

# Stepping Up the Pace

Although manufacturers were hard hit by COVID-19, they can look to the digital leaders in the industry to understand which technology investments will propel them forward. This e-book offers industry decision makers our research-based insights on the best next steps to take.

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Produced in partnership with  
**ESI**THOUGHTLAB

**Cognizant**<sup>®</sup>

COVID-19 served as a wakeup call to manufacturers. Those that have already made substantial progress on modern manufacturing principles are far better positioned to absorb the substantial business challenges that lie ahead.

# Contents

Click a link below to jump to that section.

- 3**     **Introduction: A Manufacturing Wakeup Call**
- 5**     **The Manufacturing Digital Imperative**
- 13**    **Where to Invest: Look to the Leaders**
- 21**    **Advancing Your Digital Maturity**
- 24**    **Methodology**
- 25**    **About the Authors**

# Introduction: A Manufacturing Wakeup Call

Of all industries, manufacturing was among the hardest hit by the COVID-19 pandemic. In our **2020 study**, manufacturing was most likely vs. other industries to shift investment from strategy to business continuity to cope with the effects of the crisis. Businesses in this sector were also the most likely to make significant cost reductions following the COVID lock downs and the least likely to accelerate digital transformation.

But when it comes to technology and process modernization, COVID-19 also served as a wakeup call. Before the virus, most manufacturers were comfortable taking a leisurely pace toward adopting Industry 4.0 practices and technologies. Now, with fast-changing consumer behaviors and supply/demand realities, as well as unprecedented shifts in how plant operations need to be maintained due to social distancing norms, time is no longer a luxury they can afford.

Simply put, those that have already made substantial progress on [modern manufacturing principles](#) are far better positioned to absorb substantial business challenges that lie ahead.

By investing in the cloud, open APIs, Internet of Things (IoT) and data analytics, technologically-advanced manufacturers are better equipped to quickly reset production requirements, manage supply chain fluctuations and support work-from-home employees.

The good news is, manufacturers that are succeeding with their digital initiatives can help shed light on the best next moves for less digitally mature organizations.

In mid-to-late 2019, we worked with ESI ThoughtLab to better understand what separates leaders from followers when it

comes to [digital maturity](#). We surveyed 2,491 business and technology leaders from multiple industries globally (including 216 manufacturers) that collectively account for about \$21.6 trillion in annual revenue. We also interviewed senior executives who are knowledgeable about advanced technology initiatives within their companies (see methodology, page 24). We then overlaid these results with input from our 2020 study of 500 senior executives in the U.S., including 91 manufacturers, to get a sense of how priorities may or may not have shifted due to the pandemic.

Our 2019 study distinguishes “leaders” from “beginners” to see what organizations look like at any point on the digital maturity curve (see sidebar). Our research reveals how much manufacturers should be investing in advanced technologies as a percent of revenue today and in the near future, the investments yielding the greatest returns, the returns they can expect and more.

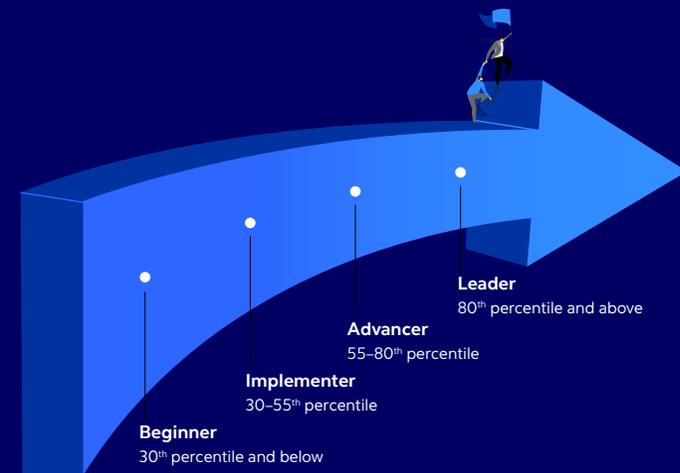
We invite you to read our ebook or visit us at [cognizant.com/digital-transformation-report](https://cognizant.com/digital-transformation-report) to read the full cross-industry report. You can also read the full version of our 2020 study at “COVID-19: The View from the C-Suite.”

## Digital Maturity Curve

To better understand what a leader looks like, we devised a framework to calculate a maturity score. The score is based on three criteria:

- I Ranking on a digital transformation framework.** We scored companies across 13 key aspects of business and technology change (see Figure 2 for the full list).
- I Ability to influence revenue through digital methods.** Drawing on self-reported data, we analyzed the level of revenue influenced directly or indirectly by digital channels.
- I Benefits generated from digital.** This included operational benefits, such as speed to market and improving cost efficiencies, and more strategic ones, such as greater shareholder value and market share.

We created a maturity score for each respondent and assigned each to one of four categories: “beginner,” “implementer,” “advancer” and “leader.” We then distilled our findings into easily digestible lessons that business and technology leaders can absorb and apply immediately.



Source: Cognizant/ESI ThoughtLab  
Figure 1

# The Manufacturing Digital Imperative

# An industry awakening to digital

Most manufacturers are in the early stages of digital maturity among the 13 areas of our framework, particularly in core areas like digital strategy, data management, software deployment and modernized core IT (see Figure 2). In all 13 areas, manufacturers lagged the general industry average.

Manufacturing leaders, however, are well ahead of the rest of the industry in many areas, particularly in terms of formulating a digital strategy and enabling automation, innovation, data management/analytics and artificial intelligence, all of which will be key to their competitive advantage.

