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Jobs for the Future

Are Manufacturing Jobs Hazardous and Declining or High-Tech and Resurging?

Understanding Job Quality in the Manufacturing Industry

AT A GLANCE

High-quality pathways prepare students for good jobs—but what do we really mean by that? JFF's Quality Jobs Framework provides an expanded definition of quality jobs, highlighting job characteristics all workers deserve in addition to good pay and benefits, such as flexibility, autonomy, stability, and advancement opportunities. Through an examination of national data, we explore job quality measures that the manufacturing industry is strong in and where it could stand to improve. As automation increases and impacts both demand and the required skills within an aging manufacturing workforce, it is crucial to increase job quality in the industry to attract talent to meet these evolving needs.

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About

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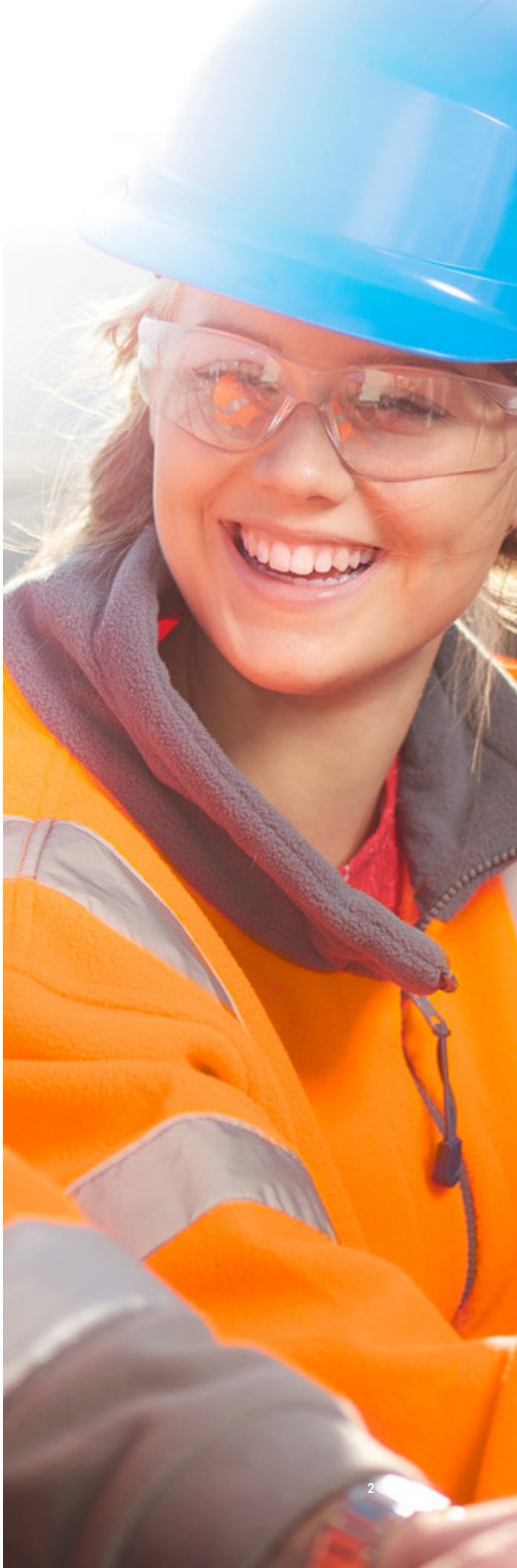


Table of Contents

Introduction 4

Manufacturing Sector at a Glance 5

- Research Considerations 6
- Compensation 7
- Advancement 8
- Agency & Culture 9
- Structure 10

Recommended Actions 11

1. Design pathways with job quality in mind. 11
2. Promote job quality awareness through regional, robust data collection. 11
3. Facilitate industry-wide collaboration to enhance understanding of the industry. 12
4. Support workforce development programs to address gaps in the industry. 12
5. Advocate for policy reform that enhances job quality. 12

Research Considerations 13

- Definitions 13
- Challenges in Employee Perspective Data 14
- Limited Data Availability 14

Endnotes 15

Introduction

More than half of the people in the U.S. labor force—92 million workers—are stuck without quality jobs and face systemic barriers to advancement. Jobs for the Future released new standards—the Quality Jobs Framework—to redefine what it means to work in a quality job, looking beyond the traditional measures of pay and benefits. In addition to family-sustaining wages and benefits that provide comprehensive healthcare and retirement savings, workers deserve job flexibility, autonomy, stability, and advancement opportunities. These characteristics reflect an optimal definition of job quality and may not be currently present in many industries or occupations. Though the practices that lead to these characteristics will look different across industries, these characteristics are ones for all industry occupations to aspire to and move toward implementing.

