



# EXAMINING THE RETURN ON INVESTMENT OF MANUFACTURING CREDENTIALS

## PART 2: Results and Discussion

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# ABOUT THE RESEARCH STUDY

The U.S. manufacturing sector continues to be central to the national economy, and relies on a highly skilled workforce of more than 12 million workers. The majority of jobs in manufacturing are likely to require a high school diploma or less. Because of this, credentials have uneven use in the manufacturing industry and are not routinely required or used as a major factor in hiring or promotion decisions.

In order to more effectively use credentials to support a competitive manufacturing workforce, and in follow up to the first report developed that examined the quality, market value, and effectiveness of manufacturing credentials,<sup>1</sup> Workcred—an affiliate of the American National Standards Institute (ANSI)—again partnered with MEP, an operating unit of NIST, to understand how manufacturing employers and workers value credentials, which credentials they value, and how they determine whether or not to pursue additional credentials.

Workcred developed a set of three interview guides to use to address these questions with direct interviews with front-line workers (credential holders), hiring managers, and supervisors at small- and medium-sized manufacturing facilities.<sup>2</sup> By examining the viewpoints from these three different stakeholder groups, Workcred anticipated a more nuanced understanding of the use and value of credentials in this important sector.

The project background and methodology, results and outcomes of the research, and recommendations are described in a series of three reports:

## THE PRIMARY RESEARCH QUESTIONS ADDRESSED BY THIS RESEARCH STUDY ARE:

**How are U.S. Manufacturing employers and workers using credentials?**

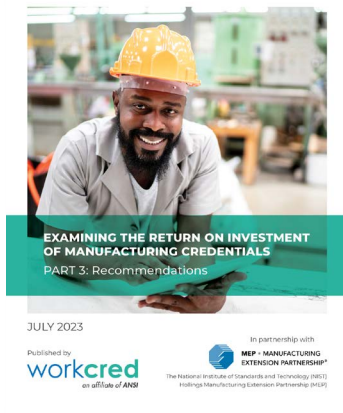
**What is the return on employer and employee investments in credentials?**



*Part 1: Background and Methodology* describes the types of facilities and individuals that participated in the research and analysis of the interviews.<sup>3</sup> It also considers the likely self-selection bias of the participants who volunteered for the interviews, and the potential impact that the COVID-19 pandemic had on participation.



*Part 2: Results and Discussion* details the analysis of the interviews, highlighting common themes and attitudes about credentials and their use in manufacturing.<sup>4</sup> Gaps in knowledge capture and use of credentials are described, as well as attitudes toward credential attainment.



*Part 3: Recommendations* lists three sets of recommendations: recommendations to support more effective use of credentials by manufacturing facilities, recommendations for implementation by policymakers, and recommendations for future research.<sup>5</sup> These recommendations are meant to be practical and actionable to make an immediate impact to support the manufacturing workforce.



# OVERVIEW OF INTERVIEWS

As outlined in the previous report, *Examining the Return on Investment of Manufacturing Credentials: Background and Methodology*, Workcred developed a set of interview guides to gather input from three different stakeholder groups—frontline workers (credential holders), hiring managers, and supervisors.<sup>6</sup> We conducted 51 interviews within 15 facilities across seven industry sectors during this research study. The interviews were all conducted at small- and medium-sized manufacturing facilities, a few of which were independently owned, although the majority were part of a larger company that owned multiple facilities. Approximately half of the facilities that were part of a larger company had a facility located outside of the U.S.

As seen in Figure 1, the overwhelming majority of interview subjects were male. While we did not collect other specific demographic information, the majority of interview subjects were white and over the age of 35. Among the interviewees, 21 were supervisors, 8 were hiring managers, and 22 were frontline workers.

*Figure 1: Overview of Interview Participants*

The overwhelming majority of interview subjects were **MALE**.

