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## 2020 Manufacturing Technology Harmonization Study

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Executive Summary  
June 2020





### *About the Manufacturing Technology Harmonization Study*

Many organizations struggle with new technology insertion into their manufacturing enterprises. SME Media 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.

Now in its second year, 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*

The sample selection for the Manufacturing Technology Harmonization Study was taken from the SME database, selected on an nth name basis. Respondents are from organizations that are providers of discrete parts, components, or sub-assembly. The 2020 findings are all statistically equal to 2019, with the only exception being an increase in the percentage of respondents representing fabricated metal products (30% this year vs only 20% last year).

	Survey Method	Average Survey Length	Field Dates	Completed Surveys
2020	Online	6 min.	April 21 - May 5, 2020	193
2019	Online	6 min.	March 18-25, 2019	251

Tabulations were generated using a statistical package, SPSS. Questions receiving fewer than 30 responses were not included in the report due to low sample size. Sample sizes of 30 respondents or greater are generally considered to be statistically reliable, meaning if the study were to be run again with a different random sample, results would not differ significantly.

Throughout the report, results of statistical significance are presented to illustrate data that is significantly significant at a 95 percent confidence level. This confidence level means there is reasonable support that the results are actually different and not different due to error or variance in the data. Testing results illustrate data points that are different enough that they fall outside the margin of error. That is, if the study were to be conducted multiple times with the same population, these data points would still be statistically different 95 percent of the time.



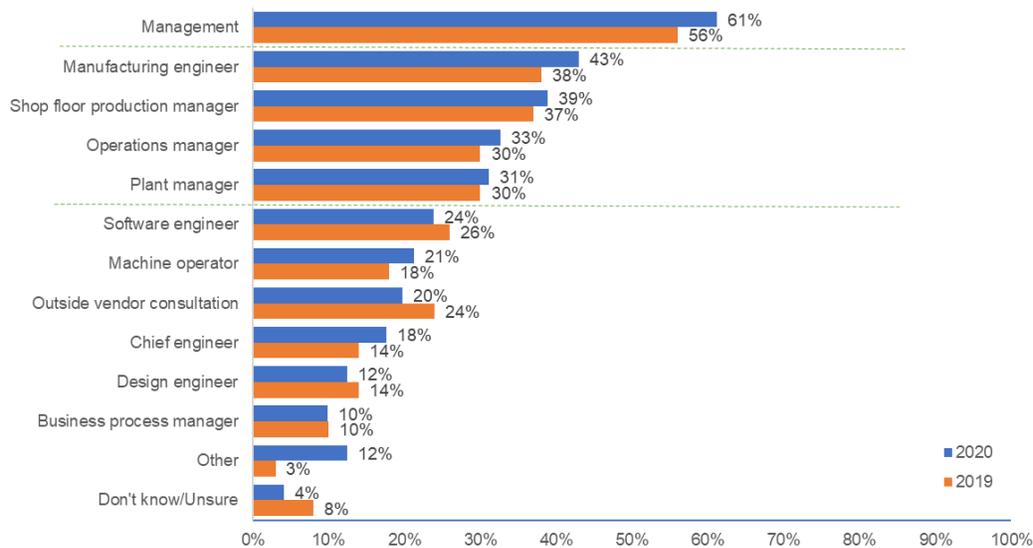
**Technology Implementation Process**

Comparable to the 2019, more than half of respondents indicated that their organization has a standardized process for implementing new technology on the production floor (59% in 2019 vs. 56% in 2020). Also comparable to last year, organizations are, on average, implementing 3-4 new technologies at any given time, with half implementing 2-5 at any given time.

**Technology Implementation Process - Software**

Software continues to not be updated frequently on production floor machines, with less than one-in-five respondents indicating that their software is updated yearly and another one-in-five being updated every few years (15% and 16%, respectively). However, year-over-year, one-quarter (28%) fewer respondents indicated that their software is updated every few years, which means more companies are waiting longer to upgrade. Organizations with revenue under \$5 million are more significantly more likely to update their software daily than organizations with larger revenues (11% vs. 3%, respectively).

**GRAPH 1: Recommenders for New Software**



Please note, the arrows represent a statistically significant difference in the data between years while the dotted line represents a statistically significance in the data within the same year.

Recommendations for new software most frequently come from Management, followed by Manufacturing engineers, Shop floor production managers, Operations managers and Plant managers. On average, 3.3 individuals from an organization are involved when recommending new software, comparable to last year.

When introducing new software on the production floor, it is typically a joint effort between the vendor and in-house staff. Organizations with \$5 million or more in revenue, between the two years, noted significant drop in respondents that indicated their company utilized a joint effort approach and appear to be moving toward new software introductions being either handled completely by the vendor or in-house.



