



2019 Manufacturing Technology Harmonization Study

Executive Summary
April 2019

ABOUT THE MANUFACTURING TECHNOLOGY HARMONIZATION STUDY

Many organizations struggle with new technology insertion into their manufacturing enterprises. SME conducted the Manufacturing Technology Harmonization Study to understand how companies approach this challenge of integrating smart manufacturing, big data, and both new and old capital equipment in a cost-effective and practical implementation.

The Manufacturing Technology Harmonization Study aims to understand the process of new technology insertion into manufacturing organizations. Identifying the need for improvement, developing the business case for investment, in-house versus vendor implementation/training, and the effect on the workforce, as well as productivity and cost implications, are all covered in this study.

STUDY METHODOLOGY

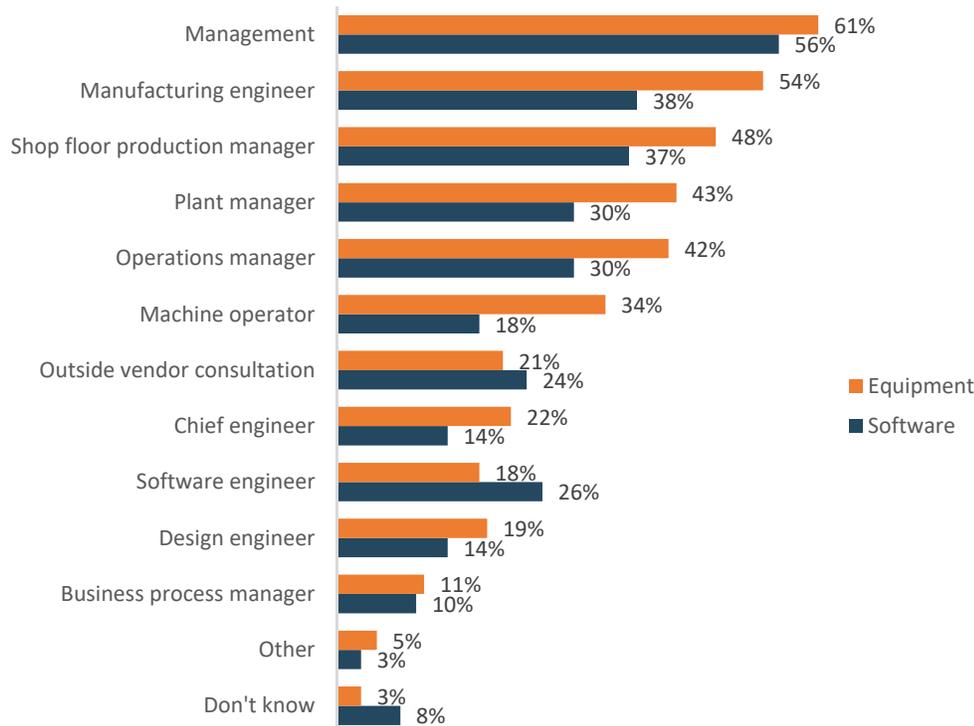
- **Target Audience:** Manufacturing industry professionals that are providers of discrete parts, components, or sub-assembly
- **Survey Method:** Online
- **Average Survey Length:** 6 minutes
- **Field Dates:** March 18-25, 2019
- **Completed Returns:** 251

More than half of respondents (59%) indicated their organization has a standardized process for implementing new technology on the production floor. Large organizations with more than \$5 million in annual revenue are significantly more likely to have a standard process compared with smaller companies (70% vs. 33%). On average, organizations are implementing 3-4 new technologies at any given time, with half implementing 2-5 at a time.

Software is not updated frequently on machines on the production floor. Slightly less than one-quarter (22%) of respondents disclosed that their software is updated every few years, while another 18% said software is updated yearly. One-fifth indicated that software on their production floor is almost never updated – this figure jumps to one-third among fabricated metal products organizations.