## 21 SUPERVISORS



## 8 HIRING MANAGERS

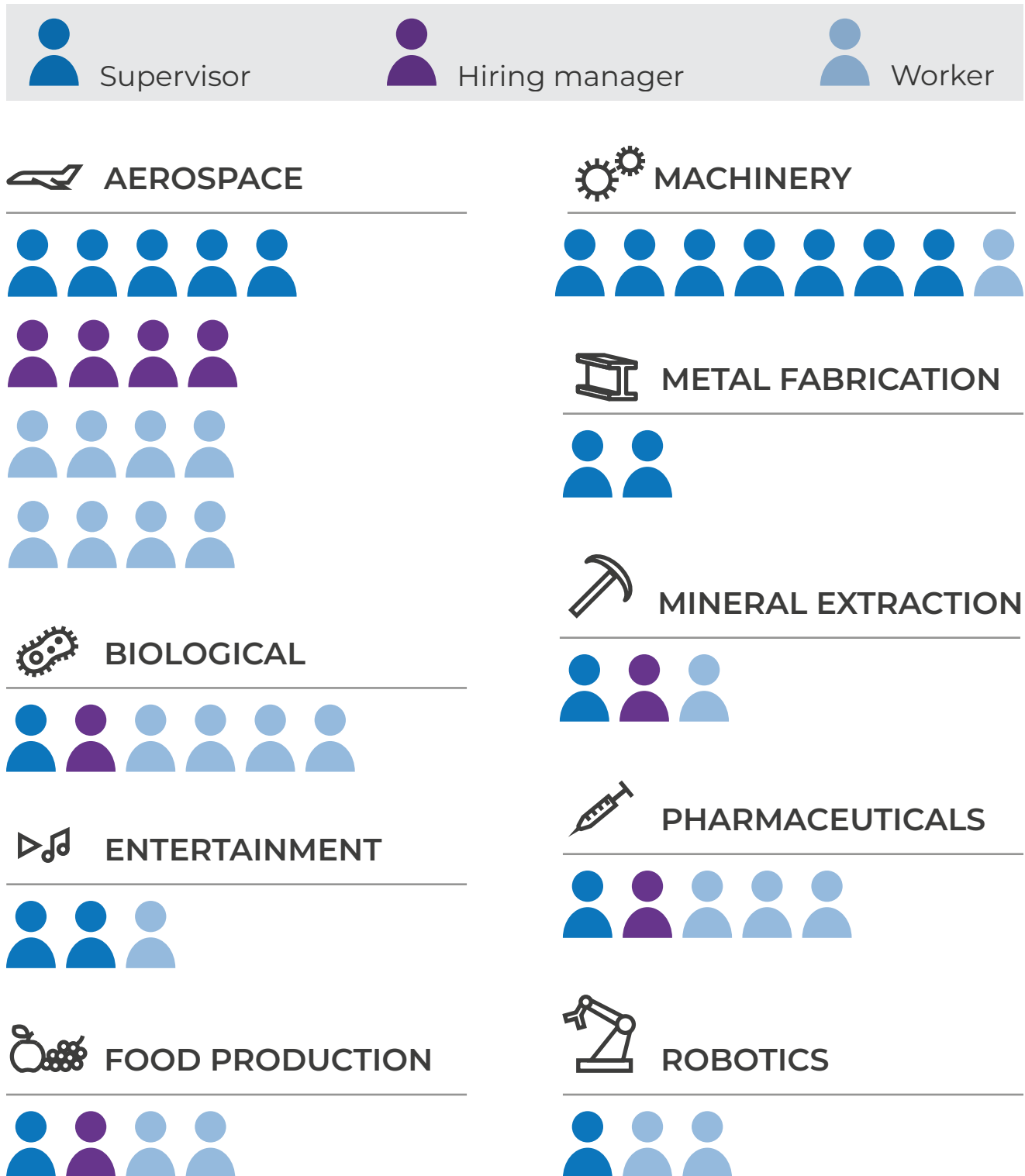


## 22 FRONTLINE WORKERS



Figure 2 shows the industry breakdown and positions of each interviewee. We discovered that since many facilities did not have a dedicated hiring manager, the supervisor fulfilled the role of hiring manager for positions they would supervise.

*Figure 2: Industries and Positions Represented*



As shown in *Part 1: Background and Methodology*, data was analyzed by having all interviews transcribed and assembling a chart of all credentials reported by study participants (see Figure 3).<sup>7</sup>

