



EXAMINING THE RETURN ON INVESTMENT OF MANUFACTURING CREDENTIALS

PART 1: Background and Methodology

JULY 2023

Published by

workcred
an affiliate of ANSI

In partnership with



**MEP • MANUFACTURING
EXTENSION PARTNERSHIP®**

The National Institute of Standards and Technology (NIST)
Hollings Manufacturing Extension Partnership (MEP)

ACKNOWLEDGEMENTS

This research work was performed under the financial assistance award 70NANB19H111 from the U.S. Department of Commerce, National Institute of Standards and Technology (NIST).

Additionally, Workcred would like to thank the following people and organizations for assisting in this research study:

- » Kyle Albert, Assistant Research Professor, George Washington Institute of Public Policy, George Washington University;
- » Stacey Jarrett Wagner, Principal, JarrettWagner Group, LLC;
- » The Hollings Manufacturing Extension Partnership (MEP) Centers; and
- » All the interviewees and participating manufacturing facilities.

SUGGESTED CITATION

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>.

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Published by Workcred, an affiliate of the American National Standards Institute.
Printed in the United States of America.

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1899 L Street, NW, 11th Floor
Washington, DC 20036

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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,¹ 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.

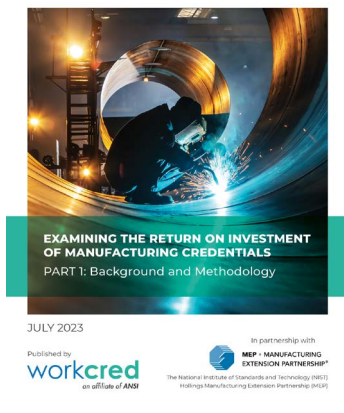
Workcred developed a set of three interview guides to use to address these questions with direct interviews with front-line workers (credential holders), hiring managers, and supervisors at small- and medium-sized manufacturing facilities.² By examining the viewpoints from these three different stakeholder 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?

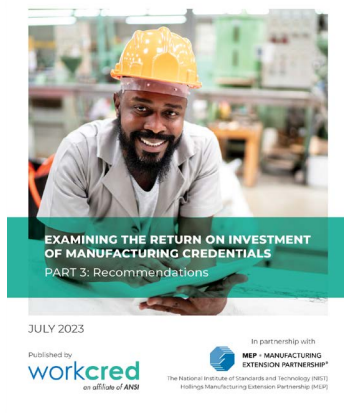
What is the return on employer and employee investments in credentials?



Part 1: Background and Methodology describes the types of facilities and individuals that participated in the research and analysis of the interviews.³ 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.⁴ 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.⁵ These recommendations are meant to be practical and actionable to make an immediate impact to support the manufacturing workforce.

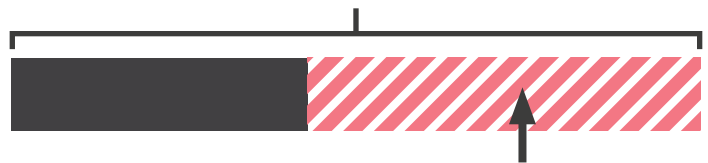
BACKGROUND

MANY MANUFACTURING JOBS ARE HIGHLY SKILLED AND DIFFICULT TO FILL

Studies confirm that skilled manufacturing jobs are difficult to fill and there is a shortage of individuals who possess the right skills. According to a study by Deloitte and the Manufacturing Institute, an affiliate of the National Association of Manufacturers, while nearly 3.5 million manufacturing jobs will likely be needed over the next decade, two million are expected to go unfilled due to this skills mismatch. As of 2017, nearly one-quarter of the sector's workforce are age 55 or older,⁶ suggesting that many people currently employed will soon reach retirement age, which will intensify the need to find new skilled employees. The COVID-19 pandemic has also revealed the increased need for domestic manufacturing of critical and/or essential supplies, which may result in new manufacturing facilities and additional demand for frontline workers in the U.S.

Furthermore, the U.S. manufacturing sector is being impacted by the larger workforce shift in the U.S. toward a knowledge-based economy, which can be defined as “production and service based on knowledge-intensive activities that contribute to an accelerated pace of technological and science advance[ment], as well as equally rapid obsolescence.”⁷ There is consensus from multiple studies that manufacturing facilities are impacted by digitization at every point along the value chain, although this impact will vary according to manufacturing sub-sector.⁸ This change will require workers to be trained to use these new digital tools. It will also require employers to

3.5 million manufacturing jobs will be needed over the next decade...