Recommendations for new equipment and software most frequently come from a combination of management, manufacturing engineers, and shop floor production managers, although there are more individuals involved when recommending new equipment than when recommending new software (an average of 3.8 people vs. 3.1). Operations managers tend to be more involved in these recommendations for large organizations with more than \$5 million in annual revenue (52% for equipment recommendations and 39% for software recommendations).

Recommenders for New Software & Equipment



When installing new software and equipment on the production floor, it is typically a joint effort between the vendor and in-house staff, especially for large companies with more than \$5 million in annual revenue. Companies with lower revenue were more likely to have the vendor onsite to troubleshoot any problems.

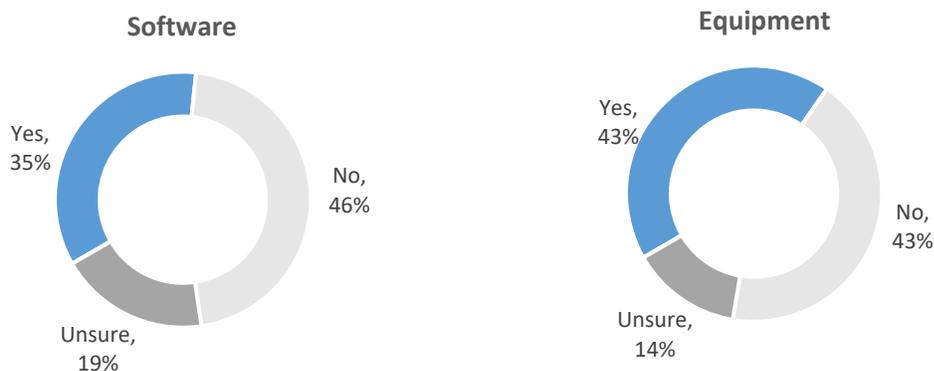
How Installations are Handled on the Production Floor

	Total Respondents	Organizations with <\$5 million in revenue	Organizations with \$5 million or more in revenue
SOFTWARE			
Vendor onsite for installation	8%	20% ▲	5%
In-house staff handles installation	28%	26%	23%
Both vendor & in-house staff	59%	54%	68% ▲
EQUIPMENT			
Vendor onsite for installation	17%	37% ▲	11%
In-house staff handles installation	16%	22%	11%
Both vendor & in-house staff	65%	41%	76% ▲

Organizations are most likely to have both the vendor and in-house staff complete a full analysis prior to integration to ensure compatibility between the old and new software and equipment. Slightly less than half of respondents indicate that their organizations utilize a joint effort when introducing new software and just over half when introducing new equipment. Less than a fifth ensure this compatibility strictly in-house and even fewer rely solely on the vendor.

During new software integrations and equipment installations, less than half have tailored training programs prior to the integration on the production floor.

Provide Tailored Training Programs Prior to Integration



Of those organizations that do have a training program in place, employees are required to complete multiple types of training. The most common requirement for employees to complete is to provide work instructions or internal process documentations.

Top 5 Training Requirements when Implementing New Software

1. Provide work instructions or internal process documentations (66%)
2. Provide a technical or operator's manual (52%)
3. Hands-on simulations (47%)
4. Training from a 3rd party vendor (46%)
5. Provide job aids (i.e. cheat sheets) (43%)

Top 5 Training Requirements when Implementing New Equipment

1. Provide work instructions or internal process documentations (65%)
2. Vendor training (58%)
3. Provide a technical or operator's manual (57%)
4. Hands-on simulations (51%)
5. Training from a 3rd party vendor (51%)