As education and workforce leaders provide better options for students and jobseekers to advance along college and career pathways, we must also consider these new standards of quality jobs when identifying which industries that lead to promising credentials to focus on.

The manufacturing industry currently stands as the second slowest-growing industry and is expected to lose jobs by 2032. However, increased federal investment in advanced subsectors of the industry, ongoing talent shortages, and the changing landscape of skills required for jobs in this industry dictate a need to explore where it stands in relation to our job quality indicators and whether it remains an industry worth pursuing.

CLICK TO ACCESS OUR QUALITY JOBS FRAMEWORK.

Manufacturing Sector at a Glance

The manufacturing industry is bifurcated, with many high-wage occupations (typically engineer and manager roles) that require bachelor's degrees and many low-wage occupations (typically machine setters, operators, and tenders) that require sub-baccalaureate credentials and minimal to extensive on-the-job training. On the surface, the manufacturing industry performs similarly to other industries on many components of the quality jobs framework. However, manufacturing is comprised of many subsectors with varying growth projections and skill requirements. One such subsector is advanced manufacturing, which is typically distinguished by its use of innovative technology to improve products or processes. Brookings further defines "advanced manufacturing" by identifying 50 advanced sectors that are characterized by the depth of their involvement in technology research and development and their reliance on STEM workers.[1] Reviewing data by subsector demonstrates that advanced manufacturing has higher wages than the overall manufacturing industry.

With differences in demand and growth and job quality in various sectors of the manufacturing industry, it is hard to make out notable strengths of the industry overall. However, when we consider these advanced manufacturing subsectors, we find a few key segments of the industry present clear areas of strength to interested potential workers. One notable strength of the manufacturing industry is job security with a lower percentage of layoffs and discharges compared to the average across all industries.

While manufacturing job opening projections trend below the national average, partly due to automation, jobs in advanced sectors such as advanced manufacturing and energy—including clean energy—are promising and are receiving increased federal investment such as the Infrastructure Investment and Jobs (IIJA) Act and the Creating Helpful Incentives to Produce Semiconductors (CHIPS) and Science Act.[2] There is also a need for a qualified-talent pipeline to address roles opening over the next decade due to an aging manufacturing workforce. Additionally, manufacturing occupations require varying levels of formal education and prior job experience, allowing some workers to access living-wage jobs with sub-baccalaureate credentials and on-the-job training.

Though the manufacturing industry shows promise in these areas, there are subsectors and occupations that could be improved to better align with our comprehensive definition of quality jobs. The manufacturing industry is very physically demanding, and the risks associated with work environments vary greatly depending on sector and role. Manufacturing workers also work longer hours and lack flexibility in scheduling. Further, diversity and inclusion are areas of concern, as we see an underrepresentation of Black and Latine workers and an overrepresentation of male workers.

It is our hypothesis that if you disaggregate by subsector and by high- and low-wage occupations, job quality would correlate with wages and occupations with higher barriers to entry.

Research Considerations

This research encountered limitations stemming from unavailable key data and the obscuring of subsector nuances, which constrained the breadth and depth of our analysis. This document uses the term "manufacturing industry" to encompass the manufacturing industry as a whole, including advanced manufacturing. We recognize these constraints and advocate for future research to address these gaps to understand the subject matter comprehensively.

Review the Research Considerations Section on page 13 for more information.

** Elements with this symbol note the unavailability of key data and challenges in employer perspective data.*

Compensation

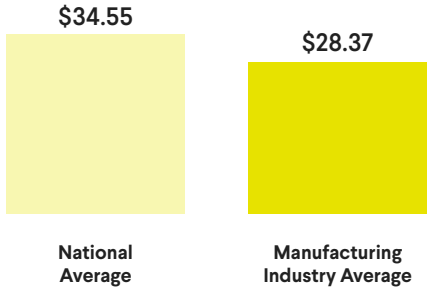
All forms of pay, benefits, and leave that enable all workers to support themselves and their dependents at the local cost of living.

Living Wage

In the spectrum of manufacturing occupations, wages exhibit significant variability, specifically between supervisors and engineers and production workers. The 100 most common roles in the industry have an average hourly pay of $28.37, which is below the national average wage of $34.55 per hour.

