

2023 Global Digital Twin Survey Report Vertical Breakdown: **Manufacturing**



TABLE OF CONTENTS

INTRODUCTION 03

KEY TAKEAWAYS 04

SECTION 1: ADOPTION AND USAGE 07

SECTION 2: IMPACT 11

SECTION 3: EXPECTATIONS 16

CONCLUSION 20

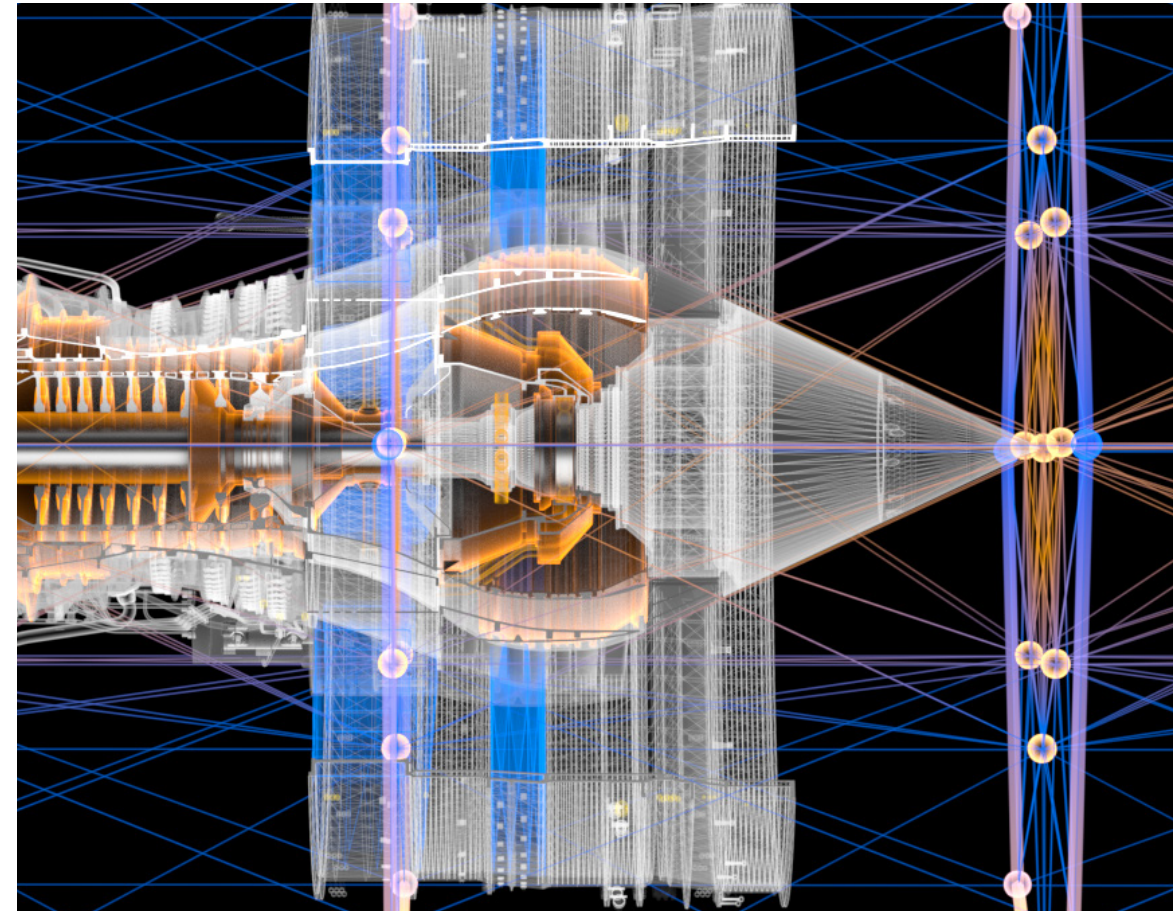
METHODOLOGY 22

Introduction

Digital twin technology is the process of using data streams to create a digital representation of a real-world asset to improve collaboration, information access, and decision-making. In 2022, Altair set out to paint the most comprehensive picture of the digital twin landscape by surveying more than 2,000 industry professionals from around the world. With that data, [we compiled a detailed report](#) that showed how industry professionals viewed, adopted, and used the technology, how people of different organizational stature understood digital twin, how organizations were using the technology to further their sustainability efforts, and much more. And the results? Incredibly informative.

In this report, we'll examine the manufacturing sector to understand how the industry has used, is using, and will use digital twin technology. In it, we see the manufacturing sector – naturally geared toward product development and process optimization – is one of the most mature industries for digital twin usage and is also a leader in sustainability efforts compared to other key industry verticals. In addition, an overwhelming majority indicated digital twin technology has had a substantial impact on new product development and maintenance and warranty costs. And looking ahead to the future, almost half of manufacturing respondents believe digital twin technology will make the need for physical prototyping obsolete in just a half-decade. In short, the data makes it clear digital twin technology is here and already making an impact.

Read on to discover all things digital twin technology as it pertains to the world of manufacturing.

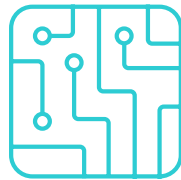
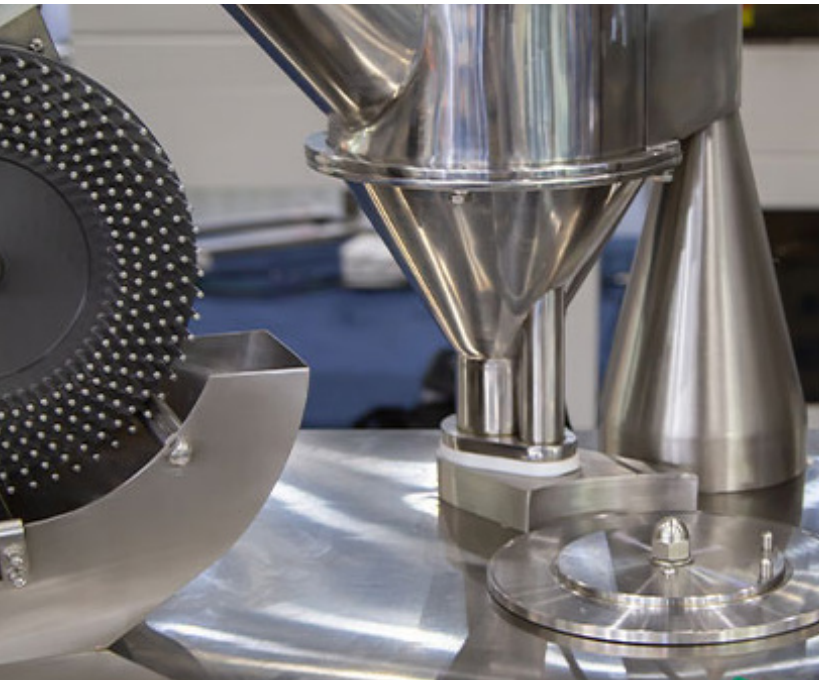




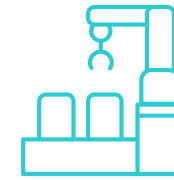
KEY TAKEAWAYS

Key Takeaways

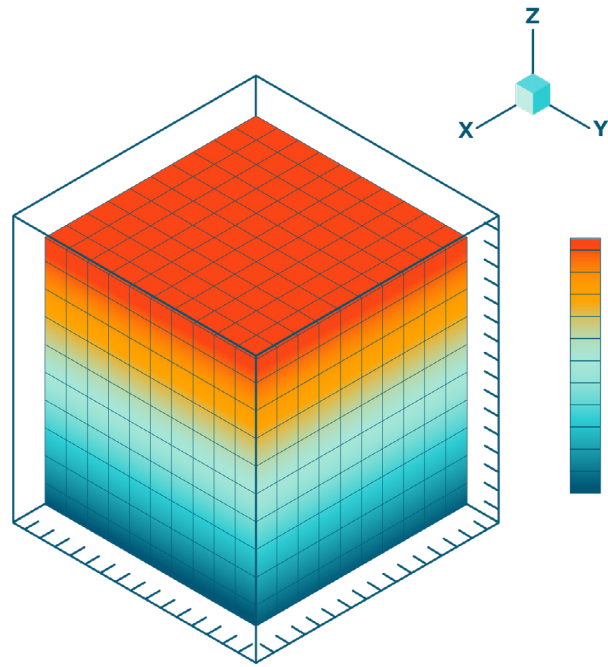
Before diving into the detailed results, here are some of the key findings the data presented.



Of the manufacturing respondents, 71% said their organizations already leveraged digital twin technology. Of those respondents, 89% indicated digital twin adoption has occurred within the last two years or sooner. That said, compared to other industries, manufacturing respondents were the second most likely to say their organizations adopted digital twin technology three or more years ago.



Of respondents who used digital twin technology, 89% said it helped their organization create more sustainable products and processes. Additionally, compared to other sectors' averages, **manufacturing was the most likely industry to say digital twins made their company more sustainable** by making materials and products less wasteful and easier to refurbish/reuse. And 94% of those who said their organizations used digital twins said the technology better informed the development of new products.



Of manufacturing respondents who said their organization doesn't currently utilize digital twin technology, 55% predicted their organization would adopt it within the next two years. Additionally, 86% of all manufacturing respondents said their organization was either currently using or plans to use digital twin technology to reach organizational sustainability objectives.



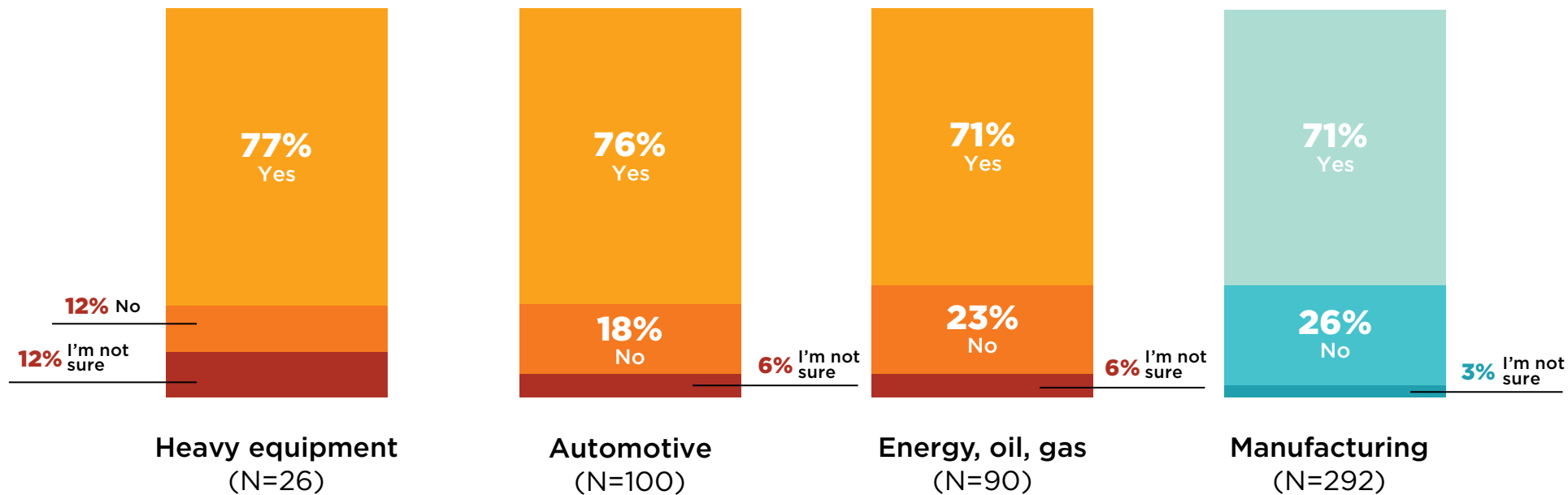
Lastly, 40% of manufacturing respondents believe digital twin is already making or will make the need for physical prototyping obsolete within the next four years.



SECTION 1
**DIGITAL TWIN
TECHNOLOGY
ADOPTION
AND USAGE**

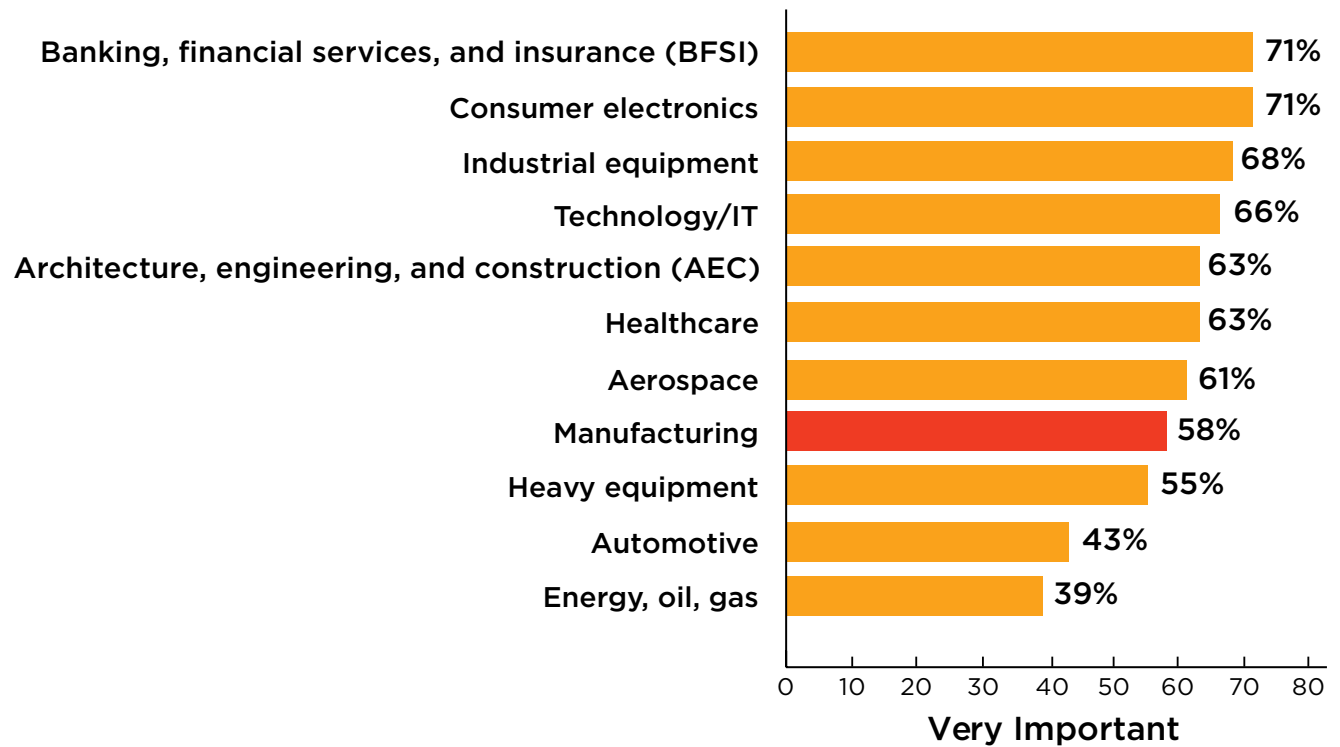
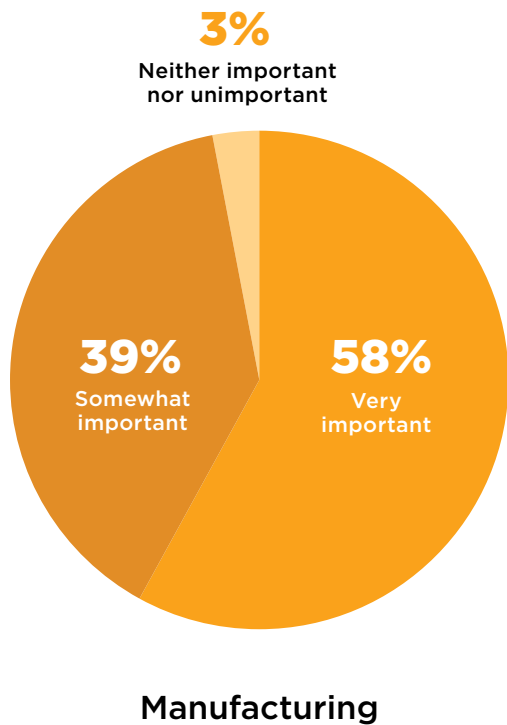
Of the manufacturing respondents, 71% said their organizations already leveraged digital twin technology. In the overall population of the survey’s 2,007 respondents, the manufacturing sector was tied for the third most likely to say it leveraged digital twin technology, just behind the heavy equipment (77%) and automotive (76%) sectors.

► Does your organization leverage digital twin technology?



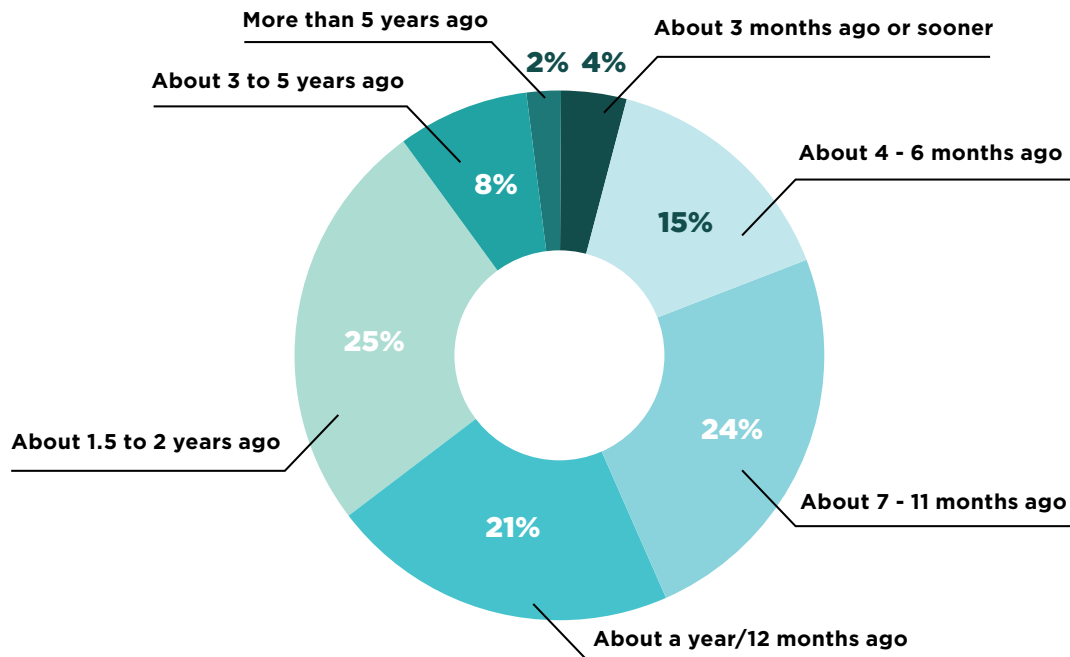
Of respondents who said their organizations leveraged digital twin technology, 97% said it was “important” to their organization – **58% said it was “very important.” Interestingly, manufacturing sector respondents were the fourth least likely to indicate digital twin technology was “very important” to their organization**, ahead of only the energy (39%), automotive (43%), and heavy equipment (55%) sectors.

► How important are digital twin solutions to your organization?



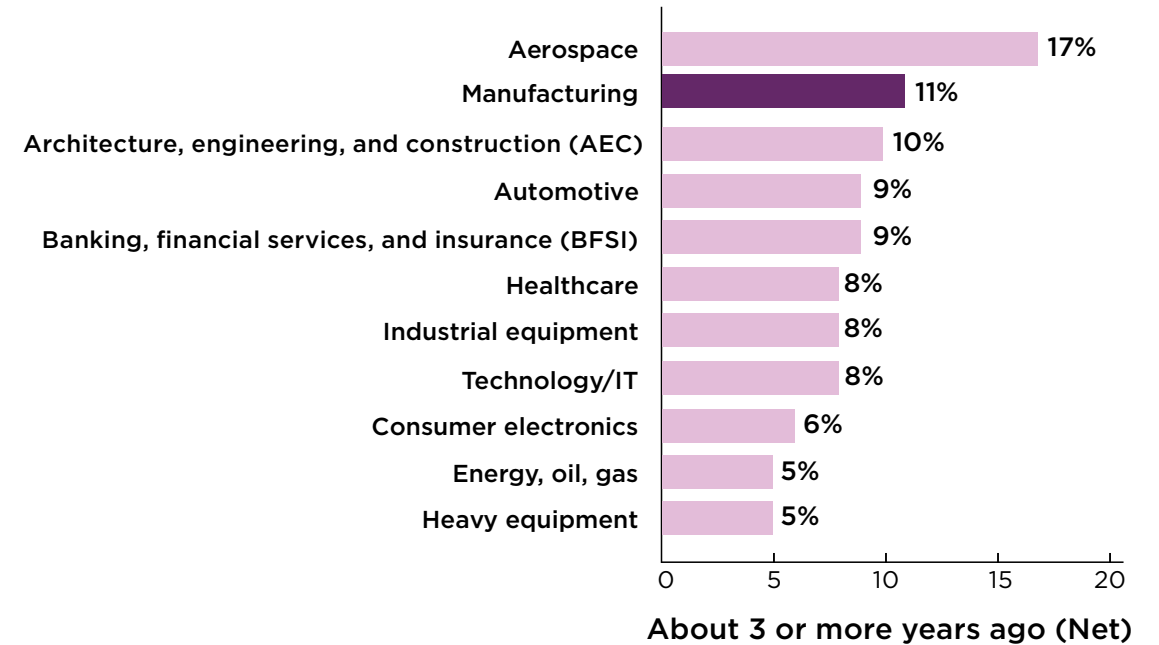
Regarding the timeframe of digital twin adoption, the manufacturing sector is still very new to digital twin technology in a broad sense. **Of those who said their organization leverages digital twin technology, 89% of respondents indicated digital twin adoption has occurred within the last two years or sooner.** 19% of respondents said their organization adopted digital twins within the past six months or sooner.

► When did your organization begin to invest in digital twin solutions?



At the same time, the data suggests the manufacturing sector is more mature in its digital twin adoption relative to its counterparts - according to the data, manufacturing respondents were the second most likely group to say their organizations adopted digital twin three or more years ago, behind only the aerospace (17%) sector.

► When did your organization begin to invest in digital twin solutions?

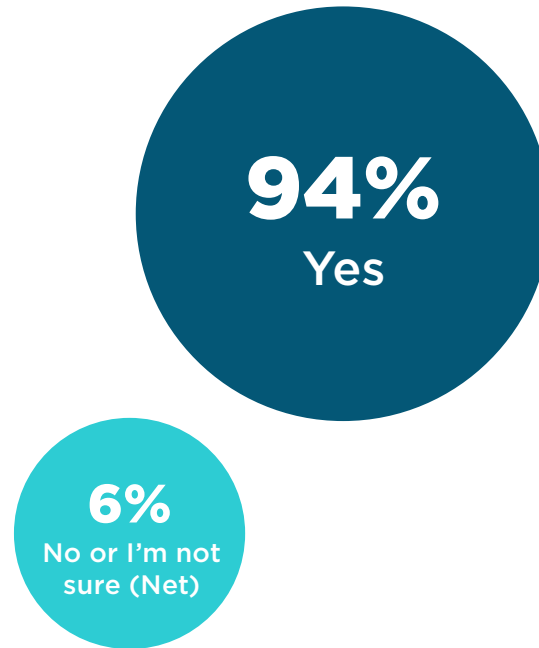




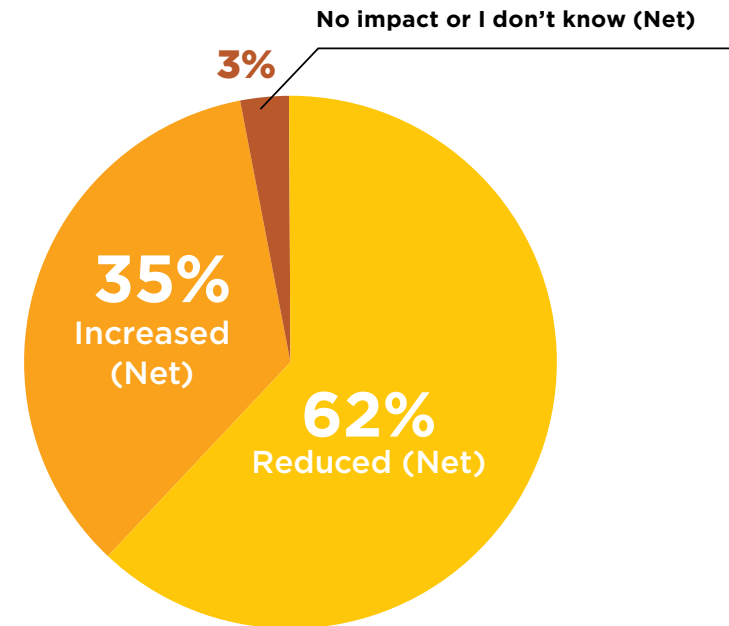
SECTION 2
**IMPACT OF
DIGITAL TWIN**

Regarding usage, manufacturing sector respondents indicated their organizations were already seeing benefits in multiple areas. **First, 94% of those who said their organizations used digital twin technology said it better informed the development of new products. Additionally, 62% of digital twin users said it had reduced their maintenance and warranty costs.**

- ▶ Does digital twin technology better inform the development of new products?



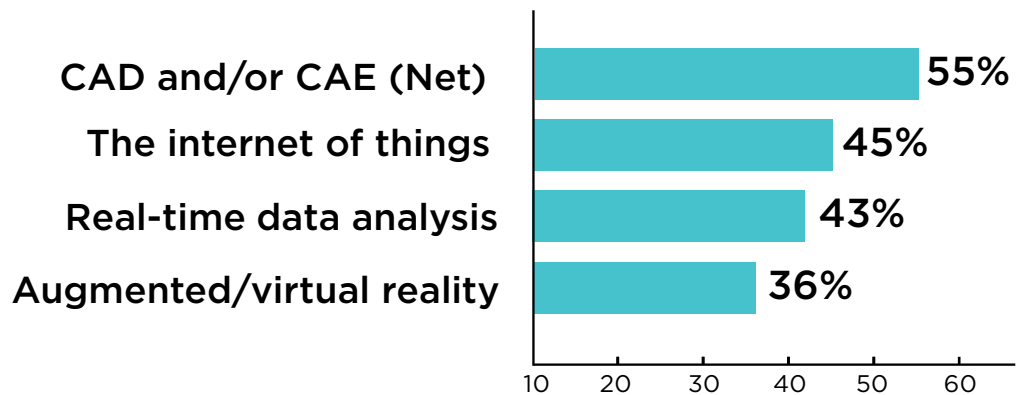
- ▶ Please fill in the blank with the response that best applies to you: Using digital twin technology has _____ maintenance and warranty costs at my organization.



Manufacturing respondents also indicated they were using a variety of technologies alongside digital twin technology, including CAD/CAE, Internet of Things (IoT), and real-time data analysis. **Interestingly, compared to other sectors, manufacturing was the most likely to say it used augmented and virtual reality (AR/VR) alongside digital twins.**

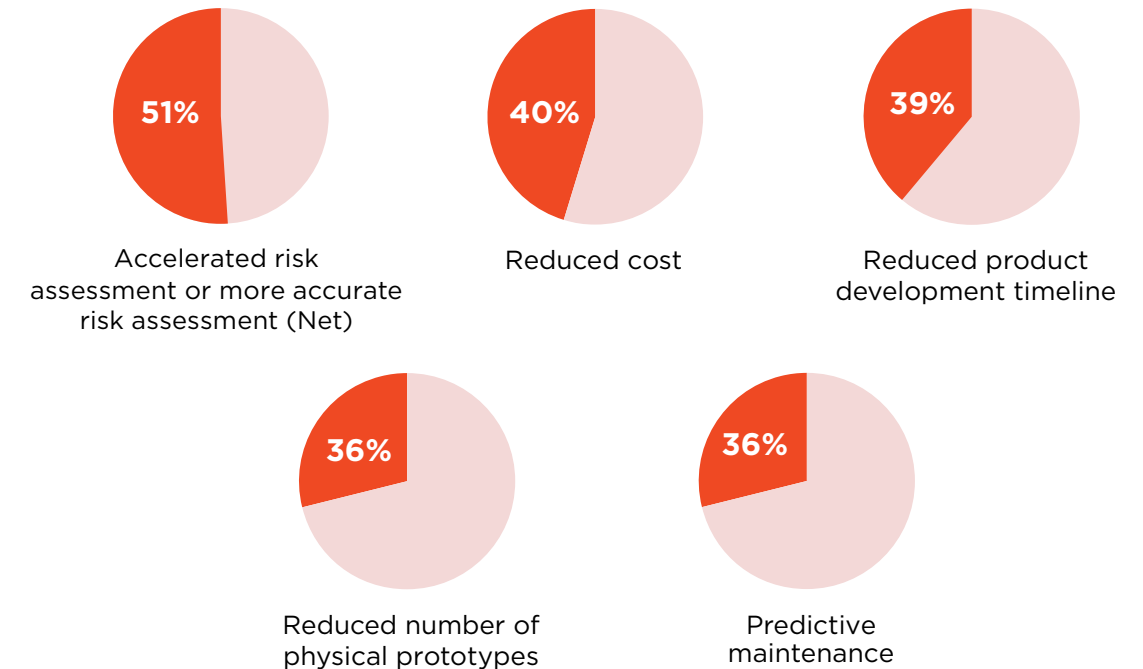
Below were the most popular technologies deployed in conjunction with digital twins from the manufacturing sector. For this question, respondents could select more than one answer:

- ▶ Which of the following technologies do you implement along with digital twin solutions to improve the process or outcomes?



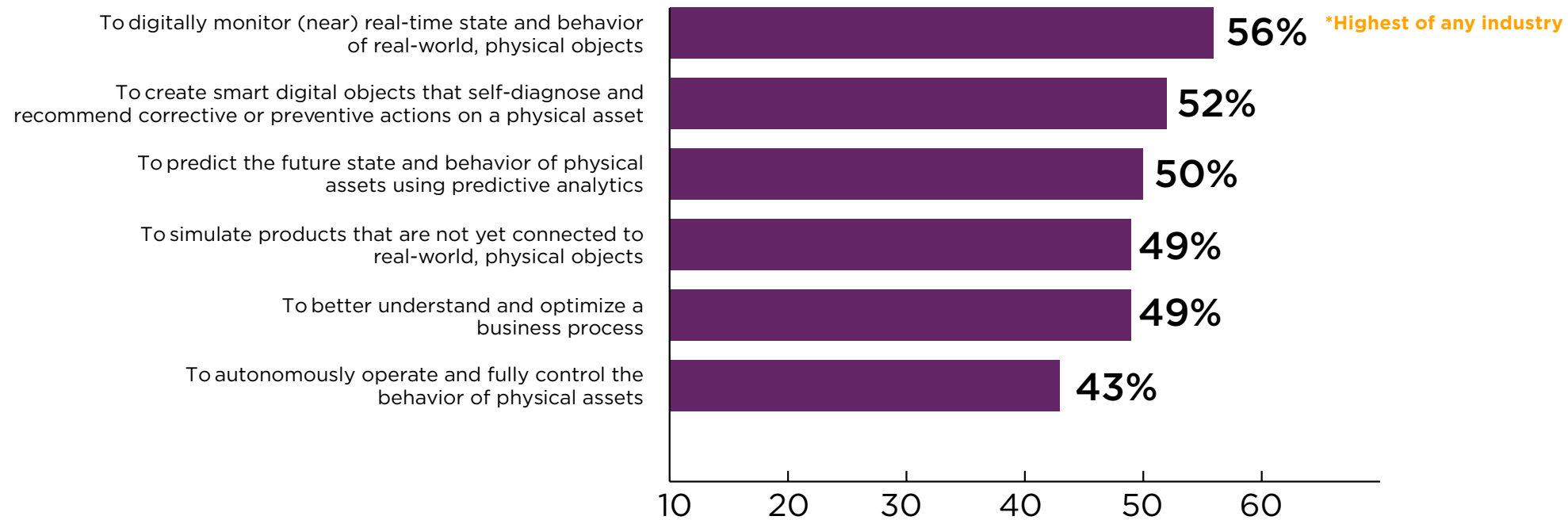
Below, you can see what manufacturing respondents who used digital twin thought were the technology's most important benefits in product development. Compared to the other sectors, manufacturing was the most likely to say reduced physical prototypes, and the second most likely to say reduced costs and predictive maintenance. For this question, respondents could select more than one answer:

- ▶ What does your organization believe to be the most significant benefit(s) of using digital twin technology in product development?



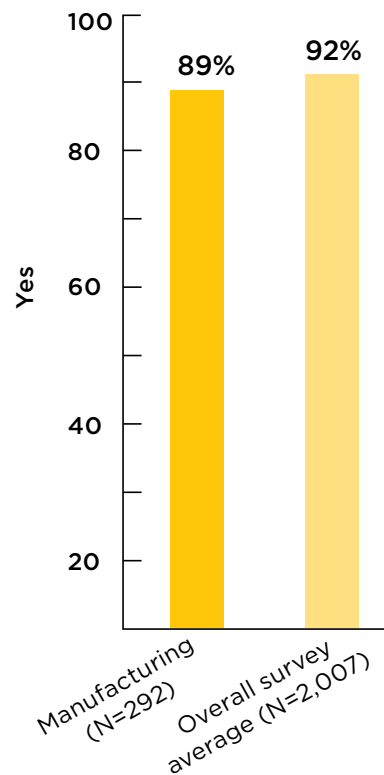
Overall, the manufacturing sector was most likely to use digital twin technology to digitally monitor the real-time state and behavior of real-world, physical objects (56%, the most of any sector), create smart digital objects that self-diagnose and recommend corrective or preventive actions on a physical asset (52%), and predict the future state and behavior of physical assets using predictive analytics (50%). Detailed responses below; for this question, respondents could select more than one answer:

► **How does your organization use digital twin technology?**



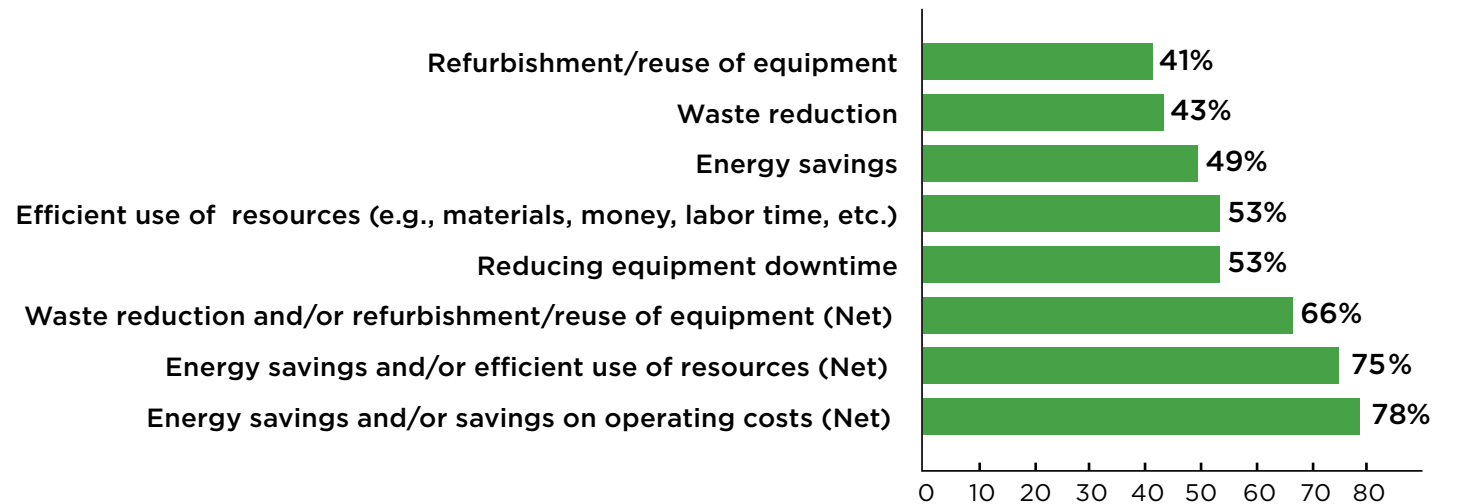
The manufacturing sector’s use of digital twin also extends into the realm of sustainability. Of respondents who used digital twins, 89% said it helped their organization create more sustainable products and processes. **It’s interesting to note while this is slightly lower than the average across all sectors in the overall survey population (92%), this is still a very high number.**

- ▶ Has digital twin technology helped your organization create more sustainable products or processes?



Below you can see a detailed breakdown of how manufacturing organizations said digital twin technology makes their products and processes more sustainable. **Compared to other sectors’ averages, manufacturing was more likely to say digital twin made their company more sustainable by making materials and products less wasteful and easier to refurbish/reuse.** For this question, respondents could select more than one answer:

- ▶ How does digital twin technology help your organization reach its overall sustainability goals?



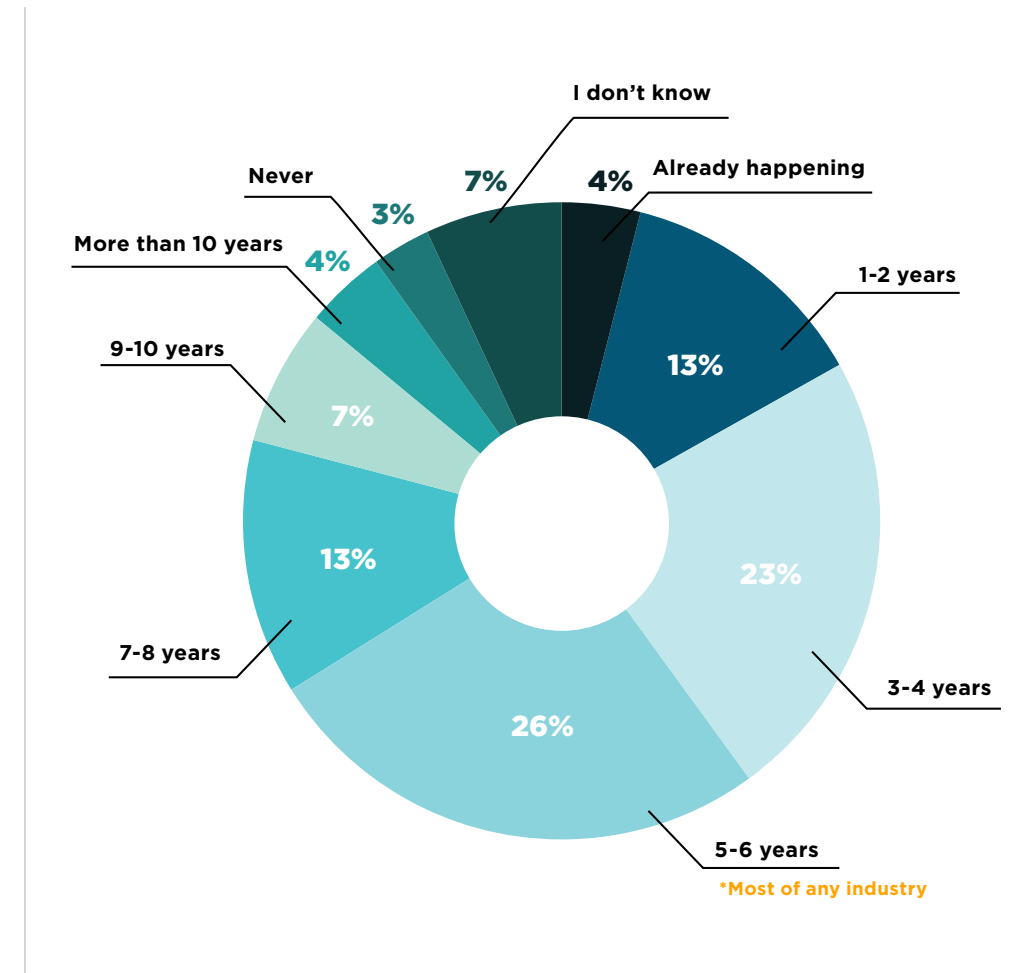
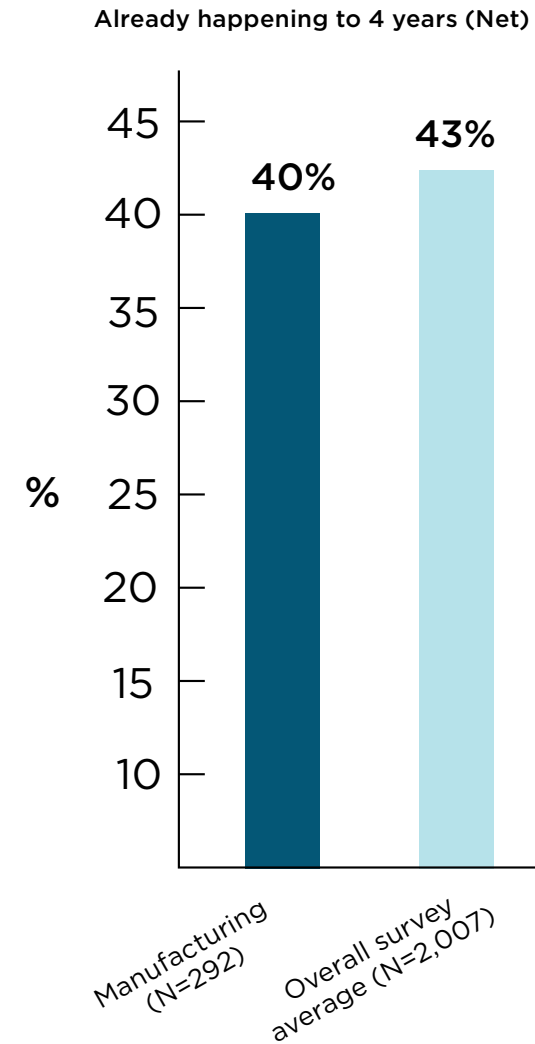


SECTION 3
**EXPECTATIONS OF
DIGITAL TWIN**

As the data has shown - both in the manufacturing vertical and in the survey's overall population - digital twin is here and impacting organizations and industries around the world. That said, many still view it as a technology of the future because of its recent adoption and how much growth potential it has. As the following data shows, the manufacturing sector has its own thoughts on the future of digital twin technology.

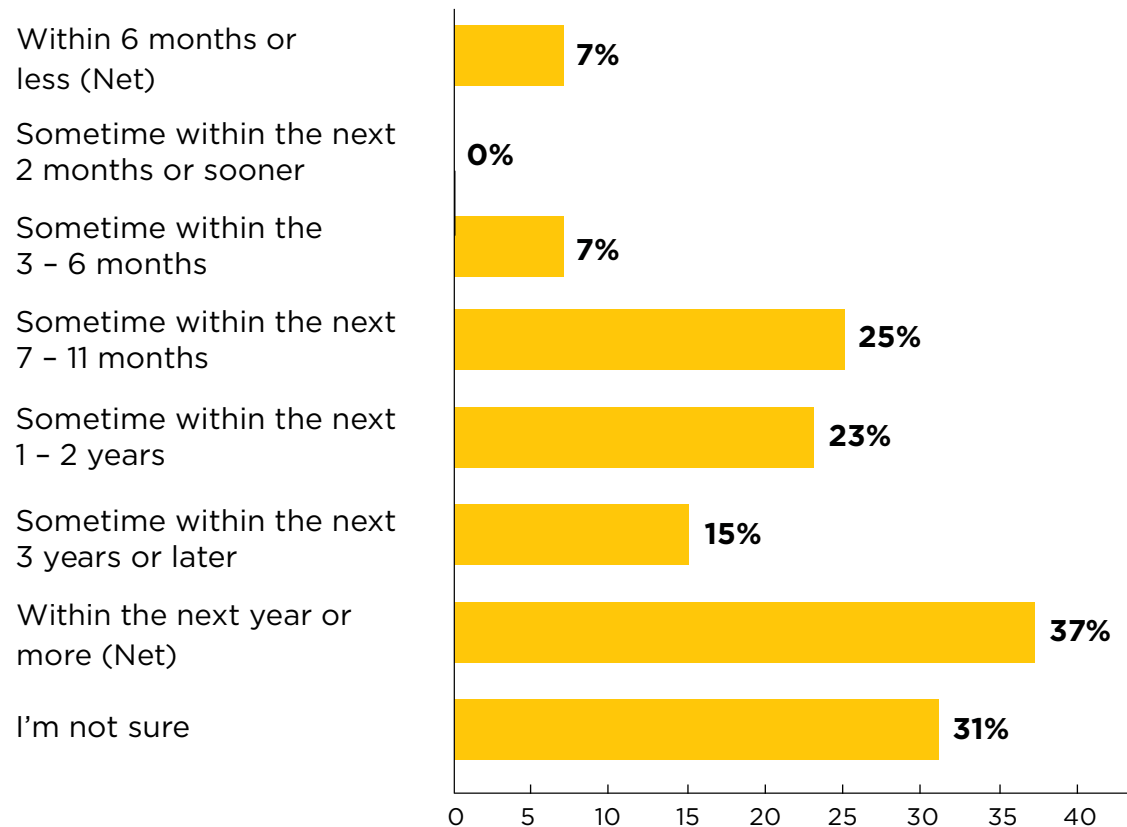
One of the most interesting findings from the overall survey's data was that 43% of respondents thought digital twin is already making or will make the need for physical prototyping obsolete within the next four years. **Despite being slightly lower than the overall survey average, 40% of manufacturing respondents believe the same.** Out of any single category, manufacturing respondents were most likely to say digital twin technology will make the need for physical prototyping obsolete in 5-6 years (26%); only 3% of respondents indicated they think it will never happen.

► When do you expect digital twin solutions to make the need for physical prototypes obsolete?



