as other sectors’ jobs by federal agencies.

Houseman notes structural change like that facing manufacturing isn’t isolated to manufacturing. “You get to a certain tipping point where closures overwhelm a local economy, and it spirals downward,” she adds. “It’s not easy. Very often, it takes a generation or more for communities to adjust. Some local economies never do fully recover.”



Who's to blame: Robots or trade?

There is a lively debate about what has caused manufacturing jobs to decline, trade and globalization or automation. While economists widely agree that increased US trade has been positive for the economy as a whole, rigorous economic studies show that trade and globalization played a role in that jobs decline. US companies' expansion elsewhere—in countries such as China, where wages used to be super low—meant less expansion and in some cases even contraction in the United States, Houseman says.

The United States remains today sort of stuck in the middle, says Susan Helper, Frank Tracy Carlton Professor of Economics at Case Western Reserve University's Weatherhead School of Management. "We're not low-wage like Mexico, we're not high-wage like Germany," she explains. "We continue to lose jobs to both kinds of countries."

As for automation, Houseman says empirical evidence doesn't support the fear out there that pits man against machine.

"The research evidence points to trade and globalization as the major factor behind the large and swift decline of manufacturing employment in the 2000s," concludes Houseman's 2018 working paper, "Understanding the Decline of US Manufacturing Employment." "Although manufacturing processes continue to be automated, there is no evidence that the pace of automation in the sector accelerated in the 2000s; if anything, research comes to the opposite conclusion."

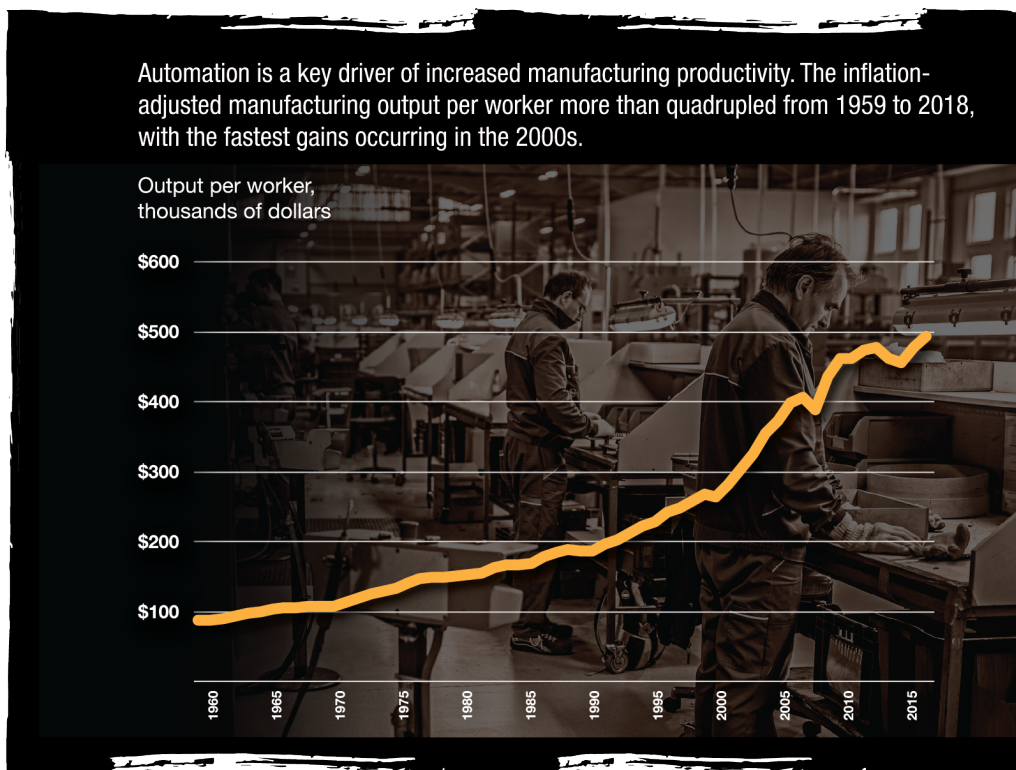
There is no identifiable big technology shock during that period that would have caused the decline, Houseman adds.

There are also findings like these: Manufacturers that are investing in new technology reported to the September 2018 Manufacturing Employment Demand Study for Southwestern Pennsylvania that they expect hiring to remain the same or increase as a result of those investments.

What impact has automation had, then, on his businesses? He flashes a quick grin. “Unbelievable,” he replies.

For Dan T. Moore, majority owner of 10 manufacturing companies, automation reduces and requires workers. In one part of the cavernous home of his company Soundwich—it makes noise-cancelling parts for vehicles—three robotic arms swing to and fro, assembling and placing parts onto a conveyer belt headed straight for, on this day, a woman named Monica. She marks each piece with a green marker, triple-checking the robots’ work.

Find any defects? “As of late, no,” she replies. The robots’ eyes—their cameras—are keeping things precise.



Data accessed April 2019

Sources: Federal Reserve Bank of Cleveland calculations from Bureau of Economic Analysis and Bureau of Labor Statistics data/Haver Analytics

Those robots replaced roughly six people, notes Moore, chief executive officer and chair of Dan T. Moore Company. What impact has automation had, then, on his businesses? He flashes a quick grin. “Unbelievable,” he replies. Machines do repetitive work accurately and tirelessly. They speed up production; for example, a rotary die cutter on the premises churns out 4,000 parts per hour where people could do 800. Machines make possible, too, what the industry dubs “lights-out manufacturing,” wherein machines work all weekend without operators.

All of this increases output, enabling US manufacturers to compete with places where workers may make much less an hour, thus allowing work to stay in communities across the industrial heartland, Moore says.

But right after he rattles off this laundry list of automation’s perks, Moore notes this: The more his companies produce, the more he needs people, too. People like Windsor Ford, the general manager of another Moore company, Fiberworx.

When Moore steps inside his 1-million-square-foot Cleveland Industrial Innovation Center, his numerous employees—“teammates,” he corrects—hug him or wave to him. And Ford greets Moore with a pen, a paper, and a “Can I get a quick autograph from you, big dog?” Moore obliges. The form’s related to a \$2,000 charge Ford put on a credit card for a device the company’s people will use to train robots. “To run our robots, it takes people to do that,” people to program and maintain the machines, Moore says. “It’s fine to buy the thing, but someone’s got to know how to use it.”

His point is automation replaces workers but also creates higher-skilled jobs that pay more. It can power people’s work, too, for example, when they analyze and act upon data collected by shop robots.



(Photos from left to right) At Cleveland-based manufacturer Soundwich, the blue light of this robotic system reflects off of parts and identifies whether they are correctly made. After a 360-degree review, robotic arms place correct parts on one conveyer belt and faulty ones on another. • This worker at Soundwich in Cleveland uses a green marker to place “witness marks,” which indicate to customers that people have checked the quality of the parts being manufactured. • Dan T. Moore, whose namesake company owns 10 manufacturing companies, speaks with Vannak So, who’s worked for one company, Soundwich, for more than 30 years.



Manufacturing still matters

In Schweitzer's office inside the Cleveland Fed sits a stack of books, all on manufacturing. The Federal Reserve's studies about the sector are prolific enough he could (and might) build a timeline of them. Why all this Fed attention on manufacturing?

Each of the Fed's 12 Reserve Banks studies and serves a corner of the United States, and the Cleveland Fed's district (Ohio, western Pennsylvania, the northern panhandle of West Virginia, and eastern Kentucky) has long been in the heart of the industrial heartland. That's one reason the heartland's economic performance has been a focus of Cleveland Fed research, Schweitzer explains in the 2018 interview, "Why the Industrial Heartland Still Matters." Another reason for studying and monitoring manufacturing, in particular, is that manufacturing tends to signal the first pinches of an economic downturn (when people stop buying and investing) and by keeping an eye on manufacturing the Fed can better do its job of setting monetary policy that's appropriate for where the United States is in terms of economic growth or contraction.

Pieces of this body of Fed research show that despite recent decades' declines in manufacturing jobs, the industrial heartland remains manufacturing-intensive except for a handful of metropolitan statistical areas (MSAs) including Pittsburgh and Columbus.

"In much of the industrial heartland, manufacturing is the primary exportable industry (meaning the industry that makes and sells the most to other places)," Schweitzer says.

“This is what these communities produce that other communities don’t.”

Predictably, then, the hits to manufacturing have rippled through heartland communities.

“The loss of employment and the loss of activity in manufacturing detracts from what those communities are producing and offering to other places,” Schweitzer says. “It makes them less attractive to people outside and inside the region.”

Over the past 50 years or so, industrial heartland MSAs have experienced weaker growth in population, employment, and per capita income than have other US MSAs, according to a trio of Rust and Renewal retrospectives that compare the economic performance of Cleveland, Cincinnati, and Pittsburgh MSAs to those of other industrial heartland MSAs and the nation.

And manufacturing’s decline has been the primary hit to the revenues some communities collect, causing “nasty fiscal situations,” says Joel Elvery, a policy economist with the Federal Reserve Bank of Cleveland. Detroit’s 2013 bankruptcy is one example he cites. Municipalities have responded to manufacturing’s decline by cutting services as basic as water treatment and ambulances, and it ultimately makes their communities less attractive. They also raise taxes, he says.

For every one worker employed in US manufacturing, another four employees are hired in other sectors.