## Manufacturers show much potential for maturity growth

Percent of respondents who say they're maturing or advanced in each area.



Total response base: 2,491

Manufacturing response base: 216

Source: Cognizant/ESI ThoughtLab, 2019 study

Figure 2

# Three-year outlook

**Over the next three years, all manufacturers in our study will have progressed in most of the core areas of our framework (see Figure 3, next page). It's heartening to see that three out of five plan to have key foundational pieces in place, including a digital strategy, a culture of innovation, workforce transformation, automation and customer-aligned operations.**

Digital strategy in particular will be critical. A comprehensive roadmap can free up cash for digital initiatives and help the organization focus on establishing a business value realization mechanism for the transformation journey.

However, two of the biggest gaps between all manufacturers and leaders are, again, in data management/analytics and AI. As we'll see, it's one thing to gather data through mechanisms such as IoT and another to make that data available to the right people for analysis. It's yet another giant step to become adept at using machine intelligence and other forms of AI to enable real-time insights.

While IoT initiatives signal a move toward collecting data that

matters, full maturity means integrating data, analyzing content, understanding which data matters most, and using AI to predict and prescribe the next best actions.

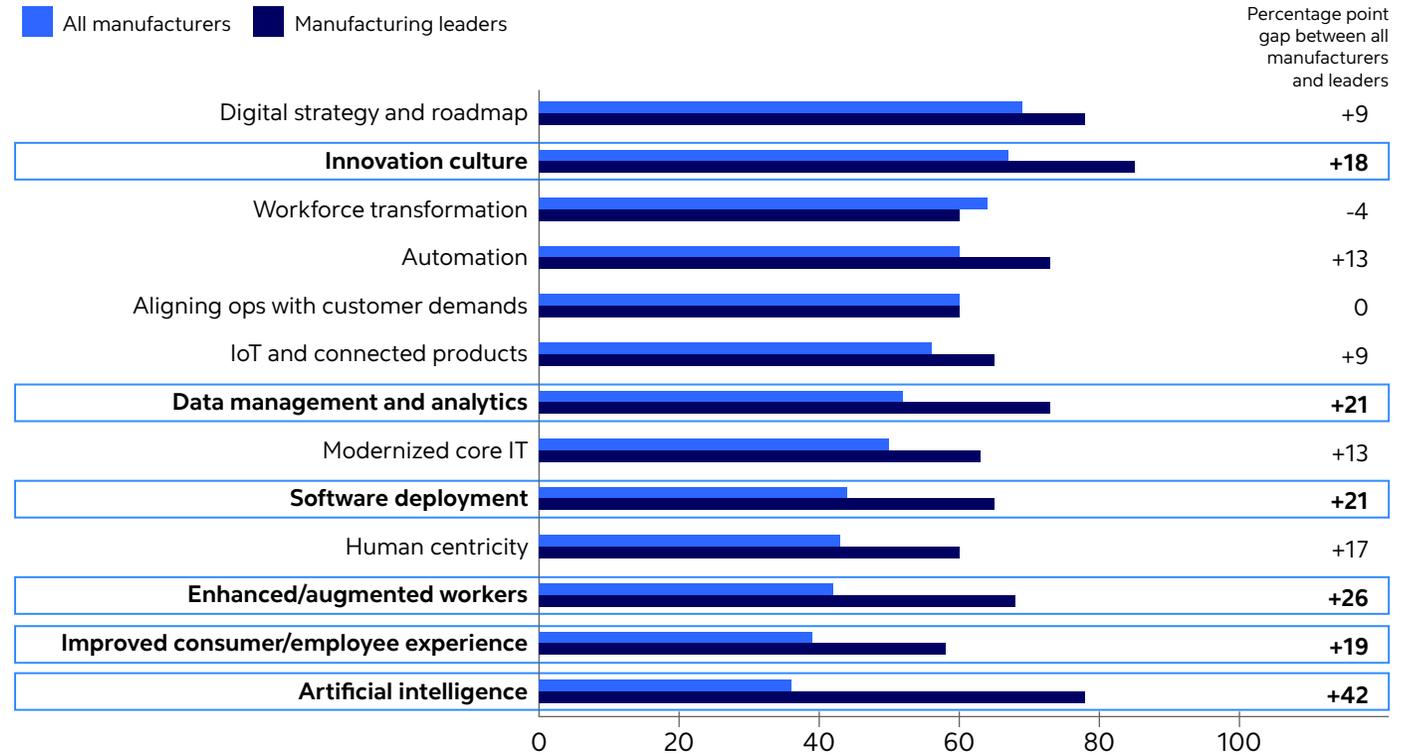
It's also doubtful, with the disruption of COVID-19, whether a three-year plan is fast enough. When the lockdowns happened, years-long strategic plans – particularly those related to remote work and the cloud – were, out of necessity, implemented within weeks. The slow pace manufacturers have been accustomed to won't serve them now or in the new landscape emerging from the pandemic.





## Manufacturers will master the basics

Percent of respondents who expect to be maturing or advanced in each area in three years.