Average Hourly Pay

AS OF MARCH 2024



Engineers and managers lead the field in earnings, all making over $50.00 an hour, while operators make below $20.00 per hour.[3]

Comprehensive Benefits

The manufacturing industry aligns with the national average in offering comprehensive benefits packages for workers in the form of employer-sponsored health insurance and retirement savings plans.[6]

Paid Leave

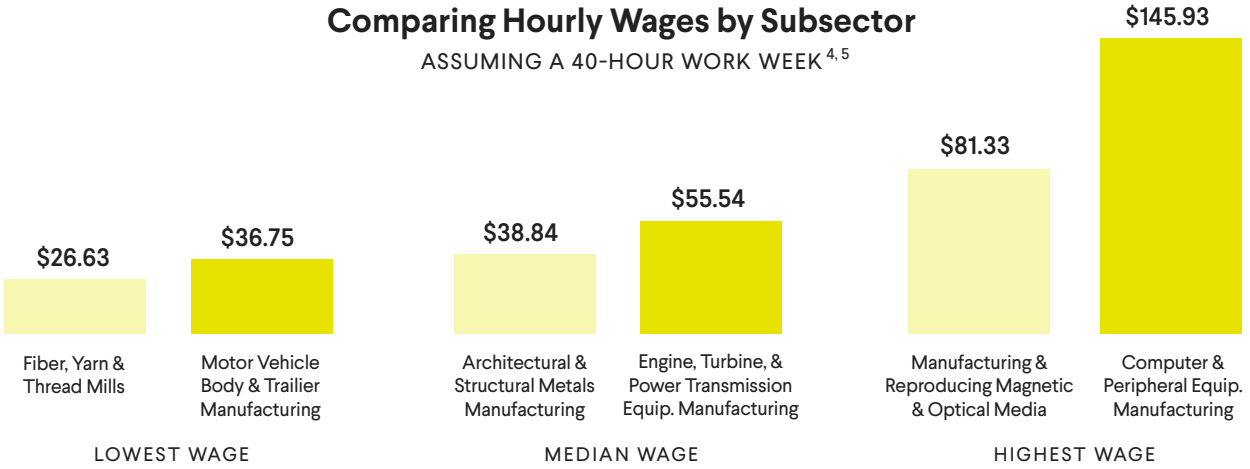
While paid leave varies greatly across the industry, most workers have access to paid time off for both vacation and sick time.[7] However, the number of workers with access to paid sick leave in the manufacturing industry does trend lower than the average across industries at 88% compared to the average of 95%.[8]

Pay Equity and Transparency

According to the Payscale Compensation Report, 44% of HR respondents from the manufacturing industry expressed their organizations' intentions to conduct a pay equity analysis along dimensions of race or gender by the conclusion of 2023, lower than the overall average of 52% across all industries.[9]

Comparing Hourly Wages by Subsector

ASSUMING A 40-HOUR WORK WEEK[4,5]



Non-Advanced Manufacturing Advanced Manufacturing

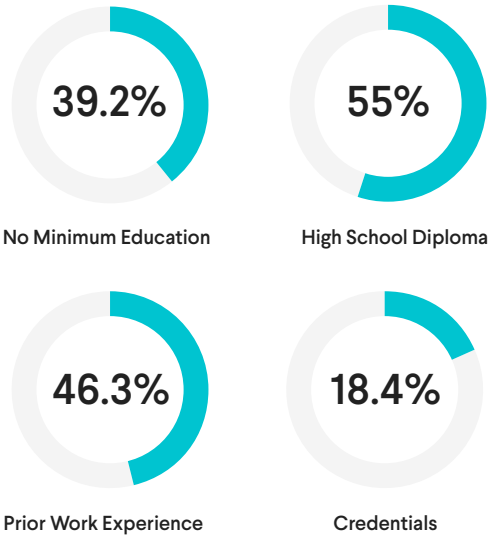
Advancement

The policies and practices that provide all workers with equitable opportunities to grow their skills, knowledge, and careers within their organization or industry.