Communities lose people, too, when manufacturing jobs disappear, and that can cause housing values to drop, the social fabric of neighborhoods to erode, and local businesses to feel the pinch, or worse yet, to close up shop. So the jobs of many who are not employed in manufacturing, from those pouring steaming cups of joe at the local diner to those practicing law from a corner office, are influenced by how manufacturing rises and falls. For every one worker employed in US manufacturing, another four employees are hired in other sectors, according to the National Association of Manufacturers.

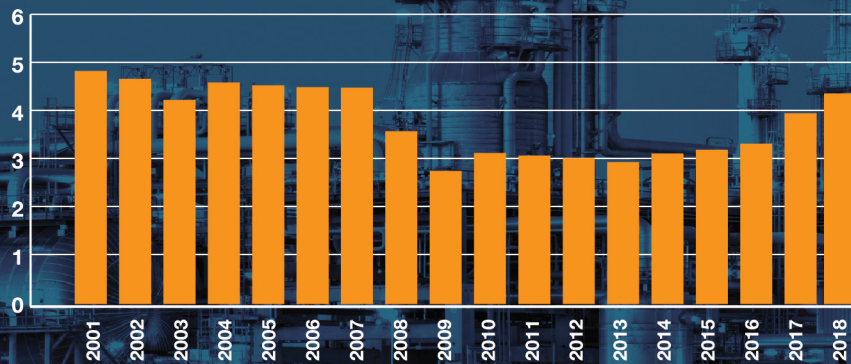
Elvery projects some continued decline in manufacturing jobs as automation and competition increase, and while Schweitzer calls that a fair assumption, he also emphasizes—multiple times—that net change in employment is the difference between two numbers: the number of jobs manufacturing is losing and the number of jobs manufacturing is gaining. So while the net numbers may tell a story of decline, it’s just as true that people are filling and entering manufacturing jobs. Manufacturers tell the Fed, too, that they’ll have more positions to fill going forward, given the size of their older workforces.

We can be competitive in manufacturing.

Looking also to the future with optimism is Bartik, the senior economist with the Upjohn Institute in Michigan. It's fairly unlikely that the 30 percent drop in jobs that manufacturing suffered from 2000 to 2010 will happen again, he says, and it's "quite possible" that reasonable macroeconomic and trade policies could at least stabilize the number of manufacturing jobs in the country. "We can be competitive in manufacturing," Bartik adds. "The share of manufacturing jobs may go down over time, but we can still have some job growth in that area, and it can still be important."

While manufacturing employment levels have been flat to down since 2000, the sector typically hires more than 3 million people per year, which includes hires for both new and existing positions.

Millions of hires



Data accessed September 2019
Source: Bureau of Labor Statistics



Long-lived advantages

Can the heartland, in particular, remain competitive in this work? Sources say yes, and resoundingly. One long-running advantage the region enjoys is the coal, iron ore, natural gas, and other resources within its slice of earth.

“The other piece is because there are already a lot of manufacturers in the area, it means you have supply chain,” Elvery says. “It’s difficult to build supply chain. And compared to other regions, there is a more skilled manufacturing workforce here. That’s another long-lived advantage.”

In order to compete globally, manufacturers will need to drive up productivity using technologies such as robotics and automation, data integration and analysis, and 3D printing, say those working inside the sector. Still, we’re a long way away from the scene where some person pushes a button and robots do the rest, Bartik predicts. In the near and medium terms, manufacturers will still need a considerable number of workers, especially those with advanced skills. The question on many minds today is where and how to successfully recruit them. The US unemployment rate is very low, so there’s no sizable surplus of people out of work right now. Manufacturers will have to either offer wages that attract workers from other sectors, Bartik says, or they’ll have to employ some of the many people who are unemployed.

Dan T. Moore is seated inside a conference room inside his Cleveland Industrial Innovation Center, formerly home to Clevite Corp., a manufacturer of automotive and aircraft bearings that

once employed thousands. He calls the property an “industrial playground.” His teammates and he have the space and the machinery to produce new products and start new companies, every year even.

If you ask any manufacturer, they’re having a terrible time finding workers.

Dan T. Moore Company now uses automation that allows it to compete pricewise with companies in countries such as China, and it’s growing its sales—Moore’s palms are in the air and he exhales, exasperated—“and there’s no one trained.” When it comes to machinists, in particular, he goes so far as to say, “We can’t be picky: ‘Here, fog this mirror, you’re hired.’” If you ask any manufacturer, they’re having a terrible time finding workers. Many more jobs than people looking for them. When you can’t find people, you can’t build a business.”

The history of manufacturing in the industrial heartland is one of prosperous heights and precipitous declines, and the present is one of decline and growth. The future hinges, say Moore and others, on manufacturing’s ability to recruit and retain the people with whom it can grow.

Given its continued concentration in manufacturing, the heartland’s future depends, too, on finding these workers, this next blue-collar generation.



PART II:

Help Wanted in the Heartland

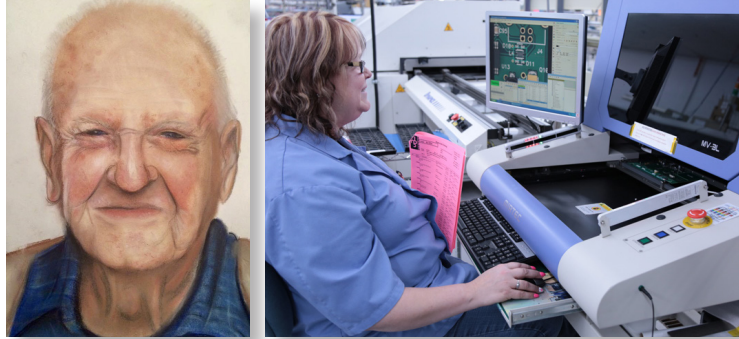
Charles Newman would return home from work, his clothing so black that his wife washed it separate from the other laundry. His was a career forged building tires in Akron, Ohio, mostly for Goodyear. Niki Ryan, his granddaughter, and her cousin used to spend the night at Grandpa's and Grandma's, and Ryan remembers Grandma waking them in the wee hours of the morning to go pick Grandpa up. He worked a lot of third shifts. A lot of Saturdays. A lot of overtime. It was the late 1960s, and business boomed in what was then the rubber capital of the world.

These are the memories Niki Ryan shares when she explains why she didn't want a career in manufacturing. "My grandpa was in a shop that was dirty and yucky," she begins. "He'd come home, and the first thing he had to do was take a shower. I didn't want to be dirty every day."

When Ryan arrives home these days from the manufacturing job she's worked for five years, she usually feeds the cat, makes dinner, and drives her daughter places. Her work is a cleaner manufacturing than her grandpa's: She's an assembly specialist for RBB, an electronics contract manufacturer that assembles printed circuit boards and industrial control panels, such as pneumatic and hydraulic controls, used by industries including medical device, automotive, and aerospace. She landed here after a layoff from the R and D industry, and "I really do like it," she says. "I've worked with technology for the last 30 years. It's what I know. And I like working

with people who are really into their jobs, people who use their brains, and there are quite a few of them here.”

A handful of Ryan’s colleagues are answering a slew of questions about their manufacturing careers on a spring day in rural Wooster, Ohio, about an hour-and-a-half drive south of Cleveland. Collectively, they have more than 100 years of manufacturing experience.



(Photos from left to right) Charles Newman. Artwork by Hannah Eicher. • Charles Newman’s granddaughter, Niki Ryan, works for electronics manufacturer RBB in Wooster, Ohio. Photo courtesy of Niki Ryan.

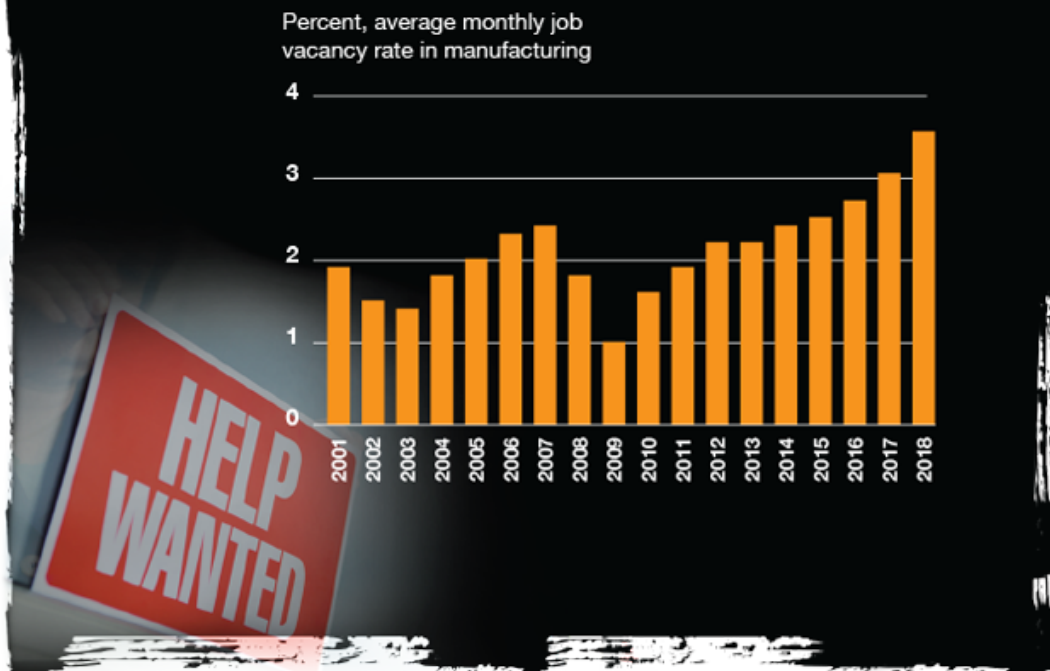
Do they have family and friends who also work in manufacturing? The response from the handful all more senior workers for RBB is a chorus of yeses. Have they heard that manufacturers can’t find the talent they need to fill positions? All say they know it firsthand and hear it from others. It’s hard to find qualified people, says Dave Thomas, an equipment engineer who’s spent three decades in manufacturing. People who come to work dependably. People with basic math, reading, and writing skills. People with a driver’s license. He hears the complaint from suppliers, customers, and his wife, who also works in manufacturing.