**Figure 3: Credentials Mentioned During Interviews**

CERTIFICATES	CERTIFICATIONS	ORIGINAL EQUIPMENT MANUFACTURER CREDENTIALS
Apprenticeship Certificate (leading to Mechatronics Certification)	American Design Drafting Association (ADDA) Apprentice Drafter Certification	Autodesk Certified User (ACU) Certification
Coordinate Measuring Machine (CMM) Training Program Certificate	American Society for Quality (ASQ) Certified Quality Auditor (CQA) Certification	Honeywell Certificate*
Electronics Certificate*	ASQ Certified Quality Engineer (CQE) Certification	Hudson Pump Training Certificate
Dale Carnegie Training Program Certificate	ASQ Certified Quality Technician (CQT) Certification	JobBOSS Training Certificate
Geometric Dimension and Tolerance (GD&T) Certificate	American Welding Society (AWS) Certified Welder (CW) Certification	SOLIDWORKS Certifications*
Hazmat Shipping Training Program Certificate	AWS Certified Welding Inspector (CWI) Certification	uniPoint Training Certificate
Internal Auditing Certificate	Association for Supply Chain Management (ASCM) Certified in Production and Inventory Management (CPIM) Certification	
International Air Transport Association Training Program Certificate	Certified Production Technician (CPT) Certification	<b>OTHER CREDENTIALS</b>
LinkedIn Learning Excel Certificate	Certified Tissue Bank Specialist (CTBS) Certification	Associate Degree in Engineering Technology
Marine Corps Engineer Equipment Operator Certificate	Food Defense Qualified Individual (FDQI) Certification	Airframe and Powerplant Mechanic License
Mechatronics Training Certificate	HAZWOPER Certification	Baccalaureate Degree*
MSSC Safety Certificate	Health And Sanitation Safety Awareness (HASSA) Certification	Internal Audit Training on ISO 9001 or AS9100 Standards
Occupational Safety and Health Administration (OSHA) Safety 10-hr, 20-hr, and/or 30-hr Training Program Certificate	Industrial Laser Certification	Diesel Mechanics Diploma
Rapid Prototyping Certificate	Lean Bronze Certification	Third Class Boiler Operator License
Repairman Certificate	Liquid Penetrant Testing (LPT) Certification	
Theatre Design and Technology Certificate	National Institute of Metalworking Skills (NIMS) Certifications*	
	Orthopedic Quality Standards and Technical Skills Certification	
	OSHA Forklift Certification	
	Safe Quality Foods (SQF) Certification	
	Six Sigma Greenbelt Certification	
<p><i>These credentials were mentioned at least once during the interviews. Where possible, the full names have been listed.</i></p> <p><i>* The interviewees were not specific about the full credential name.</i></p>		



# COMMON INTERVIEW THEMES AMONG ALL PARTICIPANTS

Regardless of the geographic location, industry, or job role held, there were two common themes that were uncovered during the interviews: a value for credentials and confusion about the worth of specific credentials.

## VALUE FOR CREDENTIALS

Both employers (supervisors and hiring managers) and workers spoke about the value they placed in credentials. Employers suggested that they valued credentials of job candidates and expressed a desire that more candidates had credentials. Workers with credentials typically felt that they had received some benefit from pursuing their credentials.

Furthermore, while many interviewees expressed value for credentials, most employers noted that only a minority of their workforce was credentialed. This lack of credentials in the manufacturing workforce was underscored in the interview recruitment process: one of the challenges in recruiting companies to participate was that many companies that were asked to participate reported that none of their frontline workers held credentials. While this does not contradict their expression of value for credentials, it does suggest that credentials are only one of many factors taken into consideration when hiring or promoting workers.

These results are also consistent with previously published research on credentials in manufacturing. Renski found that while there was an average earnings premium of \$70 per week for manufacturing workers who held a certification or license, returns are uneven.<sup>8</sup> This likely reflects differences in industries and occupations, as well as what employers express in value of credentials. Our 2018 study of manufacturing credentials found that employers greatly valued experience as well as credentials, with some small- and medium-sized companies valuing experience more than credentials.<sup>9</sup>

## CONFUSION ABOUT THE WORTH OF SPECIFIC CREDENTIALS

The employers and workers interviewed expressed a lack of readily available information on credentials relevant to their industries, occupations, and/or career pathways. They overwhelmingly depended on word of mouth or recommendations from supervisors and co-workers for information on the value of credentials. For employers, this typically meant that they relied on existing relationships and trusted their local/regional community colleges, MEP Centers, and equipment manufacturers to provide education and training for their employees.

This also resulted in an oft-repeated statement of “trust, but verify”—employers repeatedly noted that they prefer to verify the skills represented by credentials through on-the-job observation, competency-based assessments performed as part of the job interview process, or a combination of the two. Job applicants were often asked to operate a particular machine or perform a task under the supervision of the hiring manager or prospective supervisor prior to hiring. Only very rarely did candidates with industry credentials fail these assessments, but employers felt that such hands-on assessments were a low-cost way to ensure the quality of their hires.

One potential contributing factor to the lack of understanding of the value of specific credentials in manufacturing is that there are sub-sector specific credentials for some industries. For example, at one biotechnology manufacturer, the Certified Tissue Bank Specialist certification issued by the American Association of Tissue Banks was essential to the specific processes used in the facility. This certification is not likely to be valued outside of biotechnology manufacturing.