### CHART 1: How Installations Are Handled On The Production Floor - Software

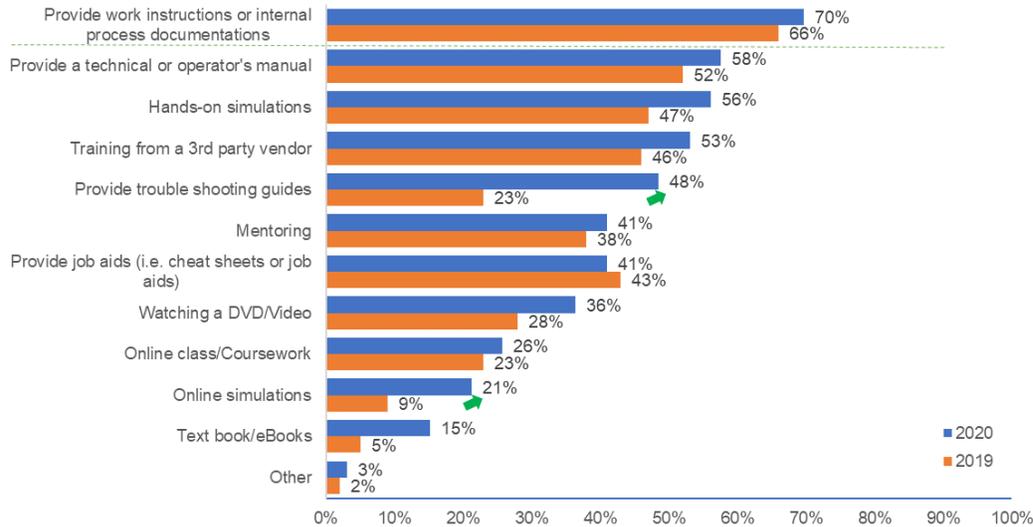
	Organizations with less than \$5 million in revenue		Organizations with \$5 million or more in revenue		Study average	
	2020	2019	2020	2019	2020	2019
	Vendor onsite for installation	16%	20%	10%	5%	12%
In-house staff handles installation	30%	26%	28%	23%	31%	28%
Both vendor & in-house staff	48%	54%	59%	68%	52%	59%

Please note, the arrows represent a statistically significant difference in the data within the same year.

In both the 2019 and 2020 studies, respondents indicated their 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 new and old software.

During new software integrations, less than half have tailored training programs prior to integration on the production floor. Of those organizations that do have a training program in place, employees are required to complete multiple types of training, primarily reviewing work instructions or internal process documentations.

### GRAPH 2: Training Requirements When Implementing New Software



Please note, the arrows represent a statistically significant difference in the data between years while the dotted line represents a statistically significance in the data within the same year.

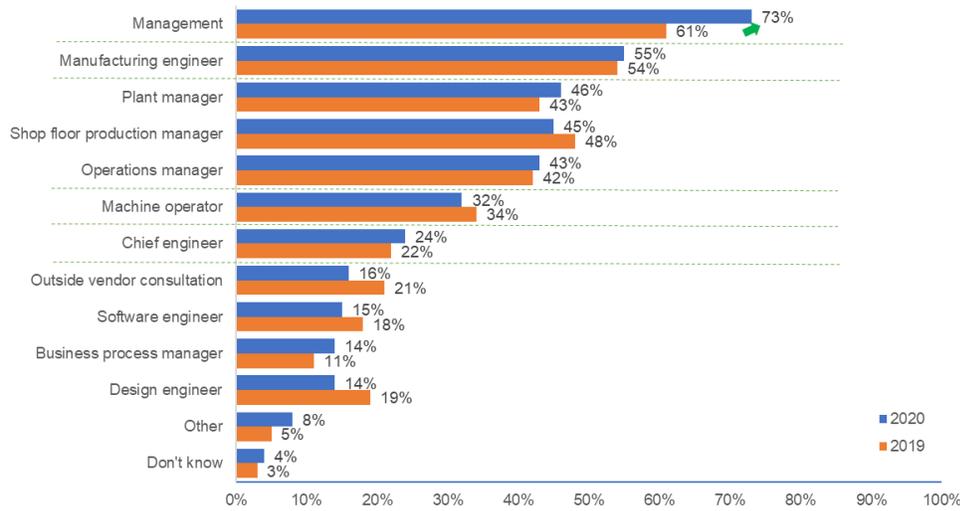
Respondents indicated that the ways their organizations measure training effectiveness is primarily through fewer defective parts/waste (64%) and increased per-hour part output (or equivalent) (61%), followed by reduced rework time necessary on parts (53%).