Micki Hendrick chimes in next. As RBB’s director of finance and administration, she’s the one in charge of hiring to fill the company’s positions, which range from entry-level to skilled. “We are having a horrible time finding people,” she says. People who understand they might not start at \$20 an hour. People interested in seizing opportunities to grow their skills and their pay. People who interview her as much as she interviews them. The company’s inability to find experienced candidates has RBB focused on hiring entry-level workers and teaching them the ropes.

Manufacturers are hungry for help. Nearly all 50 companies in the Mahoning Valley Manufacturers Coalition in Youngstown are in active hiring mode or would hire someone in one of the in-demand skilled positions, the hottest being machining, industrial maintenance, and welding, despite not having active job openings, says Jessica Borza, executive director of the coalition, a nonprofit consisting of roughly 50 manufacturers that work together to attract more people to manufacturing careers. “There is definitely not enough worker supply,” she says.

Or, some counter, perhaps there is not enough pay. (More on that to come.)

The share of manufacturing jobs that are unfilled has been steadily rising since 2014, a trend consistent with manufacturers' reports that it has become harder to find qualified workers in recent years.



Data accessed September 2019

Source: Federal Reserve Bank of Cleveland calculations from Bureau of Labor Statistics data

Note: Vacancy rate is the number of unfilled positions per 100 manufacturing jobs.

The sector's appetite for workers is echoed in a 2018 survey of Cincinnati manufacturers by the Federal Reserve Bank of Cleveland and the Urban Manufacturing Alliance and in a separate survey of southwestern Pennsylvania manufacturers. The latter, a September 2018 Manufacturing Employment Demand Study for Southwestern Pennsylvania, revealed that 111 responding manufacturers were seeking to fill as many as 2,300 open positions, up to 730 of which were entry-level jobs not requiring a degree. The companies reported as many as 750 unfilled technical production positions, jobs such as machine operator and welder that require postsecondary education and on-the-job training. Most respondents had fewer than five openings for management and leadership positions, jobs ranging from supervisor to executive and typically requiring a bachelor's degree, and engineering and professional jobs such as chemist, accountant, and engineer that require bachelor's or advanced degrees.

Across most job types, then, a lack of applicants was and is a challenge.

Anecdotally, companies say it's hardest to fill their technical production jobs, says Petra Mitchell, president and chief executive officer of Catalyst Connection, an economic development organization serving small and medium-sized manufacturers in southwestern Pennsylvania. (It conducted the Manufacturing Employment Demand Study.)

Failed drug screens, a lack of qualified applicants, and a lack of applicants in general were the top causes for unfilled entry-level positions, according to that study. For unfilled technical production positions, a lack of applicants and competition with other manufacturers were the top causes, and for unfilled management/leadership and engineering/professional jobs, competition with other manufacturers, the compensation package, and a lack of qualified applicants were the top reasons. Across most job types, then, a lack of applicants was and is a challenge.



Pipeline down to a trickle

What is it manufacturers seek? David Evans, president and chief executive officer of TESSEC LLC, a precision machining company serving industries such as defense and aerospace, concurs that the hardest people to find now are those for mid-level technical roles. For his business, he can find entry-level people to push buttons to operate machines that whittle blocks of metal into what his customers ordered. What is harder to find are the people who set that kind of process into motion, who can take a customer “print,” or order, determine what machine and which cutting is needed, and then load material and ensure the machine’s cuts are made correctly.

“The person who can prove out that first job for you take it from a print to a good product coming off the machine, that’s the person who’s harder to find right now,” Evans says. “Those are the people you need to keep new products coming into the company.”

Evans, also a member of the Cleveland Fed’s Cincinnati Branch board of directors, which regularly informs the Fed about the state of industry and the region the Cleveland Fed serves, seeks to hire people with mental and physical



James C. Evans. A January 17, 1963, Congressional Record item reads, “All of us owe a debt of gratitude to James C. Evans. He is a public servant of the highest caliber; the success of integration in the Armed Forces is a fitting tribute to a fine man.” Photo courtesy of David Evans.

dexterity. When he hears that someone tinkers with cars or builds motorcycles, he takes a special interest because, to Evans, it shows passion. That same passion fuels Evans: He remembers, maybe in the third grade, building, flying, and crashing model airplanes, then fixing them. He earned his pilot's license at 16 or 17 (he still flies a lot) and studied aeronautical engineering at MIT. One could say aviation's in his blood: His grandfather James C. Evans, who also studied at MIT, holds design patents in the business.

Past blows to the heartland's manufacturing ranks are one reason Evans suspects it's difficult to find these workers. In places like Dayton, Ohio, where his company, TESSEC, is based, tool and die shops used to dot the map, with plenty of business to go around supporting the needs of larger companies such as General Motors and Delphi. "As plants closed, you just lost that talent," he says. "You don't have that feeder to go grab someone. The talent pool is low. We're all competing and, to some degree, pulling people out of different industries."

The bottom rungs of the industry's career ladder rotted.

Joel Elvery, a policy economist with the Federal Reserve Bank of Cleveland who worked briefly as a machine operator before he attended college, shares another theory about how manufacturers ended up here. As technology has replaced certain manufacturing tasks that entry-level workers used to do, the bottom rungs of the industry's career ladder rotted, he asserts. A lot of the "move-up" jobs, jobs in which a worker started with basic machines and trained up, are gone. For example, it used to be in machining that entry-level workers would run lower-precision machines to do rough, or initial, cutting of a part. Following that, entry-level workers would move the part to a more precise machine, operated by a more skilled machinist, for final cutting. Today, the rough cut and precision work often occur in the same machine, eliminating the entry-level operator job and also some entry-level parts-moving jobs.



(Photos from left to right) Vannak So, who's worked for Cleveland manufacturer Soundwich for three decades, wears safety glasses, ear protection, and protection on her arms against heat and sharp edges. • Anthony Cook, an employee of Soundwich in Cleveland, works with a 100-ton die cutter, a machine that presses down on material to create parts.

Now the operator of a machine that does multiple jobs at the same time needs to understand all of those operations, making it harder for someone without experience to do the job.

Manufacturers started to feel the squeeze of not having grown the skilled workforce they needed after US manufacturing lost 30 percent of its employment in the 2000s, but they didn't feel it right away, Elvery says. At first, a large pool of laid-off workers was available for hire. When that pool dried up, the pipeline problem became apparent. (That unprecedented decline in jobs is detailed in Part I of "Manufacturing under Pressure," as are the oft-debated reasons for it. Many point fingers at trade and globalization or automation.) Now, companies face a smaller pool of candidates with the skills needed at a time when many manufacturers need to replace workers who are retiring.

Many US students today aren't exposed to wood shop, metal shop, and the like.

The way Elvery sees it, that lack of qualified applicants is a problem manufacturers can solve. He has stressed in speeches around the region, "If this is the situation you are facing, if you want more programmers, more machinists, the answer is you train people. Nobody else can train the workers you need as well as you can."

It used to be, and still is the case for companies that "do it right," Elvery says, that a manufacturer hires people, trains them, and keeps the various rungs of its career ladder full. But when steel companies and other manufacturers collapsed in the 1970s and 1980s, many of their apprenticeship programs, which used to reliably train workers, ceased. Another reason manufacturers' training isn't what it used to be, others say, is the diminished number and power of unions, which tend to push for investing in workers.

Earlier education that builds skills manufacturers could use is lacking, too; many US students today aren't exposed to wood shop, metal shop, and the like, says Jason Drake, director of education and workforce development for Dan T. Moore Company, which owns 10 manufacturing companies. It's why the company is partnering to teach programs and stoke interest in manufacturing in neighborhoods such as Cleveland's Collinwood, which used to be home to people who worked for the city's manufacturers but today is home to many residents unaware they even live near manufacturers. One summer, Dan T. Moore Company partnered with local educators to run an "earn-a-bike" camp in which children were given bikes and taught to repair and replace every system on those bikes. The kids faced a steep learning curve, Drake says, but they learned to use tools and to take apart something mechanical and put it back together.

Too few people today learn to build and fix things with their hands, says Dan T. Moore, chief executive officer and chair of his namesake company. Moore remembers in the fifth grade taking a board, driving a nail through it, and using additional parts, all to make an electric motor. Everyone in class did it.

One reason for the lack of exploration of and interest in manufacturing, Drake asserts, is the widespread urging that children attain a higher education. “There was a period of time when statistics were pushed that a kid with only a high school diploma and no vocational training is going to make \$1 million less than a person with a college degree,” Drake says. “This is how we got into this standardized testing, this is how we got into the notion that every kid needs to go to college. That push for college has cut off pathways to the trades for students.”

Back in Wooster, every one of the five RBB employees nods in agreement when one of their colleagues makes this point: More exposure is needed for students early in high school to the idea that manufacturing is a viable career.

Why didn't someone tell us about these career paths sooner?