**Manufacturing response base:** 216  
**Source:** Cognizant/ESI ThoughtLab, 2019 study  
 Figure 3

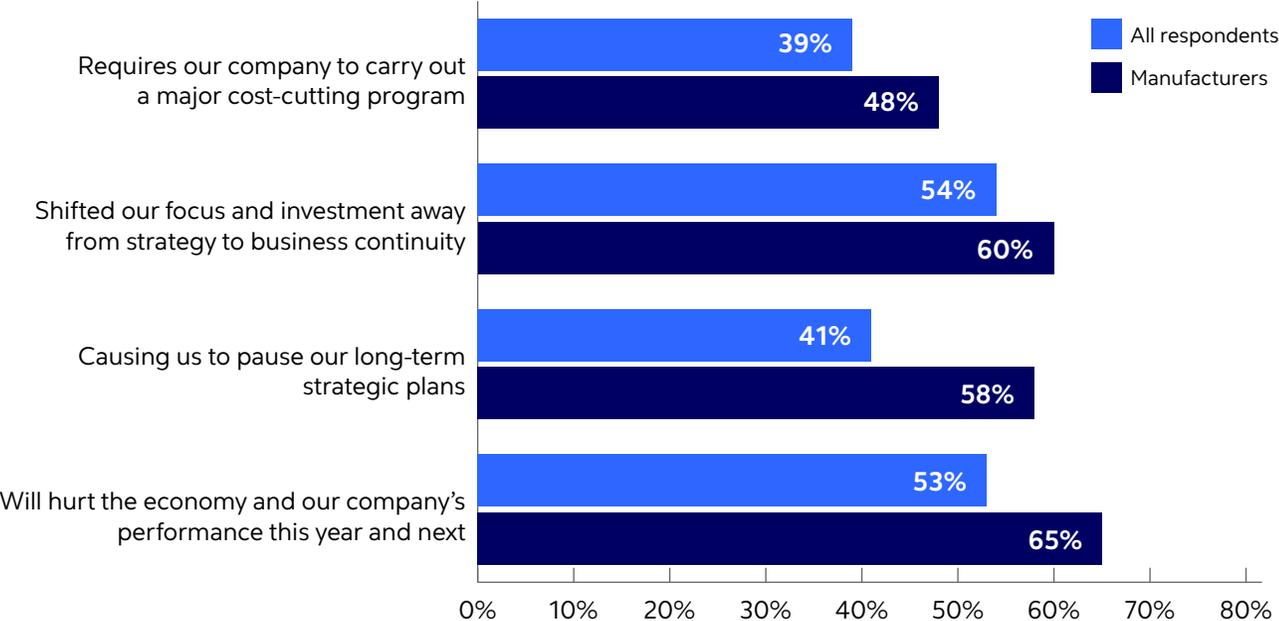
# Responding to the COVID-19 impact

Even more concerning is the degree to which the pandemic seems to have stalled manufacturers' strategic plans. Of all industries, manufacturers voiced the most concern in our 2020 study about how the virus would impact them financially and were most likely to put at least a temporary halt on their strategic initiatives in favor of business continuity (see Figure 4).

Manufacturers are pressured not only to continue pursuing their three-year plans as soon as possible but also to compress them into shorter timelines. It's hopeful to see, then, that 40% of manufacturers in our 2020 study said that harnessing emerging technologies would be a top-5 focus for their company as a result of COVID-19.

## Business impact of COVID-19

Percent of respondents who said they agree.



Total response base: 500  
Manufacturing response base: 91  
Source: Cognizant/ESI ThoughtLab, 2020 study  
Figure 4

# Stepping up investments

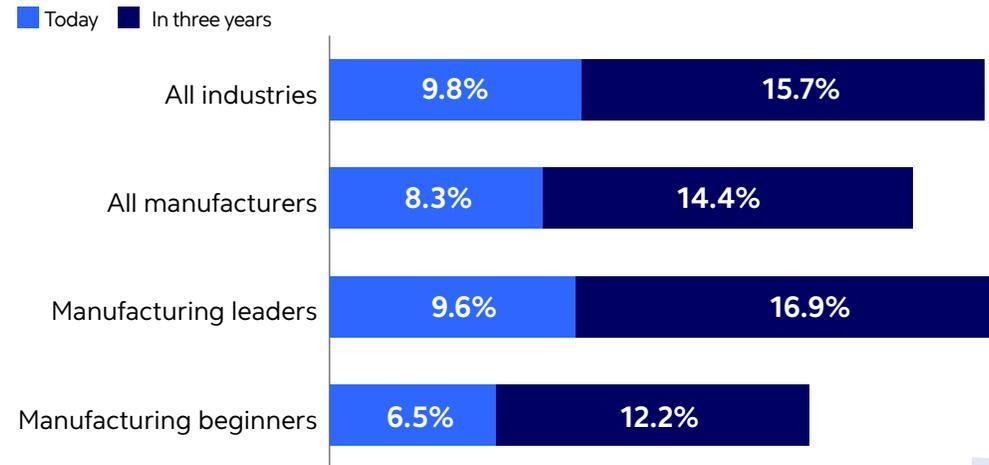
**Pursuing their digital strategies will require manufacturers to be open to investing in new technologies and processes at a time when they are concerned about cutting costs – and are already lagging behind other industries when it comes to making IT investments (see Figure 5).**

Manufacturers in our study are investing 8.3% of their revenues in technology, on average, while the cross-industry average is 9.8%.

Manufacturing leaders, however, are not only closing the gap with other industries by spending 9.6% of revenues on technology, but they'll also surpass them in the next three years. Leaders plan to boost spending to 16.9% of revenues vs. the cross-industry average of 15.7%.

## Percent of revenue spent on technology

Percentage of annual revenue currently invested in all technologies, including central IT and enterprise-wide business unit budgets, now and in three years.