Similarly, in aviation, the Federal Aviation Administration (FAA) repairman certificate is essential; it is actually a license insofar as it is statutorily required to repair and/or supervise the repair of certain aircraft parts. While some tasks on the floor of an aircraft parts manufacturer or refurbisher can be performed by an unlicensed individual under the supervision of a licensed mechanic, holding a FAA certificate is essential to advancement beyond the most entry-level job titles in such a facility. Understanding of the value of these types of industry-specific credentials is needed in order to support employers and workers in these industries to effectively use these credentials.

# INTERVIEW THEMES FOR WORKERS/CREDENTIAL HOLDERS

There were also several themes that were consistently mentioned by workers about their credentials and training.

## WORKERS FIND VALUE IN CREDENTIALS AND TRAINING

Many workers interviewed stated that they found value in multiple ways from earning credentials and/or participating in training. For example, many workers felt that they used the knowledge they had gained while earning a credential or participating in training on a regular basis at their current job. Others felt that a credential or training directly led to being hired, a promotion, or a change in occupation at their facility. One worker powerfully described the role that gaining an Airframe and Powerplant (A&P) license played in his career:<sup>10</sup>

I WAS WORKING DEAD-END JOBS FOR MOST OF MY YOUNG ADULT LIFE, AND WHEN I GOT HERE, IT WAS JUST A GAME CHANGER OR SOMETHING, BECAUSE ONCE YOU HAVE IT, YOU DON'T LOSE IT UNLESS YOU REALLY MESS UP. AND IF YOU HAVE AN A&P, YOU CAN GO CHASE THE MONEY ANYWHERE YOU WANT IN THE WORLD. SO IT WAS JUST KIND OF A LIFE CHANGER FOR ME TO GET IT RIGHT.

Interestingly, this individual used this credential to move internally within the company to his current role, highlighting how credentials can support promotion and occupational change within an industry or facility.

Another worker expressed that credentials provided the opportunity to have more professional status and job satisfaction:

I THINK [THE CREDENTIAL] WAS WORTHWHILE, NOT JUST FOR THE PAY SCALE, BUT ALSO JUST MY OWN ABILITY LEVEL HERE. AND I THINK THE REASON THAT'S IMPORTANT TO ME IS IT'S GOING TO MAKE MY PAY SCALE KEEP GOING UP. I'VE HIT A POINT WHERE I AM ONE OF THE HIGHER-SKILLED GUYS... I MEAN, THERE'S A LOT OF GUYS IN THAT TIER HERE, BUT IT'S NICE TO BE IN THAT TIER. IT'S NICE TO BE TROUBLESHOOTING MY OWN STUFF AND NOT JUST RUNNING PRODUCTION. AND IT'S A MORE FULFILLING JOB.

These comments reflect the varied roles credentials can play in the workforce—providing professional recognition or some other type of intangible value like self-satisfaction.

Workers also found training to be highly valuable to their ability to do their jobs. All workers reported that their current employer provided them with hands-on training. Interestingly, workers sometimes did not remember if they received a credential after completing a formal training program. This inability to remember whether or not a credential was awarded or the type of credential awarded complicates efforts to ascertain the value of credentials.

Similarly, gauging the value of hands-on training is difficult when workers are not given a formal record of the training or it does not lead to a credential. This lack of documentation may explain the significant importance employers place on previous experience in manufacturing, as it is a proxy for on-the-job training and skills.

## WORKERS KNOW WHICH SKILLS THEY WANT TO PURSUE

When asked about skills or credentials they would like to gain, approximately half of the workers mentioned a highly technical, digital skill as shown in Figure 4.<sup>11</sup>

*Figure 4: Technical/Digital Skills Mentioned During the Interviews*

- » 3-D printing
- » 3-D scanning
- » Artificial intelligence/machine learning
- » Augmented reality
- » Basic computer skills
- » Computer-aided design (CAD)
- » Computer numerical control (CNC) machining
- » Cloud computing
- » Excel
- » Data analytics and visualization skills for logistics
- » Digital thread technology
- » Digital twinning
- » Electrical
- » Generalist training to include math, physics, mechanics, and other concepts
- » Geometric dimensioning & tolerancing (GD&T)
- » Lean/Six Sigma
- » Mechatronics
- » Original equipment manufacturer (OEM) training
- » Robotics
- » Safety skills/knowledge
- » Software (specific type)
- » Soldering
- » SolidWorks
- » Standards training

Not surprisingly, these are skills currently being used in these small- and medium-sized facilities. For example, multiple facilities that participated in the interviews used three-dimensional (3-D) printers, though they varied in the nature of their uses. In some, 3-D printing was reserved primarily for repairing equipment, whereas in others, 3-D printing was integrated into the production process. In one case, a worker reported being able to use 3-D printers at a local community college in lieu of the employer owning its own equipment. The skills required to operate 3-D printers varied, but multiple facilities had individuals holding certifications or certificates of completion of training in SOLIDWORKS, a leading software package for designing 3-D printing.