“There's so much more we need to do to introduce students to a wide variety of opportunities,” says Mitchell of Catalyst Connection. “We talked with a group of community college students [pursuing welding careers], and they were almost resentful. ‘Why didn't someone tell us about these career paths sooner?’ they asked.”

Parents, teachers, guidance counselors, and job seekers want to know what the jobs of today and tomorrow are. They are and can be in manufacturing, and opportunities such as site visits to and job shadows with local manufacturers and “manufacturing days” inside schools and companies help inform students about these types of careers, Mitchell says.

But an array of challenges, among them plant closures and layoffs and negative perceptions about manufacturing and its jobs, don't help Mitchell—or anyone else—make the pitch.



Headwinds to hiring

David Megenhardt remembers the arms on his dad, Junior Megenhardt, made large by Junior's manual labor wrapping wire around poles to make firehoses for BFGoodrich in Akron, Ohio. Most of the 40 years Junior worked for BFGoodrich he spent making these wire skeletons over which rubber was poured to produce thick firehoses that wouldn't burst. Without the wire, water pressure would make quick work of the rubber alone. Junior took pride in his "rough and tumble" career, but when the bottom fell out of Akron's rubber industry in the early 1980s, BFGoodrich laid Junior off. It was a definite blow.

Such unceremonious ends to many a loyal worker's career and our collective memory of those careers cut short can make recruiting people to manufacturing a hard sell.

"For my dad's generation, there was no question that manufacturing was a job that was going to last forever and that it paid well and you could raise a family on it," says David Megenhardt, executive director of Cleveland-based United Labor Agency and a member of the Cleveland Fed's main office board of directors (the Bank has three boards of directors and advisory councils, too). "It's different now because manufacturers did move, and they did close. There are still remnants, still hulking ruins of factories around, impressive places that are left abandoned. So it's often, 'Well, those jobs are gone.' The hard part for manufacturers and educators is, can you convince parents to get kids into manufacturing? What's happened in the past depresses that impulse."

We don't want Lordstown to be the only story.

Moms and dads, grandparents and great-grandparents in the Mahoning Valley still speak of Black Monday, the day (September 19, 1977) when Youngstown Sheet & Tube, the area's largest steel manufacturer, shuttered its doors, costing thousands of people their jobs, says Borza of the Mahoning Valley Manufacturers Coalition. And in 2019 came another crushing blow to the region when GM "unallocated" the local Lordstown plant, displacing some 1,600 workers.



(Photos from left to right) A young Junior Megenhardt in work clothes. • Junior Megenhardt and his sons at Niagara Falls. • Junior Megenhardt, pictured in the BFGoodrich employee newsletter, which listed his title as "hand hose builder." Photos courtesy of David Megenhardt.

GM had already cut two other shifts in recent years. "That's a big headline, and it has a big impact on our community," Borza says. "What is also true and what we feel is really important is there is so much good news in Youngstown. We don't want Lordstown to be the only story." (In January 2020 came the news that GM and LG Chem have selected a vacant Lordstown property as the site for GM's new battery-cell plant, which is expected to create 1,100 new jobs.)

"There's a sense of optimism in Youngstown that I can feel," Borza adds. "I've been working in Youngstown for close to 15 years, and there's a stronger sense of collaboration than when I was first introduced to leaders in Youngstown and the surrounding Mahoning Valley, a recognition that we all really need to work together to capitalize on the assets that we have and to continue to grow our community."

Even against the backdrop of closures, manufacturing is still the biggest economic driver in the Mahoning Valley in terms of sales and gross domestic product compared to other sectors such

as government and retail, and it offers some “really strong” career opportunities today, Borza says. “We have many small and medium-sized manufacturers that have done quite well,” she says. “They continue to grow and thrive.”

Borza stresses the importance of diversification.

“They [companies] have learned to diversify themselves, their customer base, so they can withstand economic changes,” she says. “It’s important for companies to diversify. The more highly diversified companies are, the better, more stable they will be. One of the reasons people do not choose manufacturing for themselves or for young people—their students, their kids—is because they perceive it to be unstable.”



The Warner Swasey building has the lore of a Cleveland landmark because so many people worked there. In 1991, the City of Cleveland took possession of the nearly 260,000-square-foot facility. Over the past decades, there have been numerous attempts to put together financing to rehabilitate the building at 5701 Carnegie Avenue in Cleveland.

Increasingly, manufacturing leaders are learning to plan for and minimize shocks to their workforces and companies, Borza says, leading to greater stability. After the Lordstown news broke, Borza rang a company in the GM supply chain, concerned that it would need to lay off apprentices. Instead, she learned the company anticipated not a single layoff because unlike the last time GM cut business locally, the company produces parts today for almost every automaker.

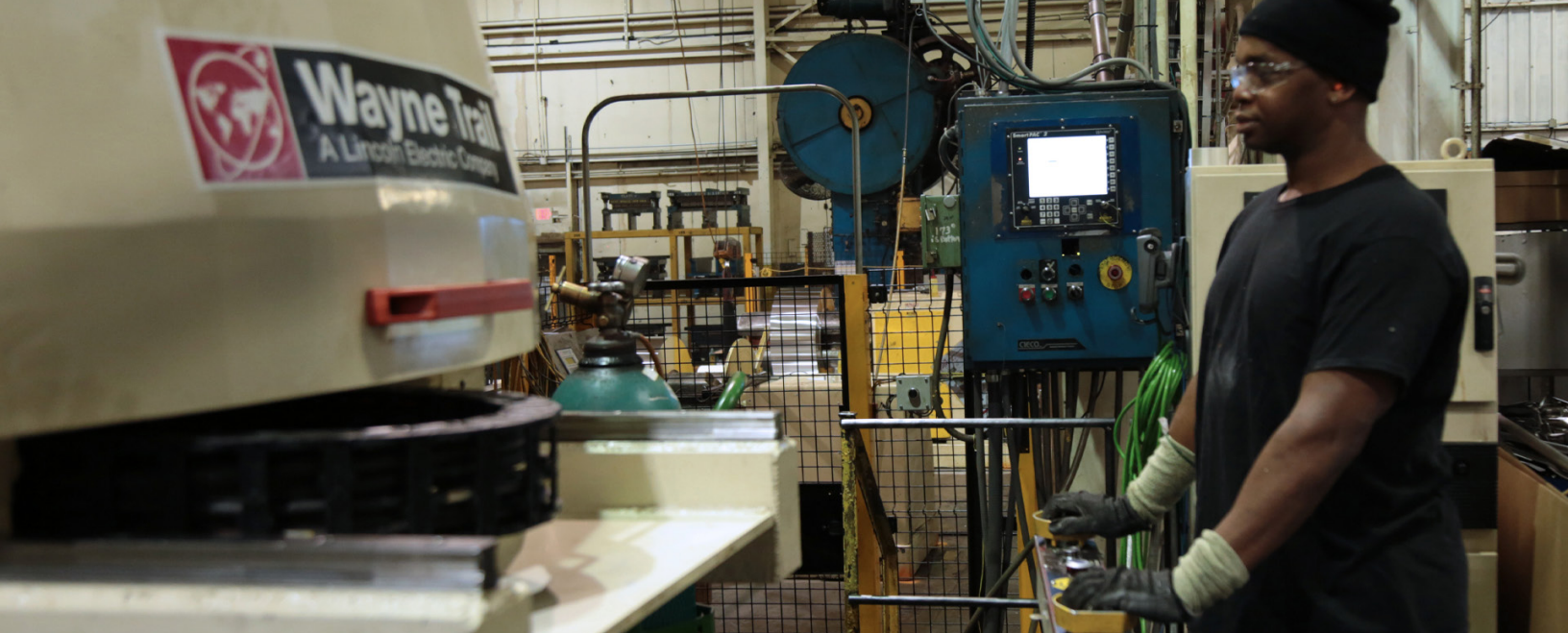
Attracting more people to manufacturing also requires addressing the stigma that many people, particularly parents, assign to it: that it’s loud, oily, and dangerous—and undesirable because of all three.

Manufacturing has this stigma in America of being old and low-tech.

Some manufacturing is loud, oily, and potentially dangerous. On a spring day inside Soundwich, one of the manufacturing companies in Cleveland owned by Dan T. Moore Company, Alex Papadopulos stands near Press 14, a 25-foot-tall piece of equipment that whooshes like a county fair ride each time 600 tons of force stamps the raw material it's shaping into metal vehicle parts. A general manager, Papadopulos has his ear plugs off and a wide smile on as he explains the workings of the gargantuan machine whose innards drip lubricant as they open and close. For people's safety, if someone or something crosses lights that reach across Press 14, an emergency stop occurs in a fraction of a second. Papadopulos, 32, says the career he leads today wasn't an option presented as viable during primary and secondary school or college. He holds an engineering degree, and his professors highlighted using that education in research and design, not on a shop floor.

"Manufacturing has this stigma in America of being old and low-tech," he says. "But the manufacturers that are thriving, they have to be creative and intelligent in finding ways to be efficient and more productive." Dan T. Moore Company's workers are encouraged to regularly spearhead new products to meet unmet needs, for example.

Those turned off by loud, oily, and potentially dangerous needn't write off a career in manufacturing, however. For example, inside RBB in Wooster, the floors look spotless, white steam rises softly from one piece of equipment, and the air carries only a light whir. Behind a bright yellow sign—Attention: Static control area—workers and visitors alike wear grounding straps on their shoes inside a 22,000-square-foot production area. If they impart static electricity to the parts inside, frying them, the printed circuit boards might not work—a serious risk given that most of what RBB builds is headed for critical items such as medical devices.