... 2 million of which could go unfilled due to skills mismatch.



One quarter of the sector's workforce is age 55 or older.

develop workforce planning and recruitment strategies that are agile and capable of finding individuals with the right skills sets.

MANUFACTURING WORKFORCE

The manufacturing workforce is comprised of more than 12 million workers, which includes more than 8 million production and nonsupervisory workers, as well as other frontline workers. While the recent pandemic has impacted employment in other sectors, the unemployment rate in manufacturing remains low: it was reported to be 1.8 percent in December 2022.⁹

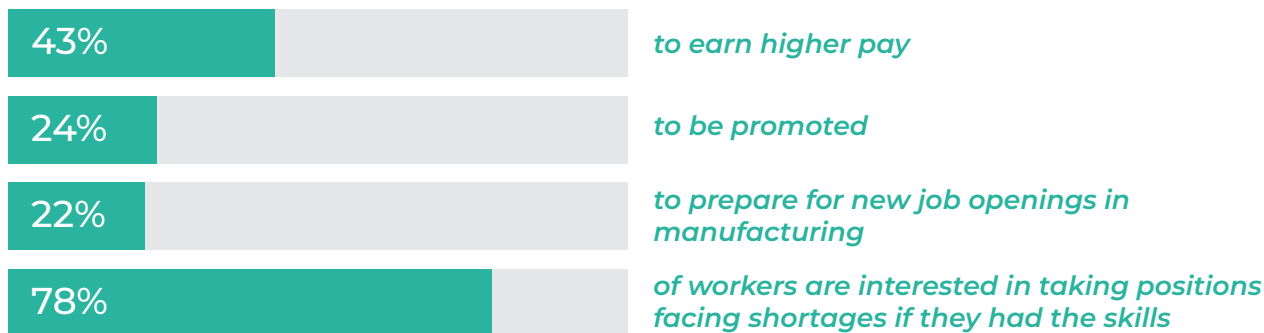
The majority of jobs in manufacturing are likely to require a high school diploma or less, although some may require a license or other credential. However, many frontline manufacturing workers are highly skilled, having acquired their abilities through on-the-job learning or other informal approaches, which are not typically tracked.

A 2018 survey of nearly 9,980 hourly manufacturing workers offers additional insight into the profile and motivations of frontline workers who learn new skills and earn credentials (see Figure 1).¹⁰

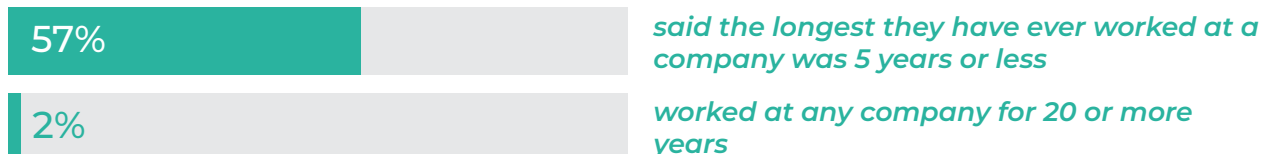
Figure 1: Motivations of Frontline Workers Seeking Credentials



The primary motivation for learning new skills was:



Manufacturing workers are highly mobile:



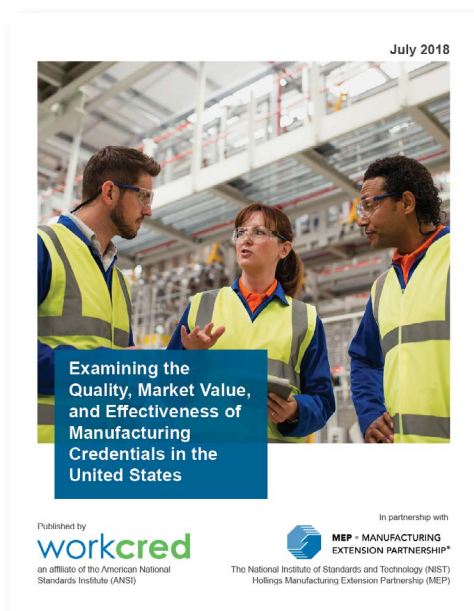
ROLE OF CREDENTIALS IN THE MANUFACTURING WORKFORCE

Credentials are powerful tools that can be used by workers and employers to more effectively and efficiently support personal and professional goals (see Figure 2). For many roles and occupations outside of manufacturing, credentials are used as a signal of skills, knowledge, and abilities. Advanced credentials and/or combinations of multiple credentials typically signal higher-level or specialized skills; this is especially true for post-graduate credentials. Employer demand for credentials, such as four-year degrees, has grown over the past decade, as seen in the increased requirement of baccalaureate degrees in job postings and wage premiums.¹¹