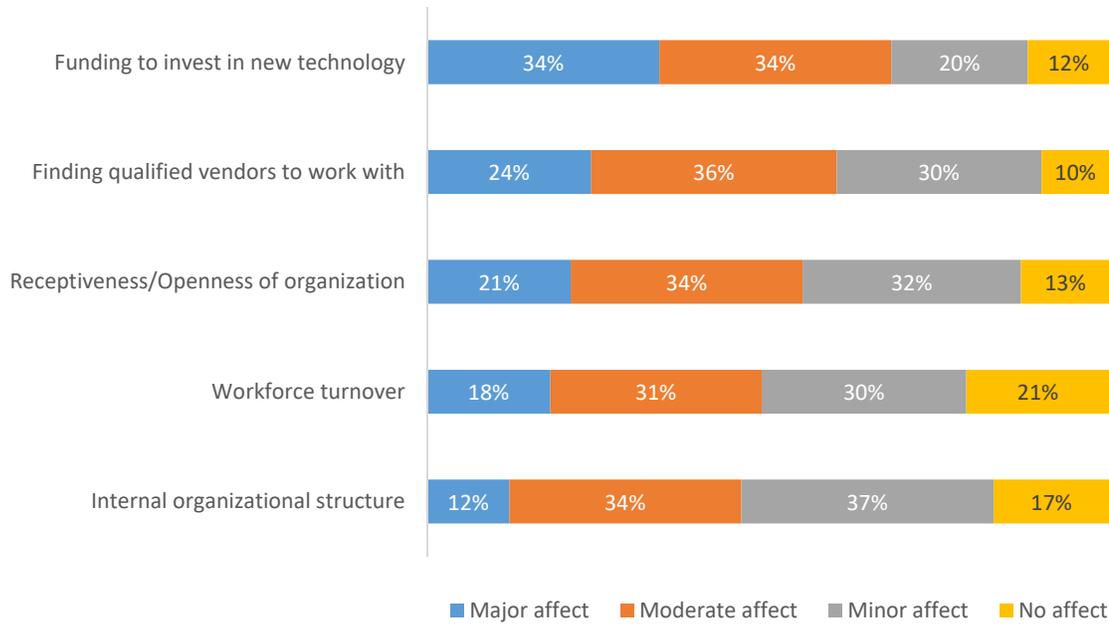
Larger organizations are more likely to have a training program and are also more likely to require employees to complete most of these training tasks compared with smaller companies.

Machine operators, shop floor production managers, and manufacturing engineers are the workforce most often trained on both the new software and equipment. For companies with less than \$5 million in annual revenue, slightly over one-third of respondents indicated that management is trained on new software.

Whether implementing new software or equipment on the shop floor, organizations were consistent in how they measure the effectiveness of employee training on these new technologies. The top methods of measuring effectiveness are determining if there are fewer defective parts/waste, followed by increased output, and a reduction in rework time necessary on parts. One-half to two-thirds of respondents gave at least one of these three methods. Although mentioned far less, 18% measure the training for new software by needing fewer employees on the shop floor and 27% measure the training for new equipment in this manner.

