

Digitization Delivers for Manufacturers

The Power of Industry 4.0 to Enhance Asset Management



Findings from the MPI 2021 Industry 4.0 Study



Introduction

The *MPI 2021 Industry 4.0 Study* examines the extent to which manufacturers are leveraging Industry 4.0 across their organizations. This summary specifically looks at how manufacturers have applied digital technologies to improve equipment practices and performances aligned with effective maintenance (e.g., safety, energy management). It also explores the opportunities and challenges manufacturers encounter when digitizing their machines and plants.

Since the *Industry 4.0 Study* was initially fielded more than five years ago, manufacturers have dramatically increased the pace at which they use Industry 4.0

technologies to enhance maintenance practices and machine performance. They've recognized that it's not a question of *if* they should digitize their assets, but *when*: digital laggards are falling behind digital leaders, and the gap is widening. This summary also highlights how self-described digital Leaders manage maintenance and perform vs. other companies.



Industry 4.0 Connects to Asset Management



Industry 4.0 allows delivery of critical information in real time. The Study finds that 55% of manufacturers already use actionable, real-time, role-based data for maintenance decision-making, with another 28% planning to do so within one year.

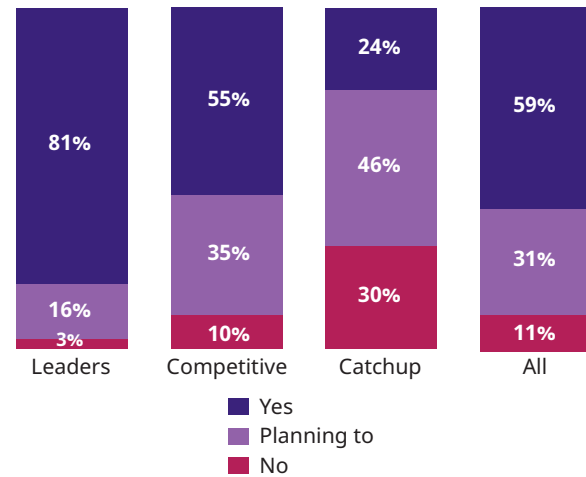
Among the 32% of executives who described their company’s Industry 4.0 capabilities as “Leaders,” 66% are currently using real-time data for maintenance vs. just 55% of companies described as “competitive” and 30% of companies described as “Industry 4.0 catchup/no Industry 4.0.”

Some 74% of manufacturers have applied smart devices and/or embedded intelligence to maintenance processes (35% report “significant application”). These findings are comparable across all manufacturers.

However, digital Leaders report higher percentages of production equipment and processes that incorporate smart devices and/or embedded intelligence (Figure 1). And they are far more likely to have applied sensors to clothing and machinery for improving safety (Figure 2).

Equipment-specific technologies can help manufacturers digitize the operation and maintenance of machines. Approximately half of manufacturers

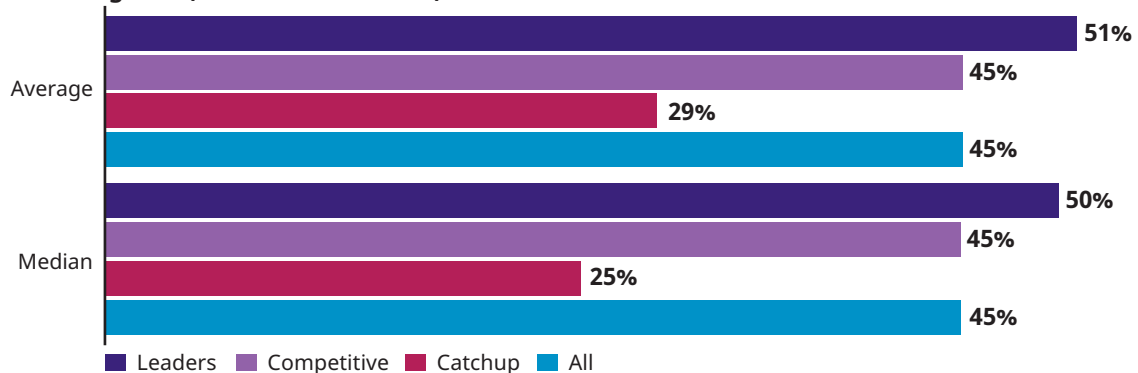
Figure 2. Sensors applied to clothing and machines to specifically improve safety (% of manufacturers)



(51%) use advanced human-machine interfaces on their plant floors, and another 41% plan to do so within three years. About 67% of digital Leaders use advanced human-machine interfaces vs. just 52% of competitive and 13% of catchup companies.