Data science was also mentioned in multiple interviews as an area in which workers sought to acquire skills and associated credentials. The manufacturing firms visited during the interviews varied in their data assets, with those using what appeared to be more modern equipment more likely to feel that they had data assets worthy of analysis in identifying opportunities for cost reduction or quality improvement. One firm boasted of a particularly impressive data dashboard through which it could track the precise cost of every component in terms of material and labor, and profit associated with each sale. However, this firm, which also had a resident data expert on staff, was the exception. More commonly, workers did not know where to find appropriate data science credentials. When pressed for ideas about which credentials one might consider, a worker mentioned that he would probably consider a certificate offering online instruction identified through a Google search.

Many workers also expressed strong interest in non-technical skills like those included in Figure 5. These skills were validated in interviews with supervisors, who also suggested these non-technical skills were important in their production workers.

*Figure 5: Non-Technical/Workplace Skills Mentioned During the Interviews*

- » Ability to learn from mistakes
- » Adaptability
- » Continuous learning attitude
- » Communication
- » Critical thinking
- » Leadership
- » Time management/planning ahead
- » Problem solving
- » Teamwork
- » Work ethic

## **WORKERS SEEK TRAINING THROUGH TRADITIONAL AND NON-TRADITIONAL PROVIDERS**

Workers expressed openness to training from many different types of training providers, including both traditional and non-traditional. Types of training providers mentioned in interviews included: community colleges, Original Equipment Manufacturers (OEM), on-the-job-training, YouTube, certification body exam preparation courses and books, in-house training, MEP Centers, and online providers. Many individuals had worked with several different types of training providers and online training. YouTube was also noted as a good resource for self-taught skills.



One type of training that was highly valued by both workers and employers was training provided by equipment manufacturers. This training often accompanied the purchase of a new piece of equipment, but it was also used for existing equipment that supervisors felt was not being fully utilized due to a lack of knowledge. One of the benefits to this type of training seemed to be that workers who participated in it obtained deeper knowledge of how they would need to use the equipment in their current role, which made it highly valuable.

One employee explains his training experience as:

“EACH SOFTWARE HAS THEIR OWN LITTLE NUANCES AND THAT KIND OF STUFF. SO, WE ACTUALLY WENT TO [COMPANY] AND WE ACTUALLY DID FORMAL, CLASSROOM-STYLE TRAINING... TO LEARN HOW TO ACTUALLY PROGRAM IT, AND USED A LOT OF THE FEATURES THAT WE WEREN'T EVEN USING. AFTER DOING THAT, WE REALLY AMPED UP OUR PRODUCTION ON THE [MACHINE].”

This direct connection between the training workers participate in and an almost immediate increased productivity is likely the reason why this type of training is so valued.

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*Types of training providers mentioned in interviews included:*

**Community colleges**

**Original Equipment Manufacturers (OEM)**

**On-the-job training**

**YouTube**

**Certification body exam preparation courses and books**

**In-house training**

**MEP Centers**

**Online providers**

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## WORKERS HAVE LIMITED KNOWLEDGE OF WHICH CREDENTIALS ARE VALUABLE

Although somewhat counter-intuitive, while workers valued the credentials they had, knew which skills they wanted to pursue, and also had some knowledge about where they might seek out additional training or education, few workers were considering pursuing another credential. Only five frontline workers had a specific credential they were considering pursuing at the time of the interviews.

The interviews also uncovered that workers primarily relied on their supervisors or managers to recommend a credential for them to pursue. Workers seemed to have some knowledge about credentials held by their co-workers. However, these were the only two sources of information on credentials named by the workers in our interviews, reflecting their limited knowledge of where to seek out information on credentials, which also limits their knowledge about which credentials would be valuable to their career goals.

Employer interviews with supervisors and hiring managers also touched on common themes, and offered additional information on how credentials are being used in manufacturing.



# INTERVIEW THEMES FROM EMPLOYERS

## EMPLOYERS PREFER INDUSTRY CREDENTIALS, BUT SEE FEW IN THEIR APPLICANT POOLS

The overwhelming majority of the participating supervisors and hiring managers mentioned that they valued seeing individuals with credentials in their applicant pools, but that it was not a common occurrence. They revealed that relevant credentials signaled many qualities that they valued in applicants: interest in manufacturing, experience in a role, and relevant skills.