Figure 2: How Credentials Differ¹²

	CERTIFICATE	CERTIFICATION	DEGREE	LICENSE
Awarded by	Education and training providers, employers, labor unions, and industry associations	Industry certification bodies	Education institutions	Government agencies
Awarded after	An exam at the end of a training or education course or a one-time assessment	Third-party, independent competency assessment	Course of study	Meeting requirements of an occupation
Indicates	Education/knowledge/skills	Skill mastery / competencies	Education, successfully passed courses	Legal permission
Time to Complete	Variable, generally less than 2 years	Variable	Variable, generally 2 years or more	Variable
Time and Renewal Requirements	Often no time limit, no renewal requirement	Time-limited, includes recertification	No time limit, no renewal requirement	Time-limited, renewal generally required
Revocation Process	Cannot be revoked	Can be revoked for incompetence or unethical behavior	Cannot be revoked	Can be revoked for incompetence or unethical behavior
Examples	CNC Machinist, Global Supply Chain, Mechatronics	AWS Certified Welder, Certified Quality Inspector, Certified Supply Chain Professional	Bachelor of Science in Engineering	Electrician, Professional Engineer
Standard for Accreditation	ANSI/ASTM E2659-18, a globally recognized American National Standard	ANSI/ISO/IEC 17024:2012, an international and national standard	National, regional, or programmatic	State law defines scope of practice

Research has shown that manufacturing employers do not place the same emphasis on credentials when hiring. In a recent study, senior staff in manufacturing facilities in Michigan revealed that 80–95 percent of positions do not require any postsecondary credentials, and only 5–20 percent of positions in their facilities required formal training or education.¹³ However, this study had a narrow geographical area and encompassed only five manufacturing facilities and one association, making it difficult to generalize the findings.



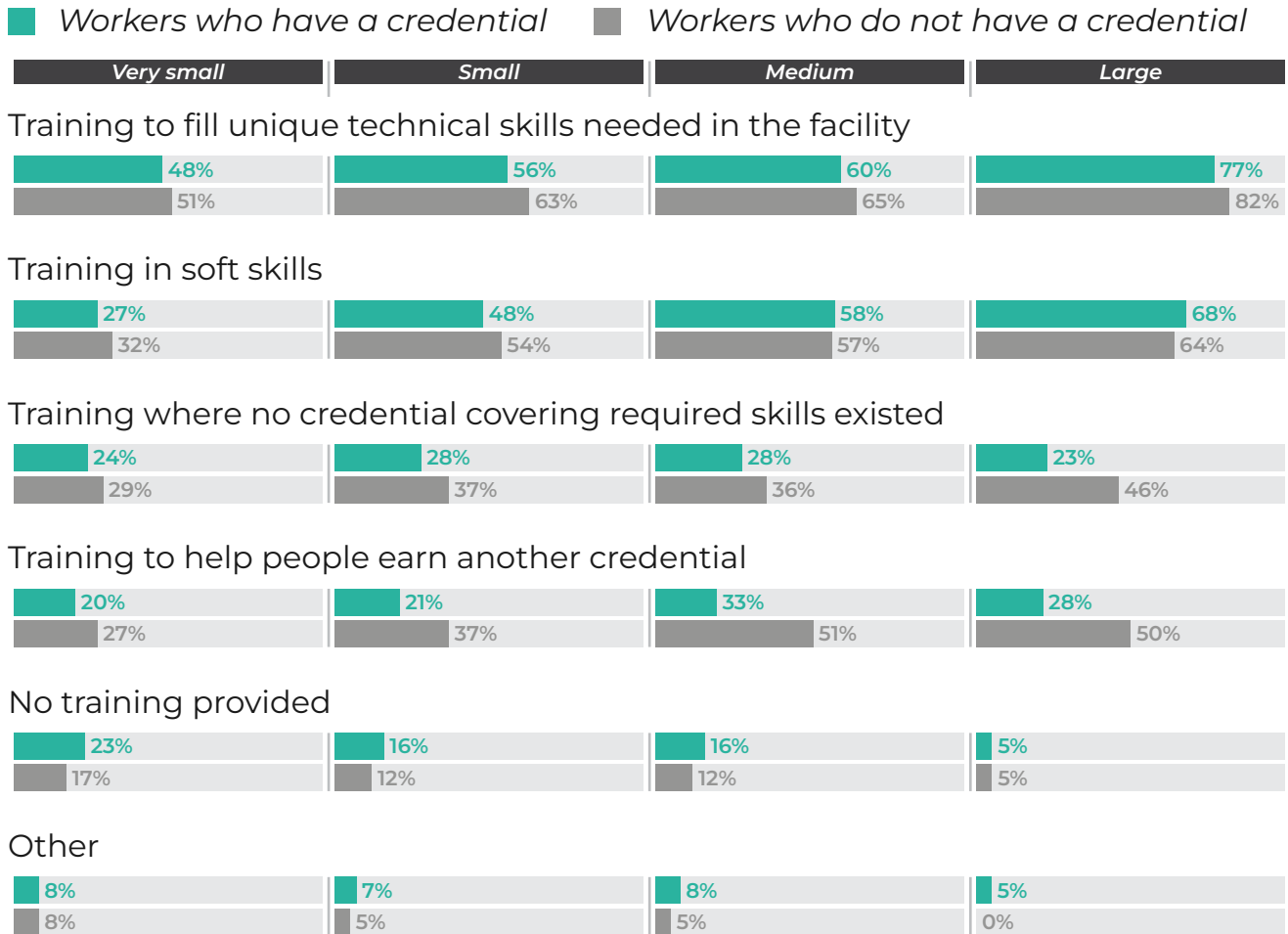
In 2018, Workcred completed a three-year research project, funded by NIST MEP, examining the quality, market value, and effectiveness of manufacturing credentials in the U.S.¹⁴ The project used a combination of surveys, focus groups, and literature reviews to examine nine research questions on the use of credentials by small, medium, and large manufacturing facilities throughout the U.S. Survey respondents (n=945) spanned more than 20 manufacturing sectors and included responses from facilities in all 50 states and Puerto Rico.