More than half of manufacturers (57%) invested more than 5% of sales in implementing an Industry 4.0 strategy in their plants, processes, and supply chains in the past year. Some 74% of digital Leaders invested more than 5% of sales vs. 55% of competitive and 32% of catchup companies.

Figure 1. Percentage of production equipment and processes that incorporate smart devices and/or embedded intelligence (% of manufacturers)



Impact from Industry 4.0 to the Performance of Asset Management



A large majority of manufacturers report that the application of smart devices and/or intelligent devices has improved maintenance performances, and digital Leaders are far more likely than competitive companies and catchup companies to report “significant improvement.” (Figure 3).

The application of Industry 4.0 in plants and processes and its impact on maintenance activities has contributed to increased productivity and profitability for nearly all manufacturers, with many reporting sizable increases:

66% report increased *productivity* of more than 5% over the past year, and 63% report increased *profitability* of more than 5% over the past year. Increases are even more pronounced among digital Leaders (Figure 4).

A vast majority of manufacturers expect productivity and profitability improvements to increase over the next five years, with 78% expecting *productivity* increases of more than 5%, and 74% expecting *profitability* increases of more than 5%. Digital Leaders expect even larger increases.

Figure 3. Impact from the application of smart devices and/or embedded intelligence (% of manufacturers)

Performance improvements	Leaders		Competitive		Catchup		All	
	Significant	Some	Significant	Some	Significant	Some	Significant	Some
Machine reliability/uptime	56%	34%	42%	42%	22%	60%	43%	42%
Safety	64%	30%	45%	38%	28%	47%	48%	37%
Regulatory compliance	58%	33%	35%	44%	25%	46%	41%	41%
Energy costs	52%	35%	35%	43%	25%	50%	39%	42%
Equipment changeover times	48%	41%	33%	45%	32%	40%	38%	43%

Figure 4. Impact of Industry 4.0 applied to plants, processes, and supply chain on productivity and profitability in past year (% of manufacturers)

	Leaders	Competitive	Catchup	All
Productivity				
Increased more than 10%	30%	17%	5%	19%
Increased 6–10%	53%	48%	32%	47%
Increased 1–5%	13%	30%	44%	27%
No change	3%	5%	11%	5%
Decreased	1%	0%	0%	0%
No Industry 4.0 currently or planned	1%	0%	8%	2%
Profitability				
Increased more than 10%	35%	18%	3%	21%
Increased 6–10%	46%	42%	30%	42%
Increased 1–5%	15%	33%	33%	27%
No change	4%	7%	24%	9%
Decreased	0%	0%	2%	0%
No Industry 4.0 currently or planned	1%	0%	8%	2%