**Total response base:** 2,491

**Manufacturing response base:** 216

**Source:** Cognizant/ESI ThoughtLab, 2019 study  
Figure 5



[< Back to Contents](#)

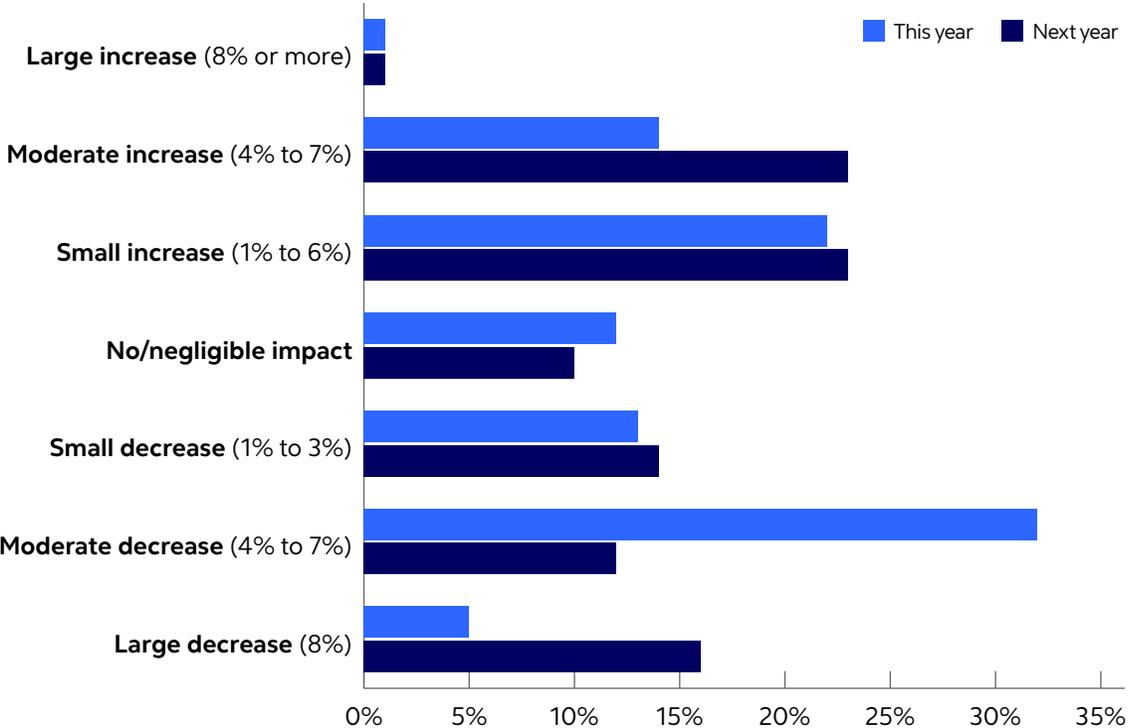
# Budget outlook is partly sunny

**This rate of spending could be slowed by the virus; however, this slowdown may not last.** While COVID-19 will negatively impact manufacturers' digital budgets in the short term, according to our 2020 study, most expect small or modest increases in the next year (see Figure 6).

Further, in our experience, manufacturing modernization does not necessarily require large expenditures. For most manufacturers we've worked with, every time they move to the cloud and retire a piece of their legacy infrastructure, they save enough to pay for the initiative itself and invest in others. By moving off legacy infrastructures through the cloud and using open APIs to enable more interoperability among systems and data, manufacturers can greatly decrease their technical debt, increase cost savings, share insights that boost revenues and achieve needed resilience and agility.

## How COVID-19 will impact budgets

Percent of respondents expecting an impact on their digital budget.



**Manufacturing response base:** 91  
**Source:** Cognizant/ESI ThoughtLab, 2020 study  
Figure 6



By moving off legacy infrastructures through the cloud and using open APIs to enable more interoperability among systems and data, manufacturers can greatly decrease their technical debt, increase cost savings, share insights that boost revenues and achieve needed resilience and agility.



# Where to Invest: Look to the Leaders



# Leaders show the way forward

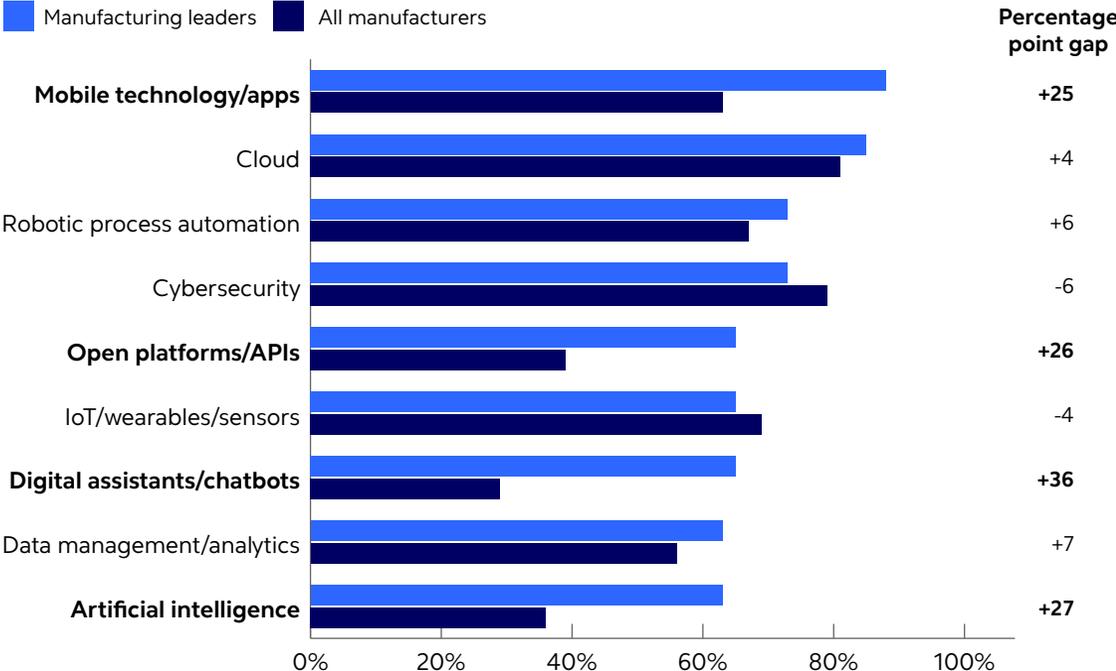
**Especially with the additional economic pressures of the pandemic, manufacturers need to specifically target which areas of investment will yield the highest returns. The answer comes from looking to the leaders in our 2019 study – where they’re spending and where they’re seeing the greatest payback.**