However, even those who strongly desired credentials when screening job applicants still wanted to verify those skills in their internal hiring process. One interviewee stated: “I think we're just kind of in that mode that, okay, great, you got certified. Now prove it.” This attitude reiterated that credentials were only one element that was valued in the hiring process, and that employers still wanted to see how the skills represented by that credential might be applied in a particular role and/or industry.

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*“I think we're just kind of in that mode that, okay, great, you got certified. Now prove it.”*

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Additionally, an employer’s personal experience with the issuer of a credential was an important part of valuing that credential. Multiple employers mentioned they trusted training providers they knew, or organizations they were familiar with, more than others. Credential issuers they trusted included certification bodies, equipment vendors, and community colleges.

## EMPLOYERS STRUGGLE TO TRACK EMPLOYEES’ CREDENTIALS

Overall, employers lacked knowledge of their employees’ credentials. At one extreme, we interviewed two individuals at one facility with several credentials, despite being told by the facility manager that none of the workers there had any credentials. At the other end, one manager stated that they had notes on all the training and

credentials for each of their employees. Most employers fell in a middle ground, however, where they tracked safety training for their employees to meet regulatory requirements, but had limited knowledge of other training or credentials for their employees.

For those who did track credentials and training, the most common approach was use of a spreadsheet. This approach seemed to meet the management and reporting needs of the facilities that used it, but it might not be manageable at larger facilities. Even for smaller employers, these spreadsheets are unlikely to contain a skills profile for each employee, which can be valuable to employers to understand which skills an employee has mastered, regardless of their current role. Skills profiles can be particularly helpful when there is a skills gap—perhaps due to an unexpected absence that needs to be filled quickly—as it allows employers to easily see which employees' skills would best fill the needed position.

More broadly, if spreadsheets are a typical approach to tracking skills, training, and credentials at small- and medium-sized manufacturing facilities, it exemplifies the lack of capacity for these types of employers to participate in education technologies like digital credentials, which are becoming more common at higher education institutions and large-sized employers. Digital credentials contain embedded information on what skills a particular credential represents, and are meant to be integrated into learning management systems and/or human resource information systems, but are not compatible with spreadsheets or other approaches that cannot process the meta-data from digital credentials.

## **EMPLOYERS HAVE LIMITED AWARENESS OF CREDENTIAL CONTENT**

Supervisors and hiring managers interviewed had limited knowledge of the specific content of credentials, even those held by their employees, unless they themselves held the credential or provided training at their facilities for the credential. Therefore, many had knowledge of credentials like the Occupational Safety and Health Administration's (OSHA) Safety & Health Fundamental Certificate and Forklift Certifications, which are commonly held or required for many facilities, but were not familiar with many other types of credentials and what they represent.

For example, one hiring manager reflected on how they seek information for certifications they are not familiar with:

INTERVIEWER: DO YOU FEEL LIKE YOU KNOW ENOUGH ABOUT WHAT THESE CERTIFICATIONS ACTUALLY MEAN? WHAT ARE THE COMPETENCIES THEY REPRESENT?

INTERVIEWEE: NO, I DO NOT THINK I DO.

INTERVIEWER: WHERE DO YOU LOOK FOR INFORMATION, IF YOU ARE EVEN LOOKING FOR INFORMATION?

INTERVIEWEE: [I] LOOK IT UP ONLINE, JUST A GOOGLE SEARCH TO FIND OUT A LITTLE BIT MORE ABOUT IT.

This perspective is consistent with the previously described employer attitude that credentials were valued in the hiring process, but would not preclude the need for on-the-job training. As another supervisor commented:

HAVING THE CREDENTIAL AND HAVING THE SCHOOLING IS A GREAT WAY TO GET YOUR FOOT IN THE DOOR. BUT ONCE YOU'RE IN THE DOOR, THE BIGGEST TOOL IS ON-THE-JOB LEARNING... IT'S ONCE YOU'RE ON THE JOB AND LEARNING THINGS, THAT'S WHEN YOUR PRODUCTIVITY AND THE QUALITY OF YOUR WORKMANSHIP GOES UP AND YOU START TO REALLY LEARN HOW TO DO MORE THAN JUST WHAT YOU LEARNED IN SCHOOL.

This viewpoint suggests that manufacturing employers might find credentials to be a more effective part of the hiring process if they are specific to an industry or occupational role. However, increasing the number of credentials available amplifies the concern that employers are not familiar with the content of existing credentials.

## **EMPLOYERS RARELY SIGNAL VALUE FOR WORKERS' RECENTLY EARNED CREDENTIALS**

Although the overwhelming majority of employers stated they valued credentials, they reported that formal recognition or rewards to workers for new credentials was rare. Only a few workers stated that a new credential they earned resulted with some sort of recognition, particularly if the credential was not linked to a promotion, including: pay increases at different levels in an apprenticeship program; pay increases for welders who had more advanced certifications; a pizza party recognizing the first individual at an organization to obtain a license; recognition from a senior leader at the company (personal congratulations and handshake); and a new set of tools to use in their role.