### Technology Implementation Process - Equipment

Recommendations for new equipment most frequently come from Management, followed by Manufacturing engineers, then by Plant managers, Shop floor production managers and Operations managers. Respondents noted a 20% increase in the involvement of management as recommenders for new equipment from the 2019 to 2020 study, up from 61% to 73%, respectively. On average, 3.9 individuals from an organization are involved when recommending new equipment, comparable to last year.

**GRAPH 3: Recommenders for New Equipment**



Please note, the arrows represent a statistically significant difference in the data between years while the dotted line represents a statistically significance in the data within the same year.

Organizations with more than \$5 million or more in revenue are significantly more likely than the study average to jointly use vendors and in-house staff. However, compared to last years' study, organizations with less than \$5 million in revenue are significantly more likely to introduce new equipment onto the production floor through a joint effort between the vendor and in-house staff. Slightly over half of respondents (52%) indicated that their companies are most likely to have both the vendor and in-house staff perform a complete analysis prior to integration between new and old equipment prior to integration.

**CHART 2: How Installations Are Handled On The Production Floor - Equipment**

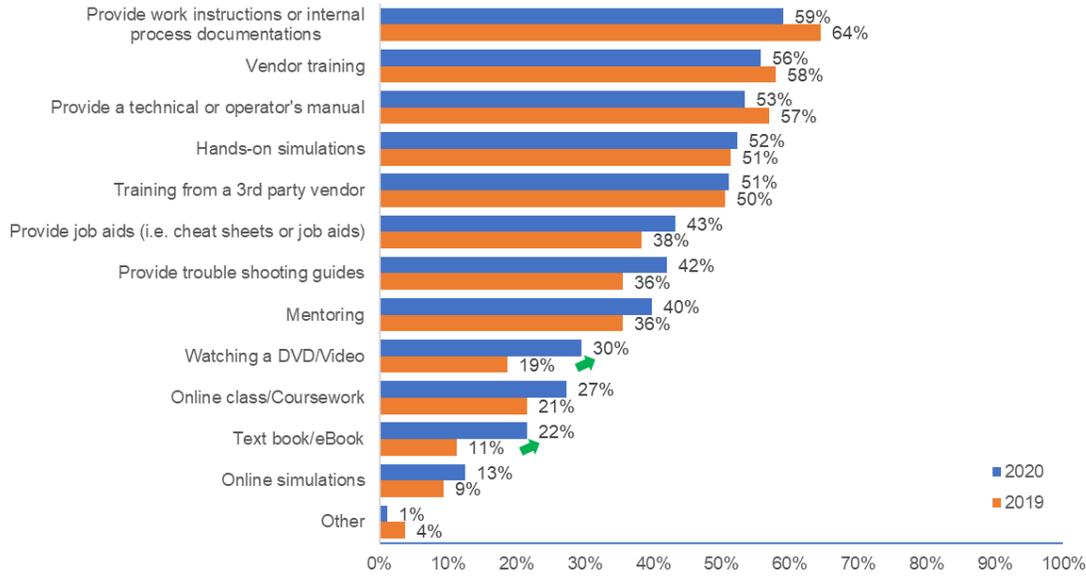
	Organizations with less than \$5 million in revenue		Organizations with \$5 million or more in revenue		Study average	
	2020	2019	2020	2019	2020	2019
Vendor onsite for installation	23% ↓	37%	13%	11%	17%	17%
In-house staff handles installation	23%	22%	14%	11%	18%	16%
Both vendor & in-house staff	48% ↑	41%	72%	76%	61%	65%

Please note, the arrows represent a statistically significant difference in the data between years, while shading in represents a statistical difference against the study average for the same year.

Slightly less than half of respondents indicated that their company has a tailored training program prior to the integration of new equipment on the production floor. Of those organizations that do have a training program in place, the most common requirement is for employers to provide work instructions or internal process documentation to employees.