Leaders are outspending their peers in all areas of technology except for cybersecurity and IoT (see Figure 7). When it comes to IoT, it’s likely that leaders have already reached high levels of maturity in that area – even higher than in other industries (see Figure 2) – and are likely reallocating those expenditures to other areas.

The greatest spending gaps between leaders and other manufacturers are in mobile technologies, open platforms, digital assistants/chatbots and AI.

## A digital divide

Percent of respondents citing a moderate or high level of investment in each technology in the past two years.



Manufacturing response base: 216  
Source: Cognizant/ESI ThoughtLab, 2019 study  
Figure 7

# The areas of greatest returns

What's interesting is that there's a close correspondence between the areas where there's the greatest gap in spending between leaders and all manufacturers and the areas where leaders are seeing the highest returns (see Figure 8).

The way forward revolves around moving to the cloud, integrating operational and IT workstreams, analyzing the data through advanced AI and democratizing access to these insights by making them accessible to the people who need it.

## Where the returns are

Percent of leaders citing a moderate or high return on investment in each technology area.

Technology	Manufacturing leaders citing returns
Cloud technology	84%
Robotic process automation	83%
Open platforms	82%
Mobile technology/apps	80%
Cybersecurity technologies	79%
Internet of Things	75%
Artificial intelligence	67%
Data warehouses/lakes	64%
Digital assistants/chatbots	61%

**Manufacturing response base:** 216

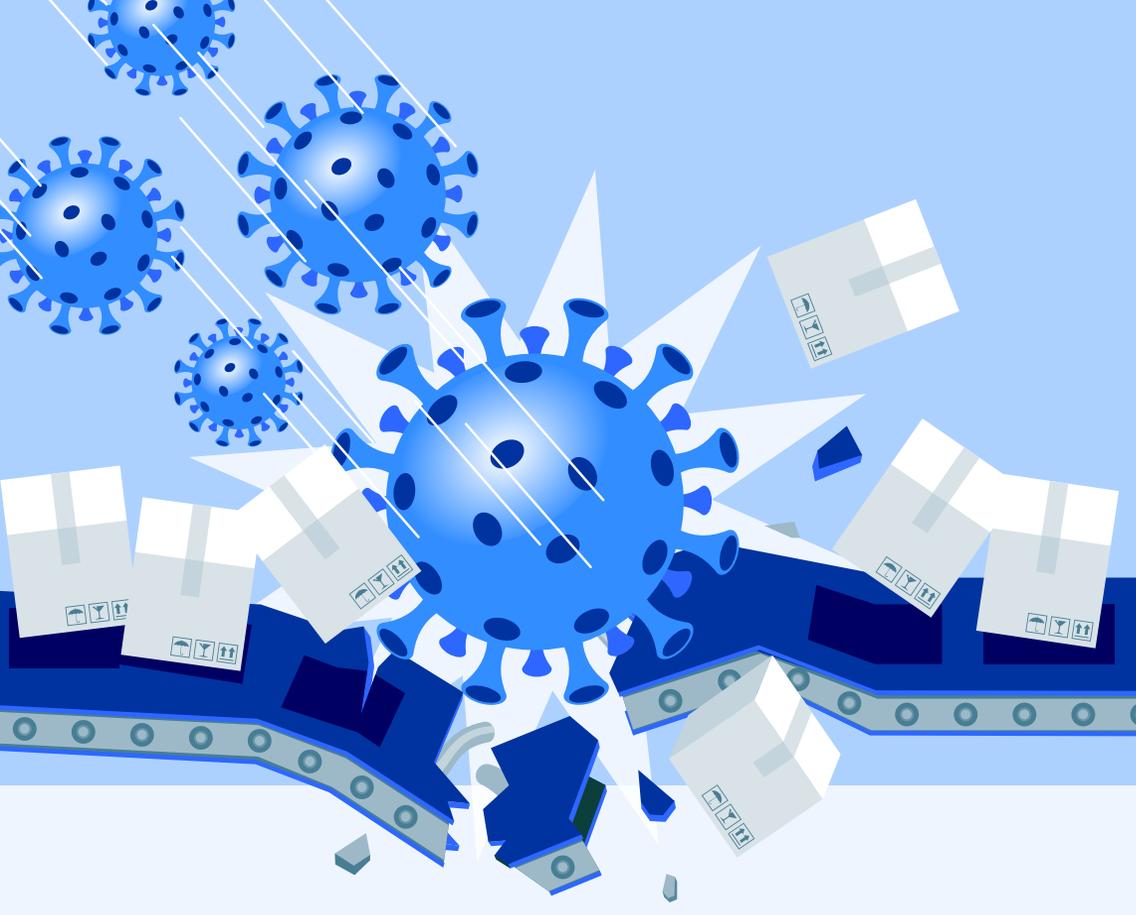
**Source:** Cognizant/ESI ThoughtLab, 2019 study

Figure 8



The way forward revolves around moving to the cloud, integrating operational and IT workstreams, analyzing the data through advanced AI and democratizing access to these insights by making them accessible to the people who need it.





