2022 Smart Manufacturing Market Survey
EXECUTIVE SUMMARY

We have been tracking the Smart Manufacturing market for over 5 years with quantitative and qualitative primary research. This survey continues our research into the Smart Manufacturing market and aims to support its participants with information about the strategies necessary to make them leaders in the 21st century.

Study Methodology

The sample selection for the 2022 Smart Manufacturing Market Survey was taken from the SME database, selected on an nth name basis as well as CESMII provided sample.

2022	Survey Method	Avg. Survey Length	Field Dates	Completed Surveys
	Online	6 minutes	March 15 - April 18	246

Tabulations were generated using a statistical package, SPSS. 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.
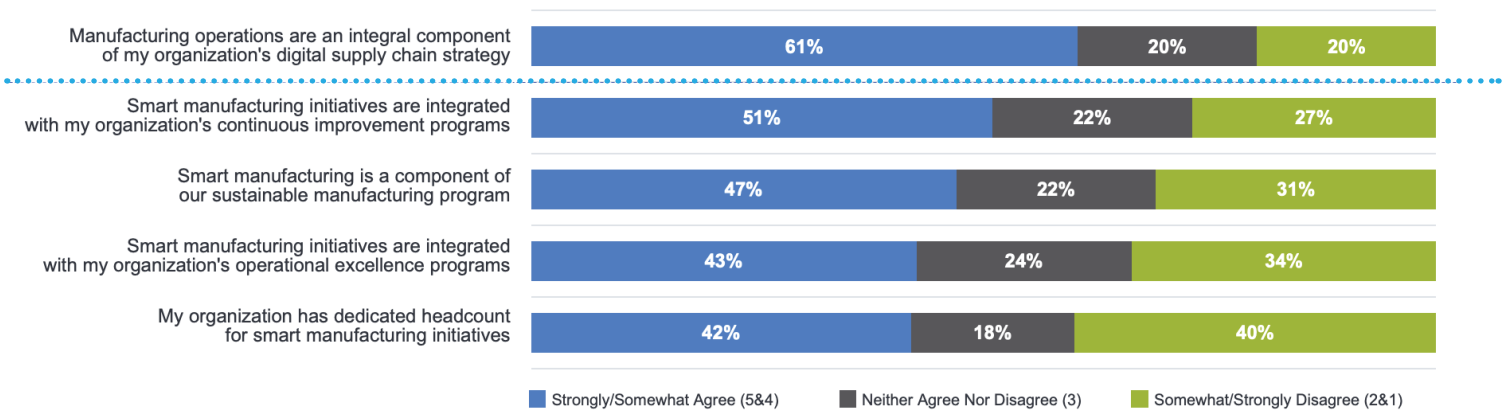
Current Smart Manufacturing Strategy

Smart manufacturing continues to follow the 1/3 rule, where 1/3 of respondents indicated that their company has no formal strategy (31%), another 1/3 of respondents indicated that their company is preparing a strategy (32%), and the final 1/3 of respondents indicated that their company is implementing/testing a strategy (36%).

Mismatch Between Smart Manufacturing Importance & Strategy

Almost two-thirds (61%) of respondents indicated that their manufacturing operations are an integral component of their organization's digital supply chain strategy. However, only two-in-five respondents indicated that their organization has dedicated headcount for smart manufacturing initiatives (42%). Respondents from companies with only one manufacturing site are significantly more likely to indicate that their companies manufacturing operations are not an integral part of their organization's digital supply chain. Less than 10% of respondents from companies with one manufacturing site have a dedicated headcount for smart manufacturing, against the study average of 31%.

GRAPH 1: Company Smart Manufacturing Beliefs

	Strongly/Somewhat Agree (5&4)	Neither Agree Nor Disagree (3)	Somewhat/Strongly Disagree (2&1)
Manufacturing operations are an integral component of my organization's digital supply chain strategy	61%	20%	20%
Smart manufacturing initiatives are integrated with my organization's continuous improvement programs	51%	22%	27%
Smart manufacturing is a component of our sustainable manufacturing program	47%	22%	31%
Smart manufacturing initiatives are integrated with my organization's operational excellence programs	43%	24%	34%
My organization has dedicated headcount for smart manufacturing initiatives	42%	18%	40%

% Strongly/Somewhat Agree. Please note, the dotted line represents a statistically significance in the data.

50% Still Need a Strategy and CESMII Can Help

A network of consulting and education partners along with CESMII's acceleration and business transformation tools can help manufacturers reassess or develop a technology-enabled business strategy. LEARN MORE.

Three-quarters of respondents (77%) indicated that smart manufacturing will increase their company's competitiveness and that company leadership understands the value of digitization/smart manufacturing and the need to invest. However, only half of respondents indicate that their company is willing to invest the financial resources in smart manufacturing initiatives.

CHART 1: Smart Manufacturing Business Operations by Number of Sites

Smart Manufacturing Business Operations	1 Site (n=28)	2-5 Sites (n=25)	Study Average (n=169)
Smart manufacturing will increase my company's competitiveness	64%	84%	77%
My company's leadership understands the need to invest in smart manufacturing	46%	68%	67%
My company is willing to invest the financial resources in smart manufacturing initiatives	39%	60%	56%
My company's leadership understands the value of digitization/smart manufacturing	50% ↓	68%	68%
Digitization of manufacturing operations is a parallel but separate effort to my company's digital supply chain efforts	21% ↓	48%	41%
My company has a "data-driven" culture, where value is placed on data-based decision making	32% ↓	64%	59%
The values of smart manufacturing would be enhanced in my company through broad-based education	61%	72%	72%

% Strongly/Somewhat Agree. The arrows represent a statistically significant difference in the data against the study average.

Respondents from companies with one manufacturing site were significantly less likely than the study average to indicate that their company understands the value of smart manufacturing, that their company has a data driven culture, and their digitization efforts are not a parallel but separate effort to their company's digital supply chain efforts.

The market is recognizing the importance of Smart Manufacturing in their businesses & operations.

Smart Manufacturing Goals & Challenges

Respondents indicated that their company's
smart manufacturing strategy has five primary goals:

1. Better manufacturing capacity utilization (65%)
2. Lower production cost (63%)
3. Improve on-time delivery (62%)
4. Operational excellence (61%)
5. Improve quality/reduce quality risks (60%)

CHART 2: Smart Manufacturing Goals by Number of Sites

Smart Manufacturing Goals	1 Site (n=28)	2-5 Sites (n=25)	Study Average (n=169)
Lower production cost	57%	79%	63%
Improve on-time delivery	57%	79%	62%
Operational excellence	36% ↓	71%	61%
Improve quality/reduce quality risks	36% ↓	71%	60%
Better manufacturing capacity utilization	57%	79%	65%
Improve visibility into production	25% ↓	58%	51%
Increase energy production	14%	12%	25%
Shorten time-to-market (new product introduction)	25%	33%	34%
Supply chain agility	18% ↓	46%	38%
Meet compliance requirements	25%	38%	27%

The arrows represent a statistically significant difference in the data against the study average.

Respondents from companies with only one manufacturing site indicated that operational excellence, improving quality/reduce quality risks, improving visibility into production and supply chain agility are significantly less important as goals versus the study average.

Top Challenges
1. Need for skilled talent
2. Cost & complexity to Implement and Integrate
3. Lack of connection between technology and business strategy

The top challenge respondents indicated was a lack of skilled talent (59%), followed by cost required to implement and complexity of system integration (52% and 49%, respectively). Respondents from companies with only one site were significantly less likely to indicate complexity of system integration as a challenge than respondents from companies with two or more sites, while respondents from companies with six or more sites were significantly more likely than the study average to indicate that a lack of willingness to abandon legacy/standard tools and technologies as a major challenge encountered.
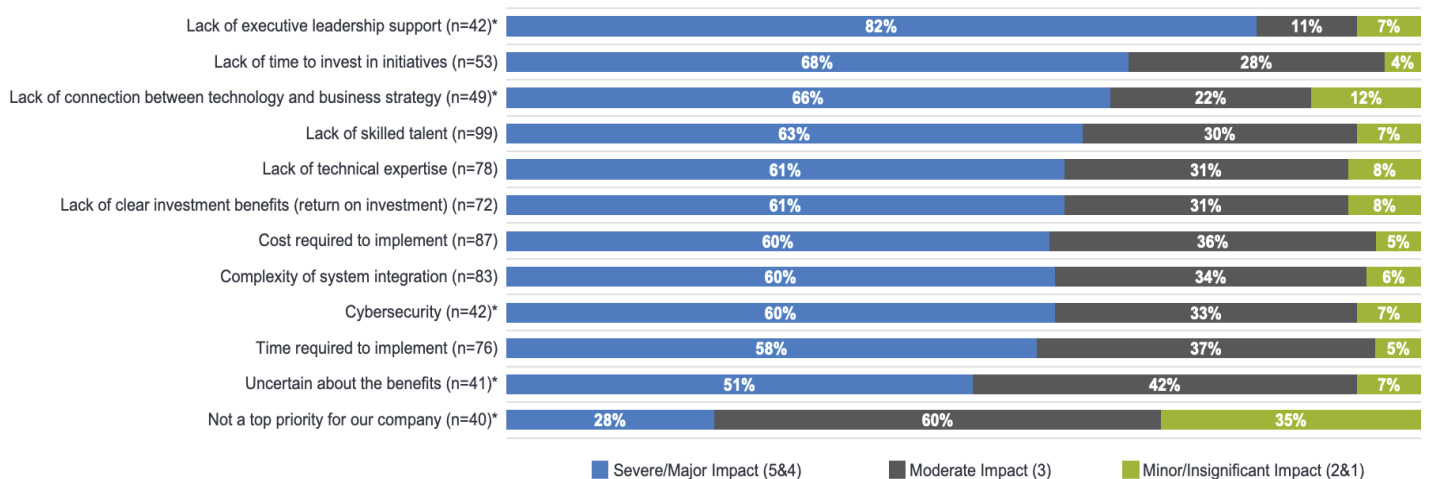
CHART 3: Smart Manufacturing Challenges by Number of Sites

Smart Manufacturing Challenges	1 Site (n=28)	2-5 Sites (n=25)	6 or more Sites (n=33)	Study Average (n=169)
Lack of skilled talent	54%	60%	73%	59%
Complexity of system integration	29% ↓	52%	67%	49%
Cost required to implement	50%	56%	48%	51%
Lack of technical expertise	46%	40%	55%	46%
Lack of clear investment benefits (return on investment)	46%	32%	58%	43%
Cybersecurity	14%	32%	27%	25%
Time required to implement	43%	60%	55%	45%
Lack of executive leadership support	25%	28%	21%	25%
Lack of data from which to make decision	14%	16%	15%	16%
Uncertain about the benefits	25%	28%	21%	24%
Lack if connection between technology and business strategy	25%	32%	36%	29%
Lack of time to invest in initiatives	29%	32%	33%	31%
Not a top priority for our company	29%	24%	30%	24%
Lack of clear implementation path to follow	29%	28%	27%	27%
Lack of willingness to change how we work	29%	28%	30%	27%
Lack of willingness to abandon legacy/standard tools and technologies	36%	20%	52% ↑	31%
Requires a new plan for data governance and data access rights	11%	12%	15%	12%
Lack of big data models	11%	12%	9%	13%

The arrows represent a statistically significant difference in the data against the study average.

Among respondents that noted a challenge faced in their smart manufacturing initiatives progress, over four-in-five respondents indicated lack of executive leadership support as a severe/major impact. Only one-in-four respondents indicated that smart manufacturing initiatives are not a top priority for their company, indicating that there is a disconnect between priority status and executive support. Although companies are encountering problems with lack of skilled talent, lack of executive support has the highest impact on companies furthering their smart manufacturing programs.

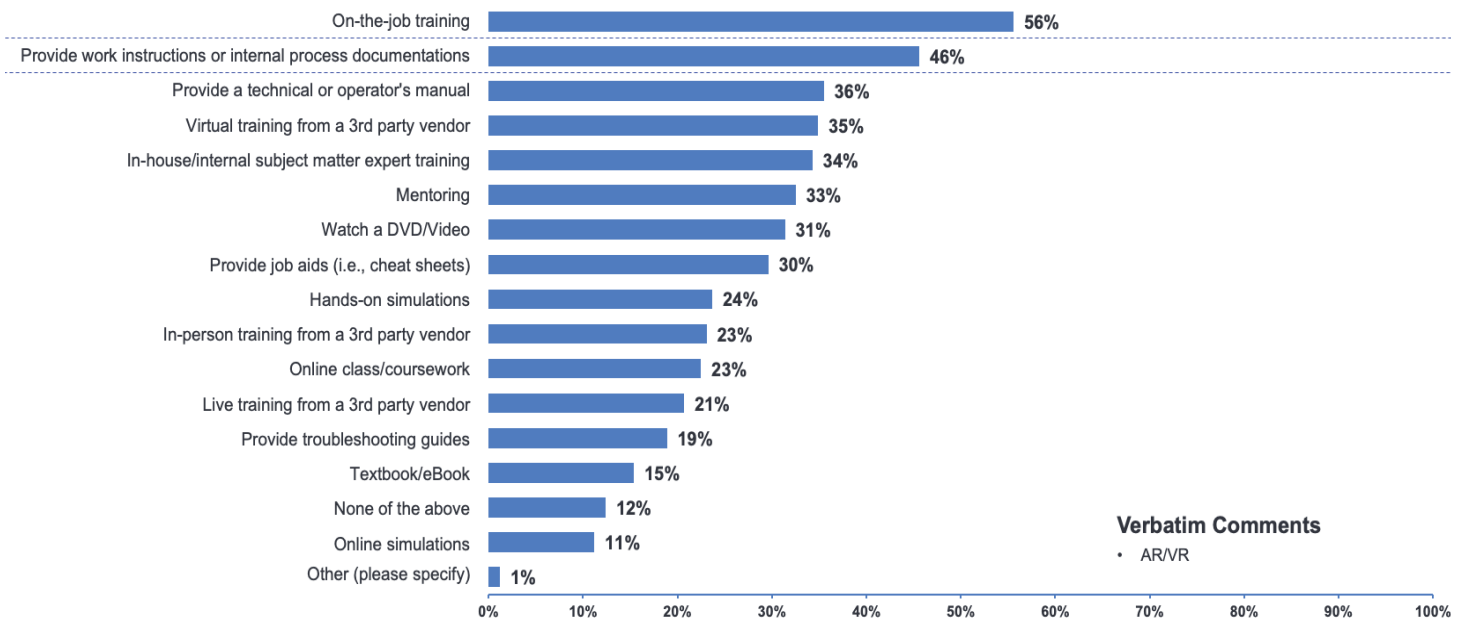GRAPH 2: Impact of Smart Manufacturing Challenges

Challenge	Severe/Major Impact (5&4)	Moderate Impact (3)	Minor/Insignificant Impact (2&1)
Lack of executive leadership support (n=42)*	82%	11%	7%
Lack of time to invest in initiatives (n=53)	68%	28%	4%
Lack of connection between technology and business strategy (n=49)*	66%	22%	12%
Lack of skilled talent (n=99)	63%	30%	7%
Lack of technical expertise (n=78)	61%	31%	8%
Lack of clear investment benefits (return on investment) (n=72)	61%	31%	8%
Cost required to implement (n=87)	60%	36%	5%
Complexity of system integration (n=83)	60%	34%	6%
Cybersecurity (n=42)*	60%	33%	7%
Time required to implement (n=76)	58%	37%	5%
Uncertain about the benefits (n=41)*	51%	42%	7%
Not a top priority for our company (n=40)*	28%	60%	35%

■ Severe/Major Impact (5&4)　　■ Moderate Impact (3)　　■ Minor/Insignificant Impact (2&1)

There is a need for executive support around Smart Manufacturing initiatives - CESMII can help.

Smart Manufacturing Training

Two-thirds of respondents indicated that they spend $2,000 or less on employee training each year, with three-quarters of companies identify and provide training opportunities to employees. Over half of respondents indicated that they primary smart training employees is on-the-job, followed by work instructions/internal process documents. Smart manufacturing training is provided for employees by their vendors and training/consulting companies.

GRAPH 3: Impact of Smart Manufacturing Challenges

Category	Percentage
On-the-job training	56%
Provide work instructions or internal process documentations	46%
Provide a technical or operator's manual	36%
Virtual training from a 3rd party vendor	35%
In-house/internal subject matter expert training	34%
Mentoring	33%
Watch a DVD/Video	31%
Provide job aids (i.e., cheat sheets)	30%
Hands-on simulations	24%
In-person training from a 3rd party vendor	23%
Online class/coursework	23%
Live training from a 3rd party vendor	21%
Provide troubleshooting guides	19%
Textbook/eBook	15%
None of the above	12%
Online simulations	11%
Other (please specify)	1%

Verbatim Comments
• AR/VR

Manufacturers want educational resources they can deploy for on-the-job training.i.e., eLearning & video resources. **Hands-on educational tools are needed for in-person or remote training. LEARN MORE.**

About CESMII

CESMII is the United States' national institute on Smart Manufacturing, driving cultural and technological transformation and secure industrial technologies as national imperatives. By enabling frictionless movement of information between real-time Operations and the people and systems that create value in and across Manufacturing organizations, CESMII is impacting manufacturing performance through measurable improvements in areas such as: quality, throughput, costs/profitability, safety, asset reliability and energy productivity. Learn more at cesmii.org and follow us on Twitter and LinkedIn.

About SME

SME offers resources for manufacturers, promotes advanced manufacturing technologies and works to develop a skilled workforce. We connect the most prestigious, experienced and innovative professionals in the industry. Learn more at sme.org, follow @SME_MFG on Twitter or facebook.com/SMEmfg.

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