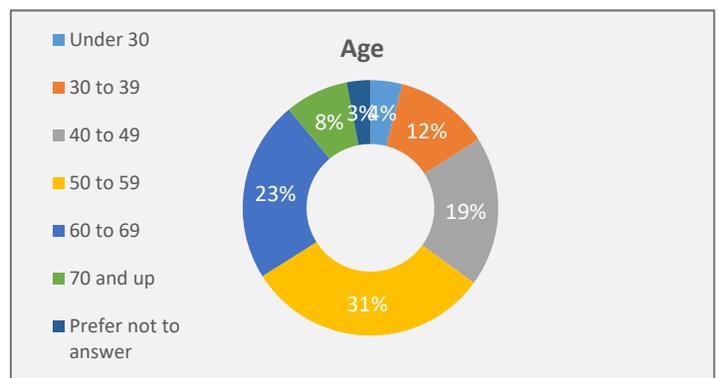
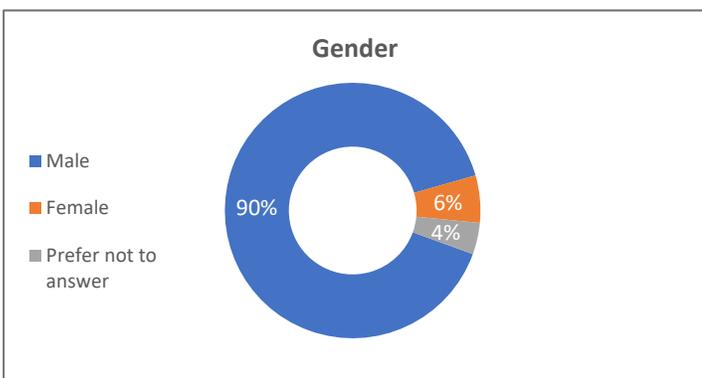
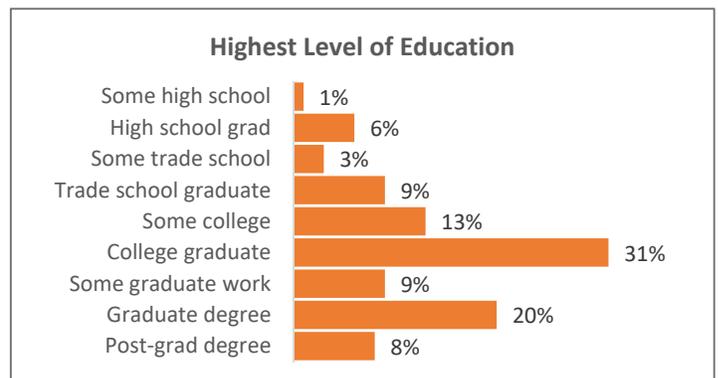
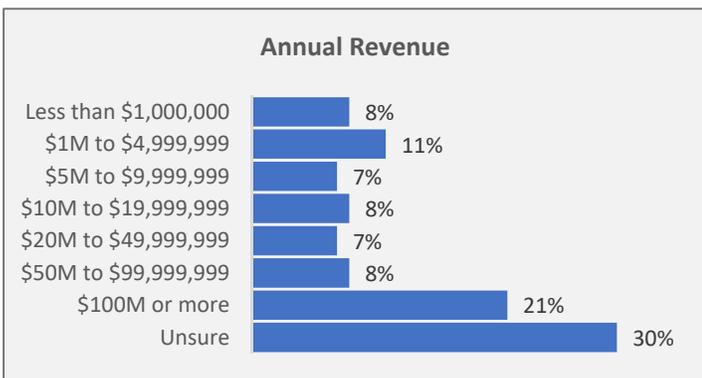
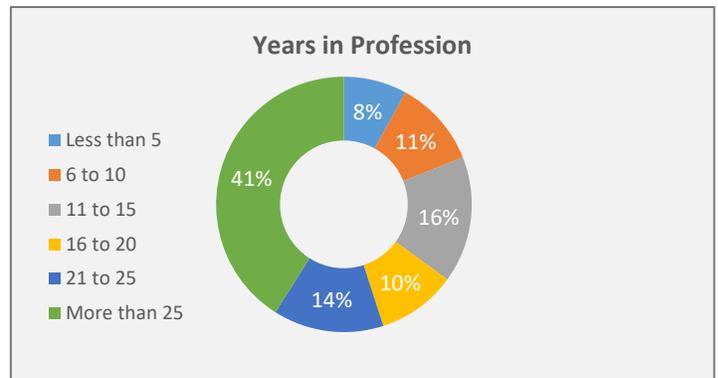
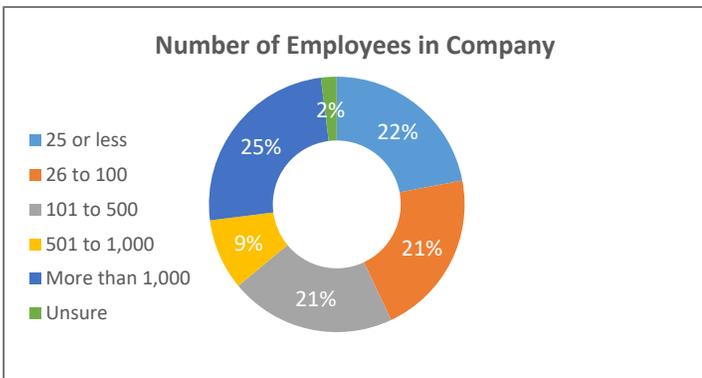
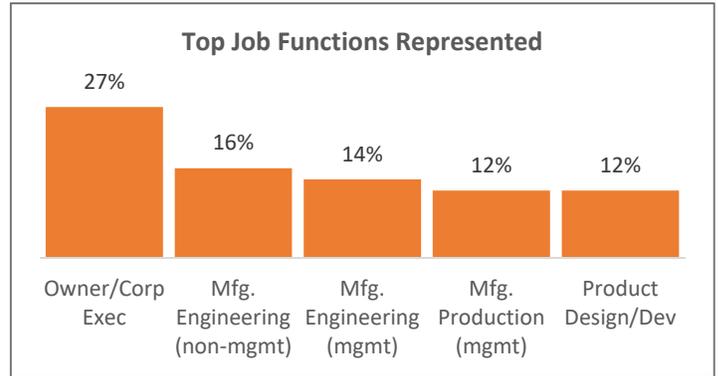
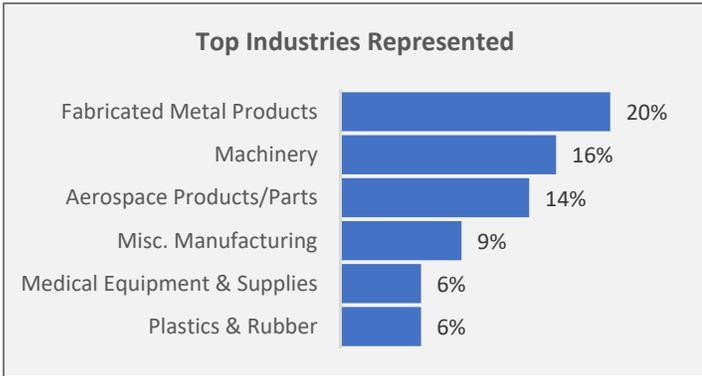
Funding is the number one obstacle in adopting new technology on the production floor. Finding qualified vendors can also be difficult for many organizations. Uniquely, among fabricated metal companies, receptiveness/openness of their organization has the most major effect in adopting new technology (31%).