According to our 2020 study, manufacturers seem to mostly be focused on the right areas for which technologies they'll invest in as a result of COVID-19 (see Figure 9). Glaringly absent, however, are open platforms and data analytics, both of which came in much further down the priority list – and are areas in which leaders excel.

### Top five areas of value and post-COVID investment

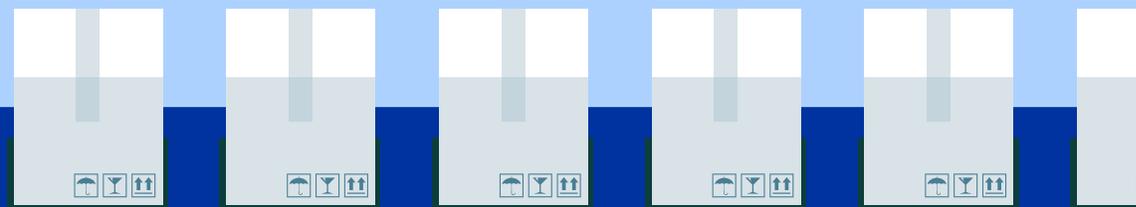
Percent of manufacturers citing which technologies were of highest value during the pandemic and which ones will see the greatest investment post-pandemic.

	Highest value during the pandemic	Top areas of investment over next 1-2 years
RPA	70%	73%
Cloud	69%	60%
IoT/sensors/telematics	63%	59%
Mobile tech/apps/wearables	52%	34%
AI	44%	47%

**Manufacturing response base:** 91

**Source:** Cognizant/ESI ThoughtLab, 2020 study

Figure 9



# A multiplier effect on performance

Leaders also demonstrate the performance impacts of making these investments (see Figure 10, next page). Importantly, leaders are much more likely than others to have realized better risk management from their use of advanced technologies. This is notable, considering the high interest among respondents in our 2020 study to build supply chain resilience (56%) and concern about supply chain disruption/risk (75%). Leaders likely have a key competitive advantage in meeting those goals as a result of their investments.

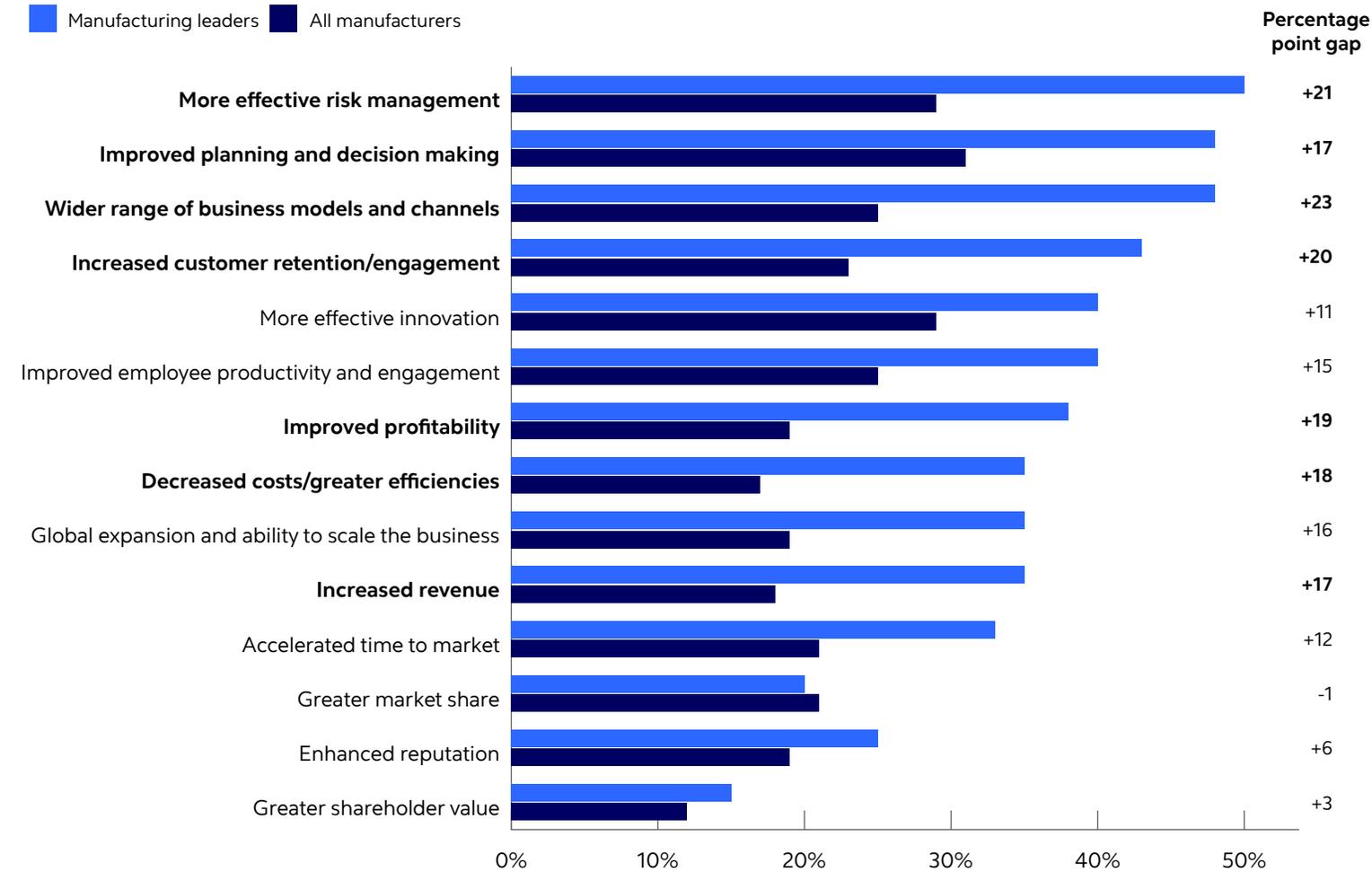
Similarly, leaders are also well ahead in facilitating improved decision making through their digital initiatives. This once again harkens back to their greater investments and maturity in analyzing data and – most importantly – getting it to the people who will make the best use of it.