The pay and opportunities available

A young man once told Borza of the Mahoning Valley Manufacturers Coalition, “I know a lot of people who need jobs, but I’m not going to refer them to manufacturing jobs if they’re dead-end positions.” Words like his, she says, help the coalition understand the information and programming needed to make manufacturing jobs accessible and appealing to more people.

What’s needed is higher wages, some argue. If manufacturers are having such a hard time attracting workers, shouldn’t they pay more to compete?

“Even though manufacturers tout that theirs is a different environment now it’s not as dirty, it’s not as hazardous as factories of the old there are still places where the manufacturing process is difficult,” United Labor Agency’s Megenhardt says. “It’s hot, it’s cold, it’s dirty, and the pay [to work there] is commensurate with other jobs that aren’t those things. If you’re paying \$12 an hour, you’re competing with everything from Amazon to a casino to a restaurant.”

Manufacturers responding to a late 2019 survey of employers by the United Labor Agency contended, however, that they can’t pass higher wage costs on to their customers. Only about 8 percent of respondents said they thought raising wages would solve their hiring problem, Megenhardt says.

“There’s some reticence,” he says. “They say, ‘We’re paying fairly for the skills that we’re asking for,’ and we’re like, ‘Well, times have changed. Maybe that pay was fair during the recession.’”

For its part, Wooster-based RBB can’t compete with the higher starting pay offered by larger corporations, in part because of increasing healthcare costs, says Micki Hendrick, who does the company’s hiring. So RBB tries to use benefits as much as pay to incentivize people to join its ranks. “I’m sure we are missing out on people because they opt for higher-paid jobs,” Hendrick says.

Sixty-eight percent of US residents age 25 years and older do not have a four-year college degree.

Like entry-level work in retail and food service, entry-level manufacturing jobs pay lower wages. “Wages are definitely an issue” that hampers recruitment efforts, Catalyst Connection’s Mitchell says. “They’re not as low as minimum wage, but it’s hard. Manufacturers can’t pay someone without skills 25 dollars an hour. But progression can be much more rapid in manufacturing, I think, than it is working in fast food.”

Manufacturers also note that plenty of the jobs they seek to fill are not low-wage and afford workers room for growth. Dan T. Moore Company employs some 600 people. Some workers make \$80,000 even six figures a year running machines, Moore says. Across the industry, welders possessing the right certification can start at \$50,000 annually. Post-secondary education and on-the-job training can be one’s ticket to such careers.

Sixty-eight percent of US residents age 25 years and older do not have a four-year college degree, according to a 2019 report on “opportunity occupations” by community development researchers at the Cleveland and Philadelphia Federal Reserve Banks. Opportunity occupations are jobs accessible to workers without a bachelor’s degree that typically pay above the national annual median wage (\$37,690). In some metropolitan statistical areas (MSAs) in the industrial heartland, among them Toledo, Ohio, and Lexington, Kentucky, manufacturing occupations such as assembling and fabricating top the list of such occupations. (The Fed explores in a documentary short, filmed in Toledo, how one mother’s life changed when she began working a job that fits the criteria. Top opportunity occupations for Toledo and 120 other MSAs are online.)

Given the ever-rising cost of college and the reality that not everyone who’s talented excels at school, manufacturing leaders proudly promote that their industry offers people without a four-year degree the opportunity of a middle-class lifestyle. “It’s getting harder to find jobs that

give you a career path and good pay for a long time without a college degree,” concurs Cleveland Fed policy economist Elvery.

Many in manufacturing note how companies often give employees the opportunity, while working, to train and advance through apprenticeships and to earn credits toward associate and bachelor’s degrees.

Niki Ryan, the assembly specialist at RBB whose grandfather’s dirty career dissuaded her from pursuing manufacturing work, doesn’t have a college degree. She quit high school, got her GED, and in her late 20s opted to go to technical school to learn electronics. Her mom had worked for an electronics company, which also hired Ryan, and that experience stoked an interest. At the end of 18 months at technical school, Ryan graduated with a diploma. RBB has taught her to do the work she does now. “I’m learning everything there is to learn,” she says. “You can grow in this industry. You can start at the bottom and work your way up.”

The health of a community is only as strong as its weakest neighborhood.

Not enough people know manufacturing affords these opportunities—to work without a four-year degree, advance along a career path, earn a livable wage, and pursue higher education while making money—say many working in and advocating for the sector.

There are repercussions to manufacturers’ not finding the people they’re seeking. There’s the drag on the companies themselves: The skilled worker shortage is creating challenges such as needing to pay overtime and limited growth and profitability. But the impact reaches well beyond plants. The sector’s ability to find and retain the workforce it needs has implications for whole communities. Countless sectors thrive when manufacturers do a brisk business and buy other sectors’ services.

“Manufacturing can power an economy,” Megenhardt says. “It brings money into a community when manufacturers produce products that are exported to the rest of the world. If you understand that the health of a community is only as strong as its weakest neighborhood, then we need to think about what jobs people will do and how they can support themselves.”

The manufacturing of the past (with its big union shops, for example) is gone, and RBB’s Hendrick doesn’t think it’s coming back, she says during the interview with her colleagues in Wooster. Still, she talks strength when she talks future.

“Strong manufacturing is based [on] the companies that are willing to commit to the workforce but have the workforce commit to them as well,” she says. “Manufacturing needs to work as a team for common goals. It’s up to us to create the new manufacturing going forward: the companies with new attitudes and the workers with new attitudes.”

Knowing well the opportunities manufacturing offers to people with and without four-year degrees and the sector’s acute need for workers at all levels, people are working to change minds (and attitudes), improve the industry, and find, train, and retain the next generation that can propel manufacturing forward.



PART III:

Adapting and Gearing Up in the Heartland

In 1979, the Pirates won the World Series, and the Steelers won the Super Bowl. But after that, the lights went out in Pittsburgh.

US manufacturing during the decade that followed lost more than a million jobs, or about 7 percent of the sector's workforce, and for a long time, many communities in the industrial heartland responded by doubling down on manufacturing, working to persuade existing manufacturers to stay and new companies to move in. Particularly hard hit, Pittsburgh didn't really have that option. Unlike other communities whose manufacturing industries were more diversified, Pittsburgh's was so concentrated in steel that when much of the steel business moved south or to other countries (more on that in Part I of this series), Pittsburgh's manufacturing sector was left with less to rebuild from.

Today, the city's football team retains the Steelers name, reminiscent of Pittsburgh's past, but its economy is now much more diversified. The city is known for its higher education institutions (Carnegie Mellon, for example, is a leader in artificial intelligence), world-renowned health care providers (e.g., UPMC), and tech (like the city's local Google hub).

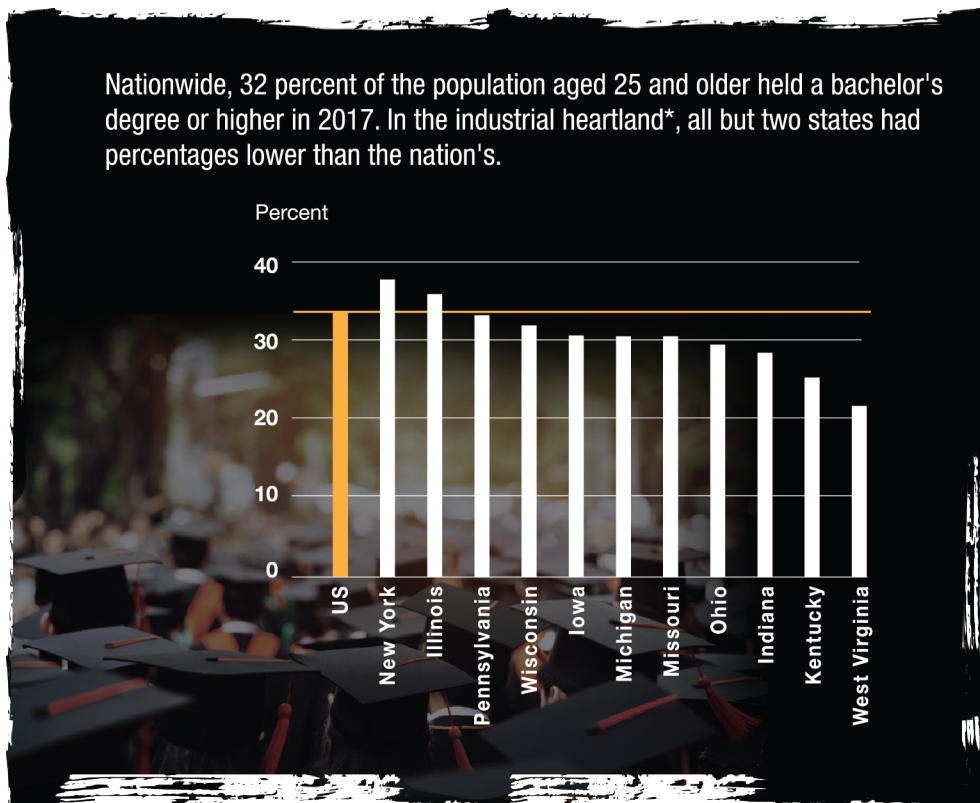
Majestic Lane, deputy chief of staff and chief equity officer for Mayor William Peduto, attributes Pittsburgh's ability to diversify and recover to the collaboration and action of local leaders who

chose to support sectors that would “stop the bleeding”: education, healthcare, technology, and finance. And the hemorrhage appears to have stopped—or at least slowed dramatically. Though the region’s per capita income fell below the nation’s average during the 1980s, when steel collapsed, it rebounded by the beginning of the 1990s and was about 4 percent higher than the national average by 2016, a Cleveland Fed Rust and Renewal report found. Plus, Pittsburgh’s metropolitan statistical area has enjoyed growth in its number of young, educated workers.