**GRAPH 4: Training Requirements When Implementing New Equipment**

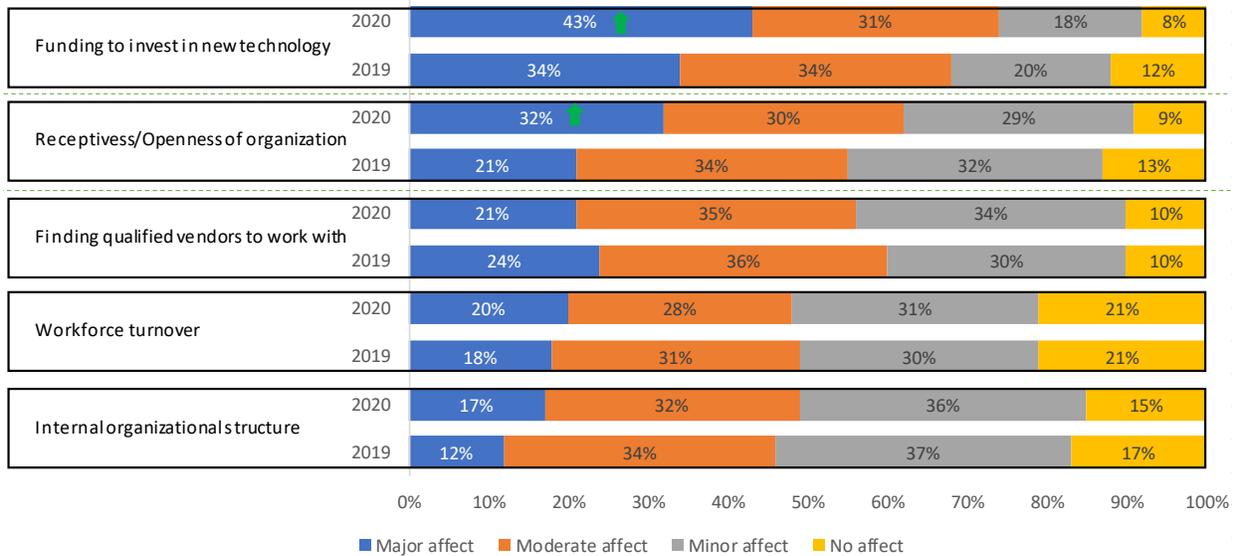


Please note, the arrows represent a statistically significant difference in the data between years.

**Workforce**

Funding to invest in new technology continues to be the primary obstacle in adopting new technology on the production floor, followed by receptiveness/openness of the organization. Year-over-year, funding to invest in new technology and receptiveness/openness of organization increased by 26% and 52%, respectively, as a major affect on their organization’s ability to adopt and harmonize new technology on the production floor.

**GRAPH 5: Affect of Factors in Organization’s Ability to Adopt and Harmonize New Technology on Production Floor**

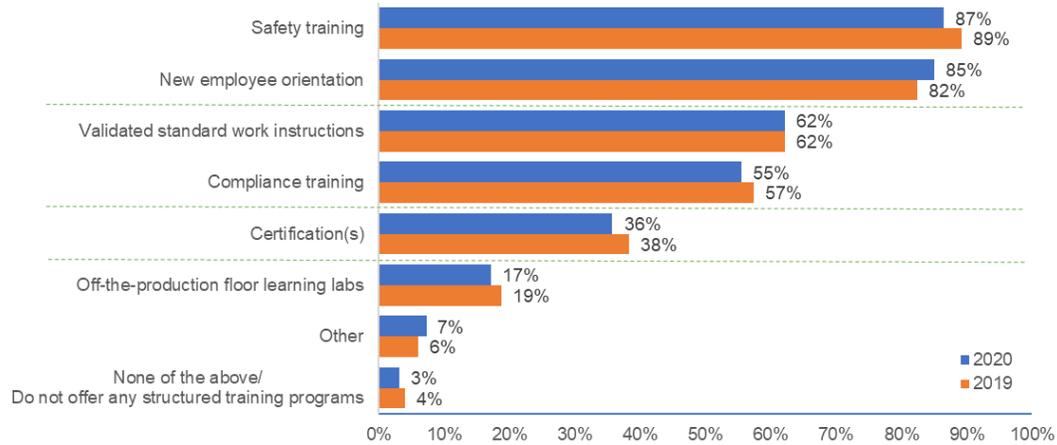


Please note, the arrows represent a statistically significant difference in the data between years while the dotted line represents a statistically significance in the data within the same year.



Comparable to the 2019 study, organizations have 3-4 training programs that are required for production floor employees, with the primary training programs being safety training and new employee orientation, followed by validated standard work instructions and compliance training. Organizations with more than \$5 million in annual revenue are significantly more likely to offer most of these training programs compared to organizations with less than \$5 million in annual revenue (an average of 3.7 training programs vs. 3.0 training programs, respectively).

**GRAPH 6: REQUIRED TRAINING PROGRAMS FOR PRODUCTION FLOOR EMPLOYEES**



Please note, dotted line represents a statistically significance in the data within the same year.



## **CONTRIBUTORS**

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## **ABOUT SME MEDIA**

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## **ABOUT AERODEF MANUFACTURING®**

AeroDef Manufacturing® is an aerospace and defense manufacturing conference and trade show. Produced by SME, in partnership with 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 Manufacturing® 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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