Skills-Based Practices

In the manufacturing industry, 39.2% of roles require no minimum education and 55.5% require solely a high school diploma. Regarding other requirements, 46.3% of roles necessitate prior work experience, and 18.4% require credentials.[10]

Manufacturing Sector Work Requirements



High-wage roles such as engineers and managers require bachelor's degrees for entry but no on-the-job training. Low-wage roles, such as machine setters, operators, and tenders, range from no formal education requirements to a high school diploma, but many also require short to moderate on-the-job training. Middle-wage occupations, such as technicians and those working in operations, have a variety of credential requirements, including a high school diploma, associate's degree, or bachelor's degree.[11]

Transparent Career Pathways*

Fifty percent of respondents in the industry express satisfaction with existing career advancement opportunities, including promotion and learning new skills, which is aligned with respondents across all industries.[12]

Career Coaching and Training

The manufacturing industry trends with the average across industries in providing financial support to employees for formal training and education for skill development, as well as offering formal leadership coaching and/or mentoring programs.[13]

One strength of the industry is the high levels of Registered Apprenticeship opportunities. A national workforce initiative, the Advanced Manufacturing Workforce Sprint has the goal of expanding and diversifying pathways into good jobs in advanced manufacturing that don't require a four-year degree. One strategy of the initiative is increasing Registered Apprenticeships.[14]

Inclusive Internal Advancement*

Thirty-five percent of respondents within the manufacturing industry reported that they would likely be promoted at their primary job, trending slightly higher than the 30% of respondents across industries who said the same.[15]

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Agency & Culture

The extent to which all workers are encouraged and supported to use their expertise to drive change within their organization and have a sense of belonging and value in the workplace.

Belonging and Psychological Safety*

Sixty-seven percent of workers in the manufacturing industry report enjoying their day-to-day work (e.g., good coworkers/ managers, pleasant work environment, manageable stress level), which is comparable to workers in other industries.[16]

Ability to Organize

There are several avenues through which workers can organize, including grassroots movements, employee resource groups, and advocacy networks, all of which contribute to shaping the industry's approach to worker representation and collective action. While comprehensive data is difficult to source, the manufacturing industry has a union membership rate of 9.1%, exceeding the average union membership rate of 6.05% in the private sector. Recent data shows a 0.5% increase in membership from 2022 to 2023.[17]

Opportunities for Input*

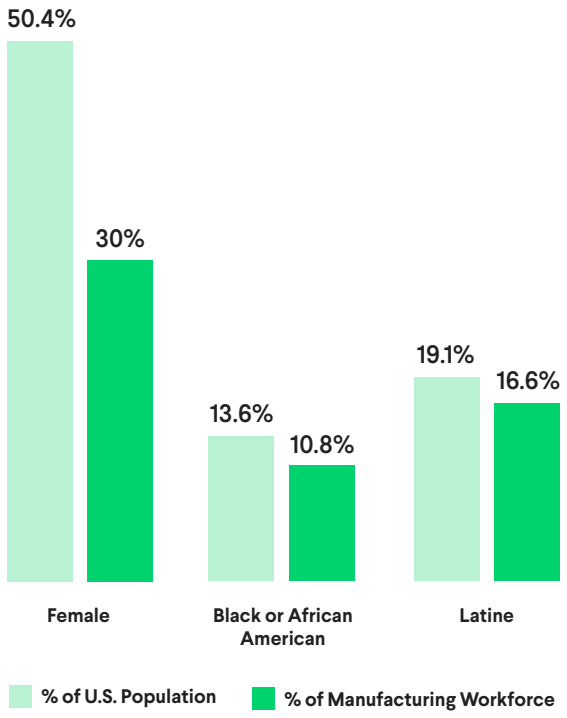
Forty-seven percent of workers within the industry report having the power to change things about their job that they are not satisfied with, which is aligned with the average across industries.[18]

Meaningful Commitment to Diversity, Equity, and Inclusion (DEI)

In 2023, 70% of the manufacturing workforce was male, indicating that women are underrepresented in the industry. In comparison to national demographics, the data reveals an underrepresentation of Black workers, at 10.8% of the workforce but 13.6% of the U.S. population, and Latine workers, at 16.6% of the workforce but 19.1% of the population.[19, 20] These demographics are similar for the advanced manufacturing subsector.[21]

Manufacturing Workforce Demographics

COMPARED TO U.S. POPULATION



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Structure

The foundational elements that support a safe, healthy, and stable environment for all workers.