Effect of Factors in Organization’s Ability to Adopt and Harmonize New Technology on Production Floor



On average, organizations have 3 to 4 training programs that are required for production floor employees. Safety training (89%), new employee orientation (83%), validated standard work instructions (62%), and compliance training (57%) were most frequently mentioned. Certifications (38%) and off-floor learning labs (19%) were mentioned less often. Organizations with more than \$5 million in annual revenue are significantly more likely to offer all these training programs compared with smaller organizations.

RESPONDENT PROFILE



CONTRIBUTORS

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ABOUT SME

SME connects manufacturing professionals, academia and communities, sharing knowledge and resources to build inspired, educated and prosperous manufacturers and enterprises. With more than 85 years of experience and expertise in events, media, membership, training and development, and also through the SME Education Foundation, SME is committed to promoting manufacturing technology, developing a skilled workforce and attracting future generations to advance manufacturing.

ABOUT SME BUSINESS INTELLIGENCE

SME Business Intelligence was created to focus on delivering research solutions to the manufacturing industry. Managed by experienced market research professionals, SME Business Intelligence is dedicated to delivering high-quality insights by effectively integrating market research and market intelligence. This integration of research and intelligence provides a unique approach to support and develop both advanced technologies and the workforce in the manufacturing industry.

ABOUT AERODEF MANUFACTURING®

AeroDef Manufacturing® is an aerospace manufacturing and defense manufacturing conference and trade show for the aerospace and defense manufacturing industry. Produced by SME, in partnership with industry OEMs, our mission is to foster innovation across the extended enterprise to reduce costs, expedite production times and maintain manufacturing competitiveness in the global economy. AeroDef showcases the industry's most advanced technologies across an innovative floor plan designed to facilitate interaction and business relationships between exhibitors and buyers looking for integrated solutions.

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