That study revealed that credentials have uneven use in the manufacturing industry and are not routinely required or used as a major factor in hiring or promotion decisions. Moreover, many manufacturers do not view credentials as the most relevant tools to identify new skilled personnel or as incentives to improve the quality of their existing workforce. In fact, manufacturers often did not know what credentials are available or how they are relevant to jobs in their workplace, which may stem from their belief that they need to train new employees regardless of whether or not they held a credential. In addition, manufacturers could not quantify whether credentials added value in terms of reduced cost or reduced training time.

That study also showed that the overwhelming majority of manufacturers are making significant investments in employee training (See Figure 3). Manufacturers provide 48–82 percent of their employees with training to fill the unique technical skills for their facility. They also provide up to 68 percent of their employees' training

in soft skills. Only 8 percent of employers are not providing skills training to their employees.

Figure 3: Type of Training to Up-skill Frontline Manufacturing Workers Who Do and Do Not Hold a Credential According to Facility Size¹⁵



Overall, this data shows that frontline manufacturing workers are highly mobile and skilled. It also suggests that while they have undergone extensive training, many lack credentials, resulting in a limited ability to validate their skills and competencies and communicate them to potential employers in a portable, transparent way. From the employer perspective, employers are making a significant investment in training and skills for their employees as they seek to develop a workforce that meets their evolving needs. However, this existing data also reflects a lack of knowledge of how credentials are currently being used by workers and employers in manufacturing, as well as identifying how they might be more effectively used to meet the needs of both of these groups.

RATIONALE FOR THIS STUDY

Due to the unanswered questions from the 2018 study, and to develop deeper insight into understanding the role and value of credentials in manufacturing, new research was needed. More specifically, Workcred designed this research study to understand how employers and workers value credentials, which credentials they value, and how they determine whether or not to pursue additional credentials.

As previously mentioned, the primary research questions addressed by this research study included how are U.S. manufacturing employers and workers using credentials, and what is the return on employer and employee investments in credentials?

Through the use of the three interview guides, Workcred conducted direct interviews with frontline workers (credential holders), hiring managers, and supervisors at small- and medium-sized manufacturing facilities. 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.



METHODS

This study relied on interviews with 51 individual workers, hiring managers, and frontline supervisors at 15 small- and medium-sized manufacturing facilities. To access workers, the study primarily relied on the NIST MEP's national network of MEP centers to help recruit manufacturing facilities willing to participate with the research. While the original plan was to conduct all interviews in-person, due to the COVID-19 pandemic the initial interviews were conducted remotely. However, as the pandemic eased, interviews returned to in-person.