Safe, Healthy, and Accessible Workplaces

This industry is characterized by higher physical requirements than other industries: 81.2% of workers spend their workday standing and 66.4% of roles require medium-to-heavy lifting.[22] While incidence rates in the manufacturing industry align with the average across industries, this risk varies greatly across types of manufacturing and position.[23]

Workers in the manufacturing industry face a greater than average risk of fatality due to exposure to harmful substances or environments and contact with objects and equipment.[24]

Job Security

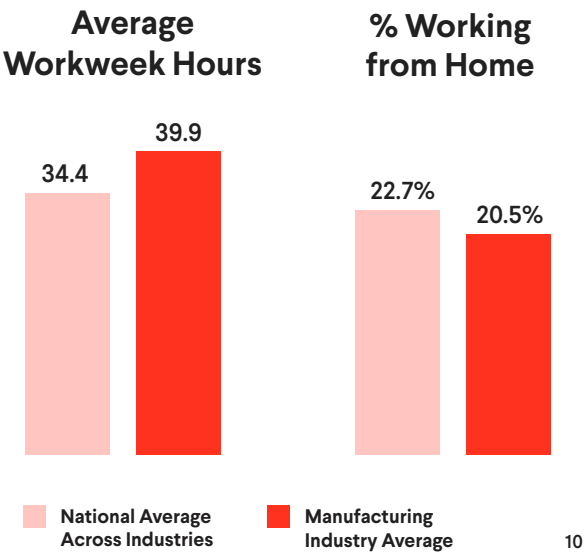
The manufacturing industry is stable, though not growing at the rate of other industries. The job security landscape is notable, with the rate of layoffs and discharges at 0.9%, below the overall average across all industries at 1.1%.[25]

The landscape of the manufacturing industry is changing due to the rise of automation and the aging workforce. Twenty-eight percent of the manufacturing workforce is over 55 years old, creating a need for a skilled talent pipeline.[26] While automation can improve efficiency and productivity, it may also lead to shifts in employment opportunities and skill requirements within the industry. For the advanced manufacturing subsector, the projected growth from 2024 to 2029 is 3%, compared to the projected growth of 1% for the rest of the manufacturing industry.[27, 28]

Fair Scheduling

Part-time and full-time workers within the manufacturing industry maintain an average workweek of 39.9 hours, exceeding the national average across industries, which is 34.4 hours.[29]

Additionally, 79.5% of workers in the manufacturing industry are not able to work from home for any of their weekly hours. This is slightly higher than the average across industries, standing at 77.3%, indicating a lower level of flexibility and control over their work hours and arrangements.[30]



Recommended Actions

Below, you can explore five key avenues for intermediary and pathways leaders to better assess manufacturing job quality in your community and address gaps. Industry and workforce partners will also play a key role in taking these actions.

1 Design pathways with job quality in mind.

- Ensure pathways programs of study include rigorous core academics and career-focused learning to develop both employability skills, such as communication and critical thinking, and technical skills, such as equipment safety, quality assurance and continuous improvement, and digital manufacturing.
- When offering career exploration opportunities, highlight manufacturing professionals who are underrepresented in high-wage positions, including Black, Latine, and Indigenous workers and female workers.
- When providing career exposure activities like job shadows and mock interviews, provide students with guidance around asking questions related to job quality.
- When offering career exploration and career exposure opportunities, showcase the variety of manufacturing positions available and highlight digital and technological opportunities.

2 Promote job quality awareness through regional, robust data collection.

- Ensure data is collected at the sector and occupational level to capture the job quality differences between advanced and managerial roles, such as managers and engineers, versus operator roles, such as machine operators and fabricators.
- Collaborate with local manufacturing organizations to disseminate information about the Quality Jobs Framework and apply the framework to your region's manufacturing industry.
- Building on the Gallup Great Jobs survey findings, collect data from local manufacturing workers about agency and culture, including work-life balance, job satisfaction, belonging and psychological safety, and opportunities for worker voice.[31]
- Collaborate with HR to collect more data on advancement opportunities, job safety and security, and job classification.

3 Facilitate industry-wide collaboration to enhance understanding of the industry.

- Utilize this resource to benchmark companies and organizations against industry averages, promoting transparency and continuous improvement.
- Collaborate across education, workforce, and industry to develop effective strategies for recruiting, supporting, and retaining a more diverse workforce, particularly in terms of racial and gender diversity, and focusing on strategies that lead to higher wage occupations within the manufacturing industry.
- Build pathways into and within the industry that promote seamless transitions and stackable credentials to ensure clear opportunities for advancement and upskilling or reskilling.