Most employers confirmed this practice, revealing that there was no formal policy for recognition or pay increases around credential attainment, even though the majority claimed that their facility management was supportive of training and credentials. Interestingly, the majority of the employers interviewed stated that the companies did pay for training or credentials for their employees, so it seems they were investing in their employees even if they were not recognizing the results of their own investments.



# ADDITIONAL FINDINGS

## CAPACITY CONSTRAINTS EXIST FOR FRONTLINE WORKERS FOR ONLINE/REMOTE TRAINING AT SCALE

As mentioned in *Part 1: Background and Methodology*, this research was conducted during the COVID-19 pandemic, and the timeline was significantly impacted as interviews were challenging to schedule remotely.<sup>12</sup> The reason for this became evident as in-person visits and interviews were conducted—manufacturing facilities have few, if any, personal computers or laptops available for frontline workers to use. All personal computers or laptops are used by management and support staff in their daily work.

For their regular course of business, this is a very reasonable decision, as these would be highly underutilized assets in the facility. However, when one considers the shift in training and learning for many institutions of higher education and companies to online and/or on-demand learning, this same decision becomes a significant capacity constraint for facilities to participate in this type of training. Individuals currently need to rely on their personal devices to participate, which may preclude certain types of training (e.g., training in new software) or delay training until computers or laptops are available.

## LOCAL TRAINING PARTNERSHIPS DOMINATE

While not all employers had established formal partnerships with their local high schools, community colleges, or universities, all relationships mentioned during the interviews were with local partners. Supervisors were often very familiar with regional high school and relevant community college programs, both as potential sources for employees and as a resource for training. In a few cases, supervisors had worked with local community colleges to ensure that the programs taught skills relevant to their facility. Informal relationships were also exclusively with regional partners, including MEP Centers.

Certainly, employers indicated value for national certifications, but preparation for the assessments was typically done through a local or regional training partner—typically a high school or community college.

## **LOGISTICS/TRACKING SKILLS WAS A PART OF NEARLY EVERY WORKER'S ROLE**

Although this may be, in part, a reflection of the industries that were involved in this research, logistics and tracking of individual components was prevalent throughout the facilities, involving nearly every production worker and supervisor. For example, nearly all facilities that tracked productivity did so through the throughput of a widget, meaning that every part of something being manufactured was tracked through every piece of machinery in the facility. Therefore, all workers on the production line, from quality control and inspection to shipping and receiving, were involved in the logistics of the facility.

While it was not the primary focus of the majority of these workers' roles, logistics and tracking skills are critical to almost all jobs in manufacturing facilities. This data certainly suggests that education and/or training programs for entry-level jobs in manufacturing should include basic logistical concepts.



# DISCUSSION

## NO CLEAR SOURCE OF INFORMATION FOR CREDENTIALS

There is clearly a need for additional information for both employers and workers to learn about credentials that meet their needs. Currently, these two groups seem to rely on their previous experience with credentials, word-of-mouth, and internet searches for their knowledge.

Given the breadth of the roles and industries encompassed by the manufacturing sector and the equally large number of credentials spanning these roles and industries, there is a role for accreditation or other clear markers of quality to make credentials more efficient in hiring practices. At a minimum, there is a significant need to educate supervisors and hiring managers about the value of existing accreditation processes for certifications and certificates, as well as the validation processes of registered apprenticeships by the U.S. Department of Labor Office of Apprenticeship and recognized State Apprenticeship Agencies.

## REMEMBER THE SELF-SELECTION BIAS

Finally, as discussed in *Part 1: Background and Methodology*, the selection process through which these interviews were solicited (convenience group) probably means that the facilities that are more likely to value and use credentials were more likely to participate.<sup>13</sup> Therefore, when interpreting these results, any attempt to generalize them should consider that of the use of credentials in manufacturing is likely to be worse than the data reflects. For example, record keeping for skills and credentials may be overrepresented in this study, or employers may be recognizing credentials even less than these results report. On the positive side, this means that the findings may have an even larger impact than suggested by the data reported here.

# CONCLUSION

Overall, this research yielded numerous insights into the use and value of credentials in manufacturing, with a particular focus on how credentials are selected by individuals and are recognized by employers. The interviews revealed a strong value for credentials in manufacturing by both workers and employers. The research also reflects a gap in knowledge about how to find valuable credentials and use them more effectively in hiring and promotion, as well as a commitment from employers and workers to continue training/education to keep skills current.