So, it seems, from the ashes of its former steel dominance, an increasingly global, prosperous, and resilient Pittsburgh is rising.

There are many upsides to Pittsburgh’s industry diversification. Today, businesses, restaurants, and stores are opening; neighborhoods are repopulating; and philanthropy is helping to create a social safety net.

Despite the city’s growing prosperity, significant challenges persist: The city’s new economy is not equitably distributing opportunity. “The manufacturing economy was something that truly could lift all boats during its heyday,” Lane says. It offered family-sustaining incomes. Black neighborhoods, among them the city’s Hill District and Homewood, flourished as manufacturing grew. Today, some populations, including black people, working- and lower-middle-class white



Data accessed April 2019

Sources: US Census; IPUMS USA, University of Minnesota, www.ipums.org

*The states with MSAs in the industrial heartland are Illinois, Indiana, Iowa, Kentucky, Michigan, Missouri, New York, Ohio, Pennsylvania, West Virginia, and Wisconsin.

people, and immigrants and refugees, don't have the education or the access to opportunity (both jobs and the "high-opportunity neighborhoods" where residents have access to transit and other amenities) needed to participate fully in Pittsburgh's growing education, healthcare, and tech sectors. That's led to rising racial disparities in income and quality of life.

A study in 2018 affirms that the decline in US manufacturing jobs disproportionately affects less-educated workers and black people, and it finds that the decline has widened racial gaps in health, marriage, and family formation in addition to income and employment.

Unrelated to race, one thing communities across the industrial heartland have in common is lower education levels. It's an inheritance of their manufacturing-intensive past, says Joel Elvery, a policy economist with the Cleveland Fed.

Pittsburgh must figure out how to make it so the new economy lifts all boats.

"During the period when manufacturing was so strong, the incentive to get education after high school was limited," Elvery says. "In 1968, it was easier than it is today to find jobs that paid well and gave you a middle-class lifestyle straight out of high school. That set up these communities for having difficulty recovering once they lost manufacturing. The industries that have really been growing tend to require a more educated workforce, and it's not easy to flip that switch."

Pittsburgh must figure out how to make it so the new economy lifts all boats. A community's ability to bounce back from economic shocks and structural change is tied to its people as much as to its location, Lane says. "For folks who may have been left in multiple generations of disinvestment, one still has to see those citizens as assets," he says. "If not, everyone pays. The people there will be the future of the region."

Invest in training, Lane urges. Invest in pre-kindergarten. Invest in anti-poverty solutions. Invest in financial education. "Workforce development and education and health and wellness: You have to do them through policy, you have to do them through budgets, you have to do them through partnerships," Lane says.



Different places, different approaches

Change to the manufacturing sector has been wide-reaching and painful at times, and change will continue. But the future is bright for US manufacturing and the people and places invested in it. Technological advances have driven productivity up to unprecedented levels—though researcher Susan Houseman’s work found that a large part of that productivity growth happened in just one sector, computer and electronic products manufacturing. Omit that sector, and the rise in manufacturing’s productivity trends much slower. Retirements are opening up jobs. And come what continued technological change may, people say the sector will continue to need people to do its work.

“The US is a huge market for manufactured goods,” and the companies producing goods often want facilities close to market, says Tim Bartik, senior economist with the W.E. Upjohn Institute for Employment Research in Kalamazoo, Michigan. Those places that possess the supply chain necessary for manufacturing have a weighty advantage. Building the capacity to do the work doesn’t depend on just one firm choosing to locate or expand in a community, Bartik says. It has to do with a whole complex of firms and whether or not they’re competitive.

“It is not the case that you are doomed if you have a history in manufacturing,” he says. “You can’t give a roadmap and say, ‘Do x, y, and z, and be successful.’ I don’t think every community should do exactly the same thing. You have to deal with your historic realities and what your

assets are. You have to deal with the reality of a changing economy. What I want to push is [that] local communities are not powerless here. They don't set the exchange rate or trade policy, but they can do things."

Whereas Pittsburgh diversified away from manufacturing and reaped success in doing so, other communities, such as Grand Rapids, Michigan, diversified and invested heavily to grow manufacturing. Today, the portion of Grand Rapids' jobs that are manufacturing jobs is about twice the national average.

For one, people in Grand Rapids paid to establish a branch office of the state's Manufacturing Extension Partnership. Investing in business incubators and job training programs like those through community colleges and the Manufacturing Extension Partnership can be attractive to small and medium-sized manufacturers, which are numerous and may not have dedicated training staff, Bartik says. He also points to the way Grand Rapids leaders engaged in so-called cluster meetings with employers.

We want to continue to invest in the workers of this community.

"If you want to help local manufacturers, you better be talking with them," Bartik says. "What common problems do they face? Maybe they have some regulatory issue, maybe the way a training program is organized doesn't suit their needs. Maybe you can collectively come up with a solution to that problem."

That's what the manufacturers of the Mahoning Valley Manufacturers Coalition did in coming together, even with competitors, to assess how well the training programs available in the eastern Ohio region aligned with the skills people need to start and build manufacturing careers.

The coalition members uncovered gaps and misalignments among programs, says Jessica Borza, executive director of the coalition, a Youngstown nonprofit working to attract more people to manufacturing careers. A person trained in manufacturing in Trumbull County should bring to a plant what a person trained in Mahoning County does, and so on, she explains. When manufacturers identified the types of skills they needed, education and training partners across the valley responded, comparing curricula and creating a common one, Borza says. That was an early win, both for trainees and the employers hungry to hire them.

"We want to continue to invest in the workers of this community," Borza says. "We want manufacturers to have the most highly skilled employees so manufacturers can produce at a level that will keep customers and continue to grow manufacturing in the valley."

The Mahoning Valley Manufacturers Coalition has consulted on, to date, three apprenticeship programs established over three years for machining, industrial maintenance, and welder fitter, the last added in fall 2018. (The coalition convened its members to discuss a fourth one for automation and robotics in late 2019.) Four career and technical centers spread across the region provide the training, and all work with colleges to ensure, through credentials and agreements that match coursework between schools, that it's an option for students to keep working toward an associate or bachelor's degree, should they desire it. It's one way community leaders are working together to build bridges to careers in manufacturing.

Still, a challenge persisted: Improving the available training didn't expand the pool of workers. So the coalition has engaged community-based organizations such as Goodwill and the Mahoning Youngstown Community Action Partnership to reach populations it didn't see applying for manufacturing jobs or who were applying but didn't possess the skills needed.

Borza's dedication to this work is personal.

Program directors are learning about barriers to employment, too. The local WorkAdvance program, for example, helps people prepare for and enter jobs in selected sectors, including manufacturing. The lack of pay for people while they trained dampened interest, but local companies saw value in the program and started paying trainees. The program also now explicitly promotes the specific companies and jobs involved.

"'Lots of manufacturers want to hire you' was too nebulous," Borza says. "If you're somebody who's thinking about making a shift in your job and have a family to feed, you're not going to take that risk without understanding more specifically what we're talking about. We're starting to understand the information and the types of programming individuals need to make manufacturing jobs more accessible to them, and manufacturers are understanding they need to invest in some of these."

Borza's dedication to this work is personal. Her dad, Jeff Martin, worked for most of his adult life for the steel industry right across the Ohio state line in Midland, Pennsylvania. When he passed away in 2014, he left to Borza one item in particular, a lunch pail—oval, sturdy, made of steel. The pail initially belonged to her grandfather, who also made a living in steel. Inside that three-compartment pail, Martin carried his lunch to work every day. Borza remembers how her father would bring it home.

"He took pride in the fact that that manufacturing job paid for my prom dress, paid for my wedding dress," she says. "He knew the work I was doing, and he was so proud that I was