Each facility was requested to provide at least one frontline worker/credential holder, one supervisor, and one hiring manager to participate in interviews. In many cases, the opportunity to interview additional workers within each group was offered and accepted. Interviews followed pre-approved interview guides, which were tailored for each role in the facility. In most cases, only one member of the research team conducted the interviews; therefore, we requested (and received) permission to record all interviews so that other members of the research team could also review and analyze the qualitative data collected at a later date. Interviewees were not compensated for their participation in this study, so every effort was made to avoid interfering in facilities' production schedules.

In general, interviews ranged in duration from 20–60 minutes. They were conducted on an individual basis unless individuals requested to be interviewed in a group format, and supervisors and hiring managers were interviewed separately from those who were identified solely as credential holders to avoid any situation in which supervisors' or hiring managers' presence could influence responses.

FRONTLINE WORKERS/CREDENTIAL HOLDERS

The interview questions for frontline workers/credential holders focused on identifying the characteristics of each post-secondary credential held, asking them to provide information about the attributes (e.g., issuers, renewal cycles, continuing education requirements) of credentials they held that did not yet appear in third-party databases such as the U.S. Department of Labor Employment and Training Administration's Certification Finder.¹⁶ We also collected data on credentials that

appeared at the time to be unrelated to manufacturing in the interest of understanding the value of non-manufacturing credentials to manufacturing workers. Credentials within scope for this part of the interview included certificates, certifications, apprenticeships, badges, licenses, and associate, baccalaureate, and graduate degrees—though the majority of credentials reported in these interviews were certifications and certificates.

For each credential, the interview questions attempted to gauge the value of the credential as perceived by the credential holder and any direct benefits the credential holder experienced in his or her day-to-day employment from holding the credential. Credential holders were also questioned regarding their plans for obtaining additional credentials, the availability of support within their organizations for earning credentials, and their general view of the value of credentials.

As we proceeded with our research, we found that the term “credential holder” in reference only to frontline workers was somewhat limiting insofar as supervisors and hiring managers were equally likely, if not more likely, to hold credentials relevant to the manufacturing sector. As such, some individuals originally recruited through the supervisors and hiring managers groups volunteered to complete the credential holder interview in addition to the interview for their primary role. In fact, we interviewed multiple individuals fitting into each group in most facilities.

SUPERVISORS

Supervisors were asked a tailored set of interview questions focusing on their perceptions of the value of credentials. Rather than focusing on the attributes of specific credentials, the interview questions for supervisors focused more on general perspectives on credentials in the manufacturing sector, including their quality and the adequacy of currently available credentials to meet the facility’s business needs. Supervisors were also asked about how they track and reward credential attainment within the facility’s workforce. As noted above, some supervisors also volunteered to answer questions from the credential holder questionnaire in cases where they personally held manufacturing credentials.

HIRING MANAGERS

Hiring managers responded to a set of questions that focused on the role of credentials in the hiring process. The questions attempted to gain insight into which credentials were perceived to be of value when hiring for specific roles and what trends they observed in the credentials held by individuals applying for positions in their organizations. Questions also addressed partnerships firms may have with specific training providers and firm-wide or facility-level policies that support credential attainment, such as the criteria against which requests for certification fee reimbursement would be considered. Again, as relevant, hiring managers were sometimes asked about their own credentials in situations in which they could also be counted as credential holders.



Members of the research team met to compare notes from interviews they conducted and share initial reflections, which were confirmed by referencing the interview transcripts. The analysis looked for patterns in which multiple individuals across multiple facilities confirmed a particular insight or theme, whether about a particular credential or type of credential, or a particular facility-level practice. These common themes that emerged were again cross-referenced against our database to ensure that our insights reflect actual practice in the manufacturing sector. Where appropriate, we considered discrepancies between our findings and those of the relatively few other researchers who have also examined workforce development in the manufacturing sector.

SAMPLING STRATEGY AND OUTREACH

The study primarily relied on local MEP Centers to help source facilities to participate in our research. The research team visited any manufacturer involved in producing any type of product, regardless of location or size (though MEP Centers primarily serve small- and medium-sized facilities).

Recruitment of facilities willing to participate and scheduling the interviews was a significant hurdle for this study. The structure of this research (interviewing a credential holder, hiring manager, and supervisor from the same facility) required outreach to facility managers rather than directly recruiting these interviewees. This meant that these managers were gate-keepers for conducting any interviews. While representatives of facilities that declined to participate generally did not give specific feedback on why they declined, some may have perceived participating in research to represent an administrative or logistical burden.