And even though a convenience group was used in this study, the results are consistent with the existing literature on manufacturing credentials. Furthermore, the same themes were identified from individuals in different facilities, geographic locations, and industries, increasing confidence that these results are accurately reflecting the views of credentials in small- and medium-sized manufacturing facilities throughout the United States.

## RECOMMENDATIONS

A set of recommendations stemming from our findings has been developed in order to operationalize the results of this research and are included in the next report, *Examining the Return on Investment of Manufacturing Credentials: Recommendations*.<sup>14</sup>



**Background and Methodology**



**Results and Discussion**



**Recommendations**

# ENDNOTES

- 1 Workcred, *Examining the Quality, Market Value, and Effectiveness of Manufacturing Credentials in the United States* (July 2018), <https://share.ansi.org/wc/Shared%20Documents/Workcred-Reports/Manufacturing-Study/Examining-the-Quality-Market-Value-and-Effectiveness-of-Manufacturing-Credentials-in-the-United-States.pdf>.
- 2 The full interview guides can be found here: <https://share.ansi.org/wc/Shared%20Documents/Workcred-Reports/Manufacturing-Study/0693-0033-NIST-Workcred-Interview-Questions-OMB-Approved-08-03-2020.pdf>.
- 3 Workcred, *Examining the Return on Investment of Manufacturing Credentials: Background and Methodology* (July 2023), <https://share.ansi.org/wc/Shared%20Documents/Workcred-Reports/Manufacturing-Study/Examining-the-Return-on-Investment-of-Manufacturing-Credentials-Background-and-Methodology.pdf>.
- 4 Workcred, *Examining the Return on Investment of Manufacturing Credentials: Results and Discussion* (July 2023), <https://share.ansi.org/wc/Shared%20Documents/Workcred-Reports/Manufacturing-Study/Examining-the-Return-on-Investment-of-Manufacturing-Credentials-Results-and-Discussion.pdf>.
- 5 Workcred, *Examining the Return on Investment of Manufacturing Credentials: Recommendations* (July 2023), <https://share.ansi.org/wc/Shared%20Documents/Workcred-Reports/Manufacturing-Study/Examining-the-Return-on-Investment-of-Manufacturing-Credentials-Recommendations.pdf>.
- 6 Workcred, *Examining the Return on Investment of Manufacturing Credentials: Background and Methodology* (July 2023), <https://share.ansi.org/wc/Shared%20Documents/Workcred-Reports/Manufacturing-Study/Examining-the-Return-on-Investment-of-Manufacturing-Credentials-Background-and-Methodology.pdf>.
- 7 Author's note: Figure 3 includes the same credential information as Figure 4 from the first report, *Examining the Return on Investment of Manufacturing Credentials: Background and Methodology*.
- 8 Henry Renski, "Estimating the Returns to Professional Certifications and Licenses in the U.S. Manufacturing Sector," *Economic Development Quarterly* 32, no. 4 (2018): 341-356, <https://doi.org/10.1177/0891242418792090>.
- 9 Workcred, *Examining the Quality, Market Value, and Effectiveness of Manufacturing Credentials in the United States* (July 2018), <https://share.ansi.org/wc/Shared%20Documents/Workcred-Reports/Manufacturing-Study/Examining-the-Quality-Market-Value-and-Effectiveness-of-Manufacturing-Credentials-in-the-United-States.pdf>.
- 10 Author's note: The quotes used throughout these reports have been edited for clarity.
- 11 Author's note: The skills included in Figures 4 and 5 were mentioned as part of the response to interview questions about which skills individuals were planning to seek out and/or which skills employers thought were important in the future.
- 12 Workcred, *Examining the Return on Investment of Manufacturing Credentials: Background and Methodology* (July 2023), <https://share.ansi.org/wc/Shared%20Documents/Workcred-Reports/Manufacturing-Study/Examining-the-Return-on-Investment-of-Manufacturing-Credentials-Background-and-Methodology.pdf>.

- 13 Workcred, *Examining the Return on Investment of Manufacturing Credentials: Background and Methodology* (July 2023), <https://share.ansi.org/wc/Shared%20Documents/Workcred-Reports/Manufacturing-Study/Examining-the-Return-on-Investment-of-Manufacturing-Credentials-Background-and-Methodology.pdf>.
- 14 Workcred, *Examining the Return on Investment of Manufacturing Credentials: Recommendations* (July 2023), <https://share.ansi.org/wc/Shared%20Documents/Workcred-Reports/Manufacturing-Study/Examining-the-Return-on-Investment-of-Manufacturing-Credentials-Recommendations.pdf>.