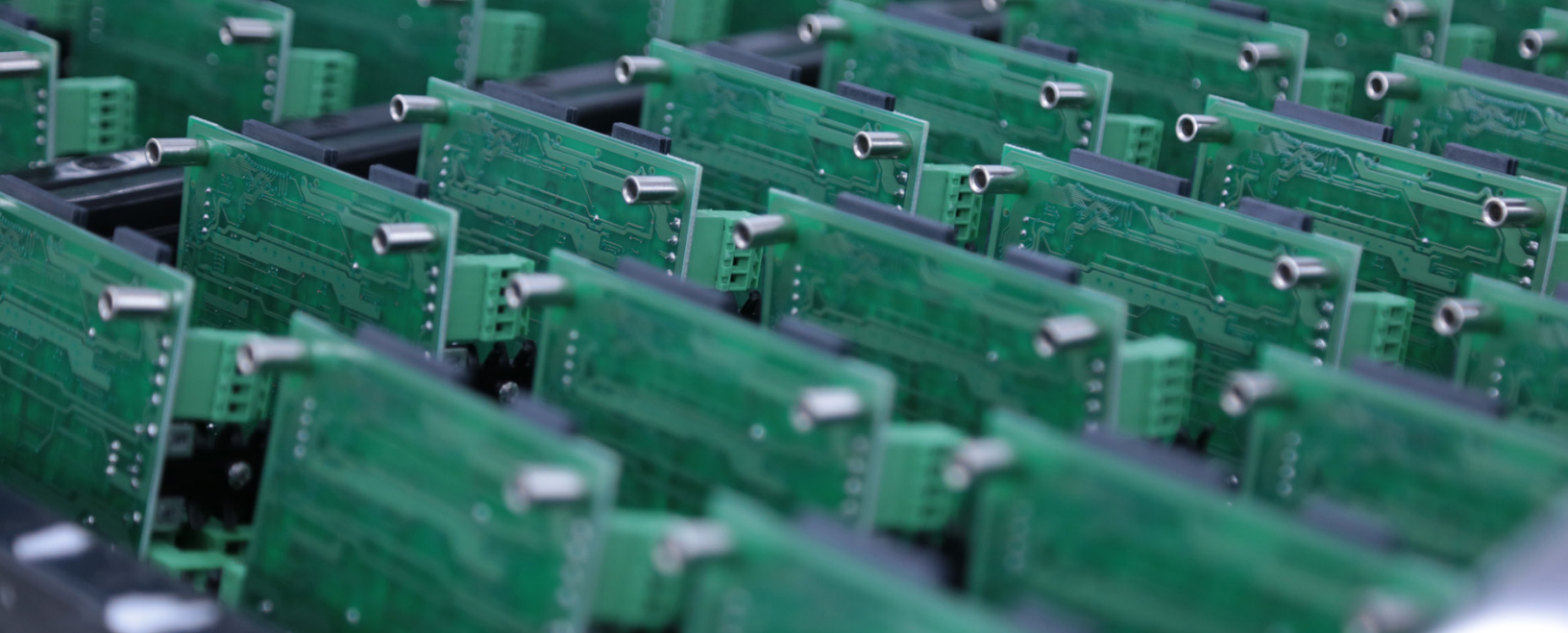
continuing to introduce young people to these careers. He thought it was important for people to understand that manufacturing was an opportunity to consider.”

Not long ago, she lent the lunch pail to her sister, who was going through a difficult time, to motivate her, to remind her that Dad would be proud of her and that the sisters have it in their genes to stick it out, to be resilient.

“She better give it back,” Borza laughs.



(Photos from left to right) Jessica Borza and her father, Jeff Martin, on her wedding day. Photo courtesy of Jessica Borza • A father–daughter picture. Photo courtesy of Jessica Borza. • A snapshot from family day at Allegheny Ludlum, where Jeff Martin was proud to have relatives, including Jessica Borza’s nephew, Tyler (in the hardhat), tour the facility for which Martin worked. Photo courtesy of Jessica Borza.



Companies take action

The future of manufacturing hinges not only on what communities like Pittsburgh and Grand Rapids and Youngstown do, but also on what companies and people do.

Bruce Hendrick has spent his career in manufacturing, working first for a global corporation and next for a fifth-generation, family-run business. Today he is owner and chief executive officer of RBB, a Wooster, Ohio, manufacturer where he's worked for two decades.

Manufacturing, he says, has a long shadow of toxicity regarding the way leaders and workers interact. "Management thinks employees don't care and aren't responsible for our business results, and employees walk around thinking, 'These guys don't care about their people. I'm replaceable,'" Hendrick says. But "it's a lot better than it used to be."

To Hendrick, if it's hard to find people to fill manufacturing jobs (and Part II of this series describes that it is for many manufacturers today), companies must do their utmost to keep the people they have. Employees grappling with stressors such as the need to care for children and elders, unreliable transportation, and addiction often leave or lose jobs, and the cost of such turnover is always understated, he says. "The cost of lost knowledge that wasn't transferred before people left, plus the lost momentum, there are all kinds of uncaptured costs that a company bears." Workplace culture is critical to retention, he stresses.

One successful program later, Hendrick is confident RBB, which assembles printed circuit boards and industrial control panels, has developed practical approaches for supporting employees, should they need support, and he's also seeing those approaches rolled out elsewhere.

If it's hard to find people to fill manufacturing jobs, companies must do their utmost to keep the people they have.

Beginning in September 2018, RBB piloted a Workplace Connections program in which an outside nonprofit resource coordinator has confidential discussions with employees about any nonwork-related challenges and needs they have and makes phone calls on the spot to providers of support. RBB employees have used the program for assistance relating to rent, vehicles, financial planning, and childcare. "People get through problems that they don't need to," Hendrick says. "If you've got employees going through a crisis, it may affect their focus, their attendance, their work's quality because they're not paying attention to the details.



RBB owner and chief executive officer Bruce Hendrick owns another company called Building Trust, designed to help businesses do just that.

"A lot of these nonprofit agencies are more than happy to help, but the people who are employed don't realize they qualify for the help, and by the time they get home, these agencies have packed up for the day," Hendrick adds. "So I'm bringing the help into the building."

He's not the only one: Another Wooster-area manufacturer began making providers of support available to its employees, too, in mid-2019. And Hendrick has heard others in town are asking to pilot Workplace Connections for their people, too. Investing in people's professional and personal needs is not only financially smart, Hendrick says, "it's humanly smart. It will come back to us in spades." He's talking intangible returns such as worker loyalty.

It is vital for manufacturers today and into the future to build workplace cultures where people can count on each other and where people are trained and empowered to do more than one thing, Hendrick says.

In the "glory days," manufacturing workers may have had one very specific job to do, says Borza of the Mahoning Valley Manufacturers Coalition. Now, because companies are leaner, there's not as much room for that, she says. At a time when attracting talent is top of mind for

manufacturers, cross-training employees as much as possible is one way manufacturers can afford their workers desired stability, plus more varied, interesting work and higher pay.

Borza sees such cross-training of employees happening at a steady clip across the nearly 50 companies that are members of the Mahoning Valley Manufacturers Coalition. “I’ve heard companies say they no longer simply lay off their employees when things soften up, that if employees also have maintenance skills, they’ll have them do preventative maintenance on their machines, they’ll have them paint,” she says. So even if and when business slows, a manufacturer’s workers can stay employed if they have a variety of skills.

Bruce Hendrick and other RBB leaders run their company in much the same way. They call it “swarming.” Since RBB specializes in small-batch orders, when a new order for, say, 500 circuit boards comes in, employees “swarm” to whatever station is necessary and do what they can to get it made quickly. “If you’ve got a dozen things you can do and you can do them all well, we can’t possibly get along without you,” Hendrick says. “There’s real job security in that. Those manufacturers that can succeed today, with threats from every angle, are the ones that are nimble, and the ones that are nimble make use of the talent of everybody in the building.”

Cross-training employees as much as possible is one way manufacturers can afford their workers desired stability.

Transparency is another must for manufacturers going forward, say Hendrick and others. Inside RBB, a dashboard, posted daily for all to see, shows how much product shipped the day before, how much money RBB made, and whether it will make money in the given month. If the company achieves a certain profit threshold, profits above it are split between employees and the company. It’s one approach for addressing the trust Hendrick says can be severely lacking in manufacturing. “That level of transparency tells everyone in the business, ‘I’m an adult. I’m a businessperson. Everybody is counting on me to get this car on the road, and there’s something in it for me if we can get these numbers where they belong.’”



“You can’t manage... with 1950s attitudes”

Manufacturers need to understand the people they’re employing, says David Megenhardt, executive director of Cleveland-based United Labor Agency, which helps people who’ve been laid off or who find themselves underemployed to find work. (Megenhardt is also a member of the Cleveland Fed’s board of directors.) For those employing many lower-wage, entry-level workers, location is important.

“Where jobs are and where populations are have to be considerations,” he says, citing reports about how much access to jobs public transit riders actually have in Allegheny County and Northeast Ohio. “If I place a facility in a relatively affluent suburb, where are my workers going to come from? If the people who would work there are 20 miles and three bus rides away, then it’s the wrong place to put the facility.

“Understand how much on the edge people can be, and maybe be more flexible,” Megenhardt urges. “Employers can be real hard and say, ‘These are the rules, if you’re late three times, I’m going to fire you.’ Or they can understand and have a dialogue with the employee: ‘If you’re going to be late, you need to tell me.’”

There’s one story Betty J. Holnapy tells to students and managers often. Formerly a career coach with Towards Employment, a Cleveland-based workforce training provider, and now a

workforce development specialist with OhioMeansJobs in Lorain County, Holnapy, years ago, was an 18-year-old single mother inspecting an onslaught of rubber parts with other women inside a rubber products factory on Cleveland's East Side. They'd measure the circumference of the parts' holes, and those that didn't measure up were thrown into the "bad box." None of them knew what the little mushroom-shaped parts were.

"Jim," she recounts saying to their boss, "Can I ask you a question?" His reply wore the gruffness customary inside factories then: "If I answer you a question, will you get back to work?" "What are these things?" she wanted to know.

She returned to the picnic table with a "Guess what we're making?" Once home, she led her dad to their washing machine and pointed out the stoppers that kept the lid from slamming. She felt pride. After that, the rate at which the women were inspecting climbed by so much that the boss told Holnapy to keep on asking questions.

Why do you think we produced more? Holnapy asks today of her students. "Because we knew what we were making," she answers. "It made us feel important. It motivated us."

Improving workplace culture and attracting and retaining workers could begin with a tweak to the way some managers approach employees, asserts Holnapy, who estimates she coached 200 manufacturing workers from 2014 to 2016. She remembers how one supervisor's eyes widened incredulously when he recounted to Holnapy how his employee had complained that he talked to that employee in sharp tones, and Holnapy replied, "Well, what are you going to do about that?"

"You're the sender of a message and a leader," she told the supervisor. "It's your job to adjust the message that you're sending so you can get what you need from your line staff. You can't manage millennials with 1950s attitudes. You can't yell at people."

Millennials, she explains, don't need people for information; theirs is the first generation for which, if they have questions, they can consult the little computers in their pockets. She's created a whole training module on managing millennials. Relationships are important to them. They watch how people say things. They want information up front. Company leaders, she says, would do well to take younger workers under their wing.

"A lot of folks don't want to put that work into it," Holnapy says. "They want people to do what they're asked to do without asking any questions. You don't have that luxury anymore. If you want people who know technology, you need to be accepting and flexible about the way they like to be led."



Eyes toward the future

David Evans knows his Dayton, Ohio, company, TESSEC LLC, has work to do in training workers on new technologies. Today, the precision machining company does subtractive manufacturing, which involves machines' taking raw material (say, a block of metal) and cutting and drilling it down to whatever final product a customer has ordered. But the future of manufacturing, Evans asserts, involves additive manufacturing, in which, instead of whittling away material to create a part someone has ordered, machines build layer upon layer in order to produce a part.

When the cost of the machines necessary for additive manufacturing and the speed at which additive manufacturing can be done become more competitive with the cost and speed of traditional subtractive manufacturing, Evans predicts the tide will turn.

The rise of additive manufacturing will spell even more change, says Evans, also a member of the Cleveland Fed's Cincinnati Branch board of directors, which regularly informs the Fed about the state of industry and the region the Cleveland Fed serves. Machines that create parts layer by layer don't need multiple workers manning them, putting pieces of material in place and telling machines where the materials are and what the machines must do. Rather, additive manufacturing machines can be turned on and left to work with minimal or even no real-time direction from people.

Evans's TESSEC has dabbled in additive manufacturing, but Evans hasn't taken the plunge in investing in new tools and machines. "Our people would happily learn these higher-end technologies, but we're trying to make parts and get those out the door," he says. "It's like in any environment: You react to the market. Orders come in and instead of planning for the future, you turn your attention to satisfying today's needs. The challenge for leaders is to keep looking toward the future."

The push-button jobs will go away. But you can't do it all electronically.

Evans sees the need for workers to learn to link robotics to machining (as other businesses have, yielding the machining of hundreds of pieces without a person's touch) and the need to recruit younger people to the field so they can learn from workers who've been on the job so long they know when something is amiss with a machine without even looking—they can just hear it.

Would companies like TESSEC be training people for manufacturing jobs that will eventually disappear? The answer, from many, is no.

"I've told my people internally this: The push-button jobs will go away," Evans says. "But you can't do it all electronically. You can't do everything through a computer. I don't think that will change. There will always be things that I think you're going to have to step back and put your hands on to figure out. You're going to need people to find solutions and be creative in solving problems."

If more people develop an array of skills, and if employees and company leaders work better and more flexibly together, more of the manufacturing world will prove resilient when, not if, the business changes unpredictably, RBB's Bruce Hendrick says.

"Regardless of the organization, it's always been true that if the people are enthused and have some autonomy over their environment and feel like they're connected to each other and they win or lose together, they can overcome any challenge there is," he says.

"A lot of organizations wonder, what's the payoff for having this culture? Why spend this time, money, and effort for this transparency and training and relationship stuff? Why don't we focus on what we're making and do those things?" Hendrick notes. "For those organizations, my response is don't do it, stay focused, and pray your people don't leave you. For other organizations that do see the value in it, let's share best practices. Even really good employers have blind spots around how we treat people."



SIDEBAR:

Building resilience

Continued change in manufacturing means continued change for people, communities, and companies. Coping with that change—and thriving in the face of it—requires resilience. Judith Rodin, former president of the Rockefeller Foundation and the University of Pennsylvania, championed the field of resilience. She defines resilience as the capacity to prepare for disruptions, recover from shocks and stresses, and adapt and grow from disruptive experiences. She identifies five main characteristics: awareness, adaptivity, diversity, integration, and self-regulation. And there’s good news: any individual, community, or organization can grow its resilience.

The many sources who informed this three-part series exploring the changing face of manufacturing offered ways in which workers, communities, and companies could build resilience. Following are a number of their suggestions.

Awareness

Awareness means knowing one's strengths and assets, liabilities and vulnerabilities, and threats to and risks of being able to prepare for, respond to, and bounce back from disruptions.



Workers might

- Ask themselves what are their next best alternatives to the jobs they have today. If those alternatives are a significant step down in pay, appeal, or location, they might work to change what their next best alternatives are.



Community leaders might

- Examine how they can become less tied to the fortunes of one company or one industry if their communities rely disproportionately on one or a few manufacturers.
- Support housing development—to recruit the workforce necessary to attract companies, there must be affordable places for people to live.

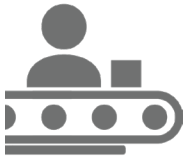


Manufacturers might

- Solicit advice from outside their organizations, perhaps via boards of advisors that are willing to look at and give honest, unfettered feedback about their numbers and the way they run their businesses.

Adaptivity

Adaptivity means being able to adjust to changing circumstances by developing new plans, taking new actions, or modifying behaviors.



Workers might

- Attend local job fairs and join professional organizations to gain networking opportunities and to stay informed of their industries' trends.



Community leaders might

- Ensure that workforce development programs are responsive to companies' long-term needs, so that employers have the workers they need to operate at a level that rewards productivity, retains their customers, and grows their industry. To the extent possible, involve employers or coalitions of employers within a given industry in these decisions.
- Invest in educational offerings and coaching that give people of all ages the skills they need for work environments that exist now and in the future economy. Revisit curricula regularly.

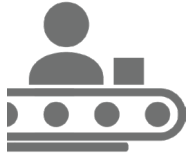


Manufacturers might

- Invest in training workers who are capable of doing a variety of tasks that need to be done, for example, on a production line. Workers who have more skills tend to have more job stability, and cross-training means more varied, interesting work for employees and increased resilience for workers and companies.
- Educate workers about their career ladders: If workers know how people advance at companies and within the sector, that knowledge might encourage them to stay. Particularly at a time when finding workers is difficult, retaining workers is key.

Diversity

Diversity means not relying completely on one element for a critical function, but instead having alternatives and backups one can call on during a disruption.



Workers might

- Devise a plan A, B, and C for who will watch their children or elderly parents during a work shift, so if one arrangement fails, they have others to fall back on.
- Familiarize themselves with alternative forms of transportation in case the usual one fails or is unavailable.
- Search out opportunities to learn relevant skills, or take on other tasks that expose them to different aspects of the business.



Community leaders might

- Buy or set aside land strategically so that they have the flexibility to take advantage of opportunities to develop sites in locations that are attractive to businesses and accessible to workers.



Manufacturers might

- Train management—not just front-line workers—on how machines work and to analyze data to understand why machines might fail. With that know-how, managers could mitigate large-scale risk or failure and increase long-term productivity.

Integration

Integration means sharing information, collaboratively developing ideas and solutions, and communicating with those involved and affected. It's often achieved via a "feedback loop," or some method of gathering information, analyzing it, and responding to it to keep functioning.



Workers might

- Seek out career coaches. Towards Employment, a workforce training provider in Cleveland, is one provider of coaching, including a model that extends from before job placement to after workers are hired.
- Leverage other sources of free career advice: podcasts; self-help, motivational, and business books; TED Talks; and peers and industry organizations on LinkedIn.



Community leaders might

- Have ongoing conversations with employers and workforce development leaders about short- and long-term labor force needs. Conversations and partnerships between municipal bodies, non-profits, and businesses can unearth companies' shared experiences and identify difficulties and opportunities as they emerge—and even before.
- Place greater emphasis on helping workers to navigate and/or cope with the effects of local, state, and federal policies, from trade agreements to changing work requirements (that may affect benefits such as Medicaid or food stamps) to the loss of public benefits due to a promotion or an increase in earnings or hours (called the benefits cliff) to minimum wage adjustments.
- Explore participation in or collaboration with a local Manufacturing Extension Partnership partner. The MEP is a public-private partnership with centers in all 50 states and Puerto Rico that works to help manufacturers grow and create jobs.

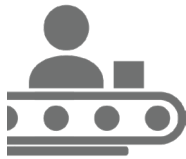


Manufacturers might

- Institute programs wherein workers are asked to suggest how to improve the manufacturing they do and have a plan for who will organize and address the suggestions that are made.
- Look for and fill unmet needs. If one company doesn't make the next new product, another will.

Self-regulation

Self-regulation means controlling oneself in ways that make it possible to deal with disruptions without extreme malfunction or catastrophic collapse.



Workers might

- Invest in developing and diversifying their skills before a layoff. It can be easier to afford continuing one's education when one is still earning an income than it might be after a job loss.
- Follow passions for creating something outside their work days, as time and energy allow, that has the potential to evolve into something more permanent and that earns money.



Community leaders might

- Lobby for change to policies that are determined by others but constrain their communities.
- Try to link up with larger communities that have local anchor institutions around which they might coordinate economic development efforts.



Manufacturers might

- Diversify the customers they serve. That way, they're less likely to be exposed if one of their customers experiences trouble.
- Consider various ways to introduce programs that are responsive to workforce needs and make business sense. This is especially important for those workers who fill lower-wage, entry-level positions and who may rely on public transportation, childcare providers, and other supports to come to work. For example, manufacturers might get creative about when shifts begin and end so workers who rely on others for support, such as rides to work and childcare, may find more reliable assistance. An employer toolkit produced by the Women's Fund of the Greater Cincinnati Foundation offers more ideas and information.