EFFECT OF COVID-19 ON THE RESEARCH PROCESS

The COVID-19 pandemic—and the associated changes to facilities' visitor policies and general strain that it placed on organizations—was a root cause of the difficulty in organizing research visits, and affected every phase of this study. The initial outbreak occurred just as the project team was finalizing the interview guides in February 2020, which delayed the process to obtain administrative approval from the U.S. Office of Management and Budget and George Washington University's Institutional Review Board.

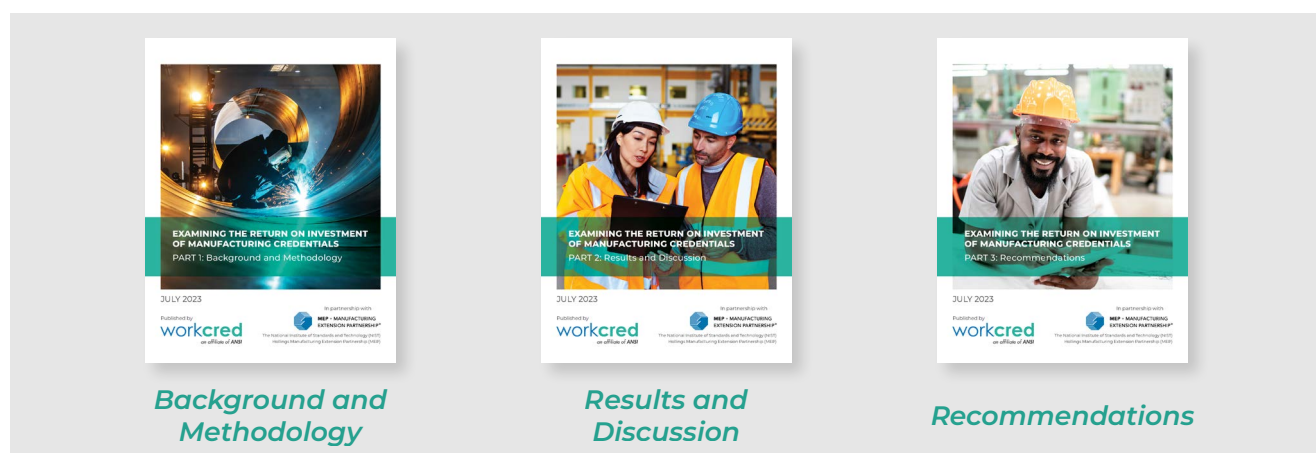
Once approval was in hand, public health conditions required conducting all interviews virtually, which was another hurdle. Manufacturing facilities struggled to coordinate these virtual visits for a reason that became evident after visiting the facilities in person: facilities have very few computers accessible to frontline workers, as most machines on the production floor are not operated by personal computers. Even when computers existed within a facility and were accessible to individuals most likely to be classified as credential holders, they may not have been equipped for virtual conferencing.

Project members began conducting in-person site visits in August 2021; however, the COVID-19 pandemic continued to impact the interviews—for example, one facility in Tampa had to cancel their scheduled interviews due to an outbreak of the Delta variant within their facility. Other facilities' senior management provided feedback that they were reluctant to have non-essential, outside individuals visiting due to the risk of COVID-19 transmission. Moreover, the inconsistencies in supply and demand for labor unleashed by the global pandemic put a strain on many of the facilities visited. Several interviews were scheduled and then canceled due to staffing limitations—frontline workers were needed on the production line and could not participate in interviews.

Nevertheless, participating facilities are diverse enough to represent the experiences of many small- and medium-sized manufacturing firms in the U.S., although the study likely would have benefited from the participation of additional manufacturers.

RESULTS

The results of this research are further discussed in the next report, *Examining the Return on Investment of Manufacturing Credentials: Results and Discussion*.¹⁷



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>.
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- 11 Emily Rolan, *Occupational Employment Projections Through The Perspective Of Education And Training* (U.S. Bureau of Labor Statistics 2019), <https://www.bls.gov/spotlight/2019/education-projections/pdf/education-projections.pdf>; Anthony Carnevale, et al., *Recovery: Job Growth and Education Requirements Through 2020* (Georgetown Public Policy Institute 2013), <https://cew.georgetown.edu/cew-reports/recovery-job-growth-and-education-requirements-through-2020/>.

- 12 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>.
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- 16 For more information about the U.S. Department of Labor, Employment and Training Administration's Certification Finder, visit <https://www.careeronestop.org/Toolkit/Training/find-certifications.aspx>.
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