It also can't be overlooked that leaders are better equipped to cut costs as a result of their investments. This was of high concern to respondents in our 2020 study.



# The benefits of digital investments

Percent of respondents citing each benefit they've realized from their digital initiatives.



Manufacturing response base: 216  
 Source: Cognizant/ESI ThoughtLab, 2019 study  
 Figure 10

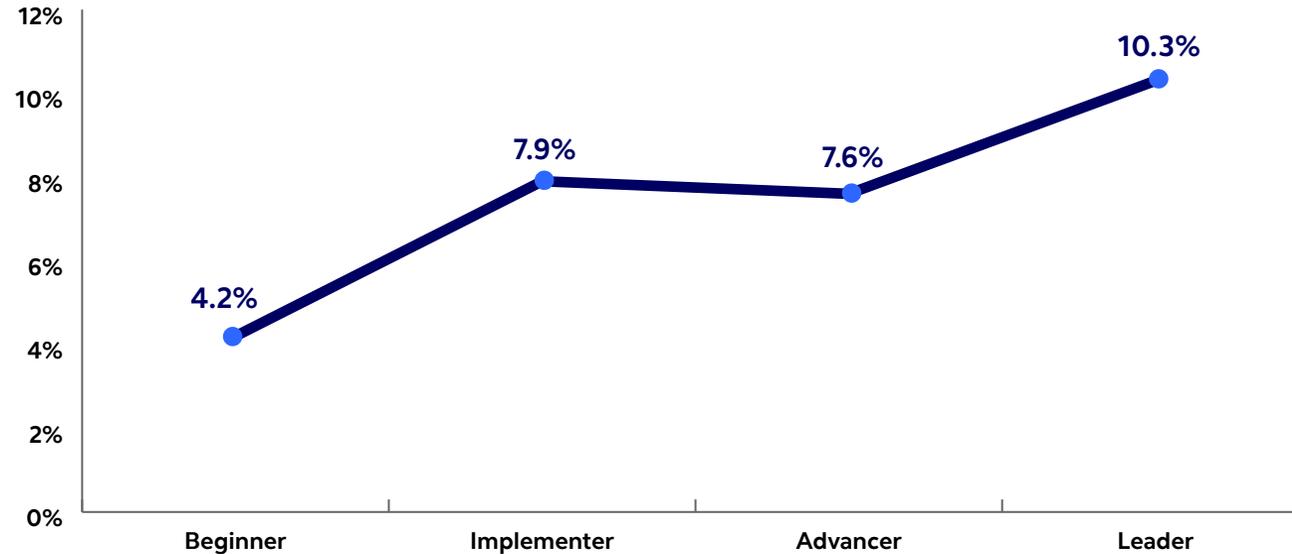


# The digital advantage

**The clear message to manufacturers is that smart investments in digital initiatives will pay off.** Leaders realized a cumulative net impact (revenue minus cost) of 10.3% of revenue – the third highest among all industries (see Figure 11). The average boost to the bottom line for each manufacturer is just over \$7.6 million, based on the average revenue of our respondents. Ironically, for manufacturers, one of the advantages of being behind is the large dividend to be garnered from moving ahead.

## Bottom-line boost

Cumulative net impact of digital investments, expressed as a percent of revenue.



**Manufacturing response base:** 216

**Source:** Cognizant/ESI ThoughtLab, 2019 study

Figure 11

# Advancing Your Digital Maturity

A group of workers in a factory setting, wearing yellow hard hats and face masks, looking towards the right. The image is overlaid with a blue gradient.

# The road ahead

**Especially with the experience of COVID-19, the key attributes of a modern manufacturer are agility and resilience. Here's how manufacturers can unlock these fundamentals:**

**I Let your business strategy guide your digital maturity actions.**

Advancing digital maturity will be the foundation on which modern enterprises operate. However, it is critical to step back and consider newer business capability needs that the pandemic imposes. This might require organizations to conduct an assessment to identify capability gaps and design a digital maturity improvement roadmap. Doing so will ensure investment focus in a cash-strapped environment.

**I Open channels of inter-enterprise collaboration.** The modern enterprise demands a holistic approach to business operations that eliminates operational silos and unlocks data. The data needs to be integrated with business and engineering systems and converted to information that can be utilized to drive down operating expenses or launch new service lines.



**I Focus on IT and OT convergence.** Data generated by physical assets (operational technologies, or OT) needs to be integrated with the IT systems designed to support them. This means integrating systems affiliated with different manufacturing processes on the factory floor with enterprise resource planning (ERP) and product lifecycle management (PLM) systems. This provides a 360-degree perspective on operations that can be analyzed in order to anticipate and adjust for equipment failure, production bottlenecks and supply chain issues. Converging IT and OT also provides the foundation for customer data transparency, which will drive customer growth and retention.

**I Democratize data.** Business users need access to data and the tools to analyze it. Cloud computing and open APIs can help unlock critical data that was previously inaccessible. This needs to be combined with data modernization efforts that aggregate and normalize data, making it much easier to store, use and share. Accessible data also holds insights that can be mined via AI. The opportunity presented through data democratization, modernization, integration and conversion to insight takes on more urgency in a post-pandemic world.

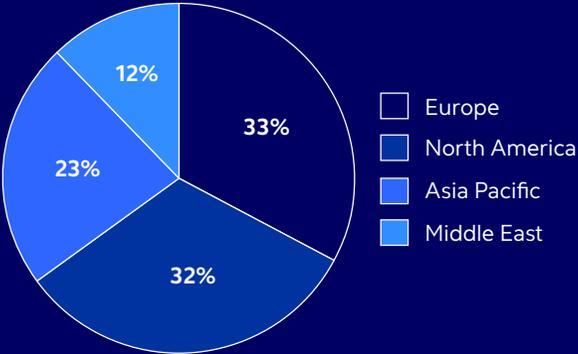
**I Achieve continuous development, deployment and operation.** Use of advanced technologies will enable more agile product development that can be executed using an “any shore” model. This means not only the ability to leverage Agile software development methods and tools, but also the creation of a common product foundation. Such an approach helps to institutionalize organizational agility, ensuring prompt development and delivery of products and services that anticipate and meet regional market requirements.



# Methodology

Working with ESI ThoughtLab, we surveyed 2,491 C-level executives and their direct reports in late 2019, across regions and industries, and from a mix of functions across the enterprise. The purpose of the study was to gauge progress made in and future plans for digital transformation. Of these respondents, 216 were from the manufacturing sector. The breakdown of the survey sample is displayed in the following graphs.

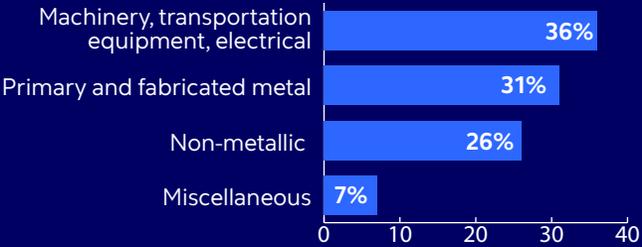
## Manufacturing respondents by region – 2019



(Percentages don't sum to 100% due to rounding.)

**Source:** Cognizant/ESI ThoughtLab, 2019 study  
Figure 12, Figure 13, Figure 14

## Respondents by subsector – 2019



## Respondents by title – 2019



## 2020 study

In April and May of 2020, ESI ThoughtLab and Cognizant conducted a short “pulse” survey of senior executives at 500 U.S.-based companies, including 91 manufacturers. The purpose of the study was to understand the impact of the pandemic on business strategies. The companies ranged in size from \$500 million in revenue to over \$50 billion, and comprise six industries: education, financial services, healthcare, life sciences, manufacturing and retail.

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# Learn More

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## About Cognizant Manufacturing

Cognizant's Manufacturing and Logistics Practice operates as a trusted global partner to automotive, industrial and process manufacturers as well as transportation and logistics companies helping them accelerate business performance and drive growth through the power of digital. By leveraging our domain expertise and knowledge of manufacturing, transportation and logistics business processes, we're able to deliver next-gen digital solutions "in context" across the R&D, sourcing, production and aftermarket support value chain. In doing so, we enable organizations to take a holistic approach to their business, delivering systematic and structured transformation that defines the modern business and delivers the promise of Industry 4.0. Our business unit has been recognized as one of the top 10 providers of manufacturing services by HfS Research for innovation, execution and voice of the client. Learn more at [www.cognizant.com/manufacturing-technology-solutions](http://www.cognizant.com/manufacturing-technology-solutions).



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Cognizant (Nasdaq-100: CTSI) is one of the world's leading professional services companies, transforming clients' business, operating and technology models for the digital era. Our unique industry-based, consultative approach helps clients envision, build and run more innovative and efficient businesses. Headquartered in the U.S., Cognizant is ranked 194 on the Fortune 500 and is consistently listed among the most admired companies in the world. Learn how Cognizant helps clients lead with digital at [www.cognizant.com](http://www.cognizant.com) or follow us [@Cognizant](https://twitter.com/Cognizant).

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## About ESI ThoughtLab

ESI ThoughtLab is an innovative thought leadership firm that creates fresh thinking and actionable insights through rigorous research and evidence-based analysis. It specializes in using the latest quantitative and qualitative tools to examine the impact of technology on companies, cities, industries, and business performance. ESI ThoughtLab is the thought leadership arm of Econsult Solutions, a leading economic consultancy.

The ESI ThoughtLab report "Driving ROI Through AI" was the source for the data and much of the analysis in this ebook.

To learn more, visit [esithoughtlab.com](http://esithoughtlab.com).

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