4 Support workforce development programs to address gaps in the industry.

- Invest in and promote programs, such as Registered Apprenticeships, that enhance skills, make direct connections to employers, support career advancement, and align with the framework's principles.
- Foster partnerships between educational institutions and employers to ensure that workforce training aligns with the evolving digital and technological needs of quality jobs in the manufacturing industry and offers opportunities to advance to higher-level/higher-wage positions.
- Foster partnerships between educational institutions and employers to ensure that training and work-based learning opportunities are accessible to underrepresented groups in the manufacturing industry, especially high-wage occupations.

5 Advocate for policy reform that enhances job quality.

- Support pay transparency efforts, encouraging employers to include salary ranges in the job descriptions.
- Secure funding that supports strengthening the connection between learning and work, such as education-to-career pathways and work-based learning opportunities that prepare people to enter quality manufacturing jobs.
- Commit to the Advanced Manufacturing Workforce Sprint to contribute to the development of a diverse, skilled pipeline of workers in the advanced manufacturing industry.[32]
- Advocate for equitable and inclusive hiring practices that prioritize local workers, including skills-first hiring and fair chance hiring that provide greater access to quality jobs.
- Advocate for improved paid family and medical leave at the state and local levels.
- Advocate for wage increases that meet the criteria of the regional living wage for the lowest-paid manufacturing occupations, such as various machine setters, operators, and tenders.

For more detailed information and possible actions to support policy reform in your area, review the blog, Four State and Local Policy Trends That Help Advance Job Quality.[33]

Research Considerations

Subsector Nuances

One of the primary limitations for determining quality indicators of the manufacturing industry is that this resource utilizes industry-level data to look at the manufacturing industry overall. In doing so, that process obscures key differences across subsectors. As an example, while demand for manufacturing isn't increasing overall, these five advanced sectors are growing: pharmaceuticals, computers and electronics, automobiles, aerospace, and food and beverage manufacturing. Similarly, due to automation, there is growth in occupations, such as industrial machine mechanics and first-line supervisors while others, such as printing press operators and engine and machine assemblers, see decline.[34, 35, 36]

Definitions

TITLE	DEFINITION	SOURCE
Manufacturing	The manufacturing industry is defined as workers engaged in processing materials into new products. This industry group is comprised of NAICS 31–33.	• Payscale • Pew Research Center • BLS • Society for Human Resources Management • Lightcast • Gallup
Production Occupations	This occupational group includes engine assemblers, structural metal fabricators and fitters, bakers, butchers and meat cutters, meat packers, computer-controlled machine tool operators, forging machine setters, machinists, pourers and casters, tool and die makers, printing press operators, upholsters, furniture finishers, model makers, gas plant operators, tire builders, etchers, and engravers.	• BLS
Advanced Manufacturing	*Individual advanced industries were identified using two criteria:* • An industry's R&D spending per worker must fall in the 80th percentile of industries or higher, exceeding $450 per worker. • The share of workers in an industry whose occupations require a high degree of STEM knowledge must also be above the national average, or 21% of all workers. An industry must meet both criteria to be considered advanced. Together the two thresholds identify 50 industries that invest heavily in technology innovation and employ skilled technical workers to develop, diffuse, and apply new productivity-enhancing technologies. Of the 50 industries, 35 fall under manufacturing. JFF uses those 35 subsectors to define advanced manufacturing when using Lightcast data for calculations.	• Brookings • Lightcast

Challenges in Employee Perspective Data

Finding data that reflected employee perspective, especially in elements requiring subjective input, was difficult. Namely, with data sourced from Gallup, more information within the dataset and sufficient sample sizes for confident statements on work-life balance, job satisfaction, and related aspects were needed, potentially impacting the confidence of insights.

Limited Data Availability

Efforts to locate industry-level information for all elements outlined in the Quality Jobs Framework proved challenging. This limitation underscores the importance of addressing data availability gaps to facilitate more comprehensive assessments.

The two elements that were not successfully obtained for this analysis are:

- Proper Job Classification, which examines whether workers are properly classified (as employees, contractors, etc.) based on clear and transparent criteria and in accordance with local law and whether they receive proper benefits and protections based on that classification.
- Transparent HR Function, which examines workers' access to transparent and responsive support on work issues, their comfort in seeking out that support, and clear communication of worker's rights.

Endnotes

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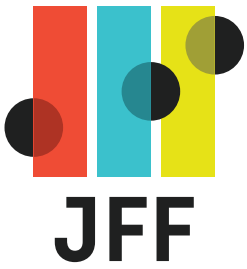

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