Industry 4.0 Asset Management Challenges

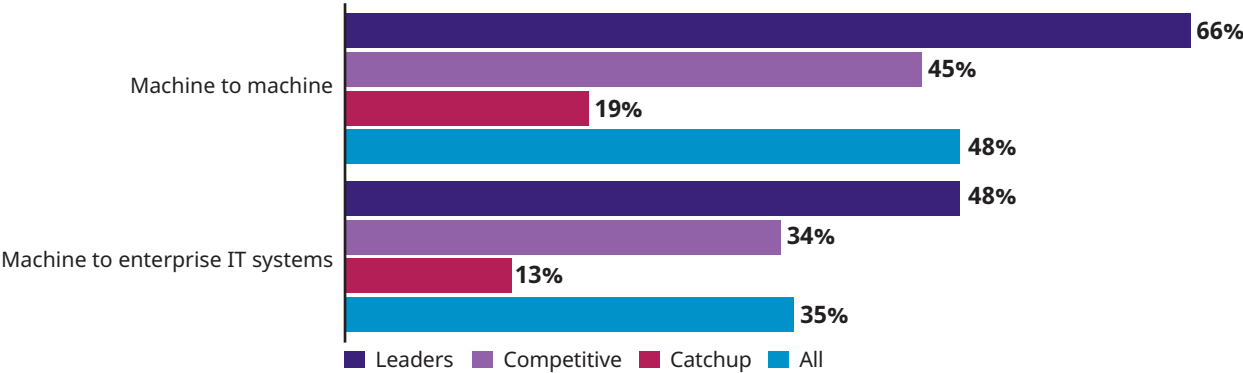


Industry 4.0's impact on maintenance practices could be even greater if the network infrastructures were more capable of accommodating Industry 4.0 communications. Less than half of network infrastructures are currently capable of machine-to-machine communications (e.g., sensors in one machine trigger actions of another machine) without at least some upgrades. Only a third are capable of communicating from machines to enterprise IT systems (i.e., machine sensors send data to the company business systems). Digital

Leaders are far more likely to have capable network infrastructures (*Figure 5*).

This lack of capable networks results in many executives not receiving plant floor data. Just 43% of manufacturers report that all company executives who need Industry 4.0-enabled data have access to it. Some 57% of digital Leaders report that all executives have access vs. 38% of competitive and 30% of catchup companies.

Figure 5. Ability of network infrastructure to accommodate the following Industry 4.0 communications (% of manufacturers)



Industry 4.0 Takeaways



Industry 4.0 offers significant opportunities for manufacturers to improve maintenance practices and machine performances. But the *MPI Industry 4.0 Study* finds that many aren't taking full advantage of digital tools to improve asset management.

Given the range of opportunities to improve equipment safety, reliability, and productivity, nearly all manufacturers should aggressively invest in their development by:

- Identifying targets for Industry 4.0 based on poor equipment performances (e.g., downtime, excessive startup times, lengthy changeover times).
- Deploying smart devices to provide real-time data on how machines operate (e.g., temperature, vibration, energy draw) that allow maintenance departments to quickly intervene.
- Implementing technologies that provide automated, proactive machine capabilities (e.g., machine learning) to support predictive maintenance, prevent downtime, and optimize performances.

Methodology



The *MPI Industry 4.0 Study* was conducted by The MPI Group using an online questionnaire promoted by a panel company to manufacturing plant executives and managers. The MPI Group received 445 valid participants in June and July 2021. Responses were entered into a database, edited, and cleansed to ensure answers were plausible, where necessary. All respondent answers to the survey are anonymous.

MPI Industry 4.0 Study questions consisted of:

- Directive single-answer questions for which respondents were asked to “check one” answer category
- Directive multiple-answer questions for which respondents were asked to “check all that apply”

- Open-ended numeric questions for which respondents were asked to respond with a number.

For this report, tables and charts for “check one” and “check all” answer categories are presented either in the format presented on the survey or, where more meaningful, in descending order based on the percentage of responses for a particular answer category (i.e., the answer category with the highest percentage is listed first). Data for directive questions is presented with the percentage of responses for each answer category. Tables and charts for open-ended questions are presented with the median and average statistics.

The MPI Group

The MPI Group (MPI) serves leaders with research, advice, and performance-targeted solutions that provide a competitive advantage in today’s fierce marketplace. MPI combines the disciplines of research, strategic advice, knowledge development, and hands-on leadership to create a difference — in performance, in profits, and in the people who make them possible.

In addition to the *Industry 4.0 Study*, MPI conducts other public research studies, exploring strategies,

best practices, operational measures, and profitability across new management opportunities, technologies, and methodologies, including the *MPI Manufacturing Study* and the *MPI Disruptive Technologies Study*.

MPI also offers credible, independent, and private-label research on issues that matter to customers — along with access to associated custom content including infographics, blogs, eBriefs, white papers, keynote presentations, webinars, videos, interactive tools, and social media support.

MPI offers presentations on *Industry 4.0 Study* data and other MPI research. To learn more about the *MPI Industry 4.0 Study*, schedule an *Industry 4.0* presentation, or to find out more about other research conducted by MPI, contact:



The MPI Group
mpi-group.com
+1 (216) 991-8390
jbrandt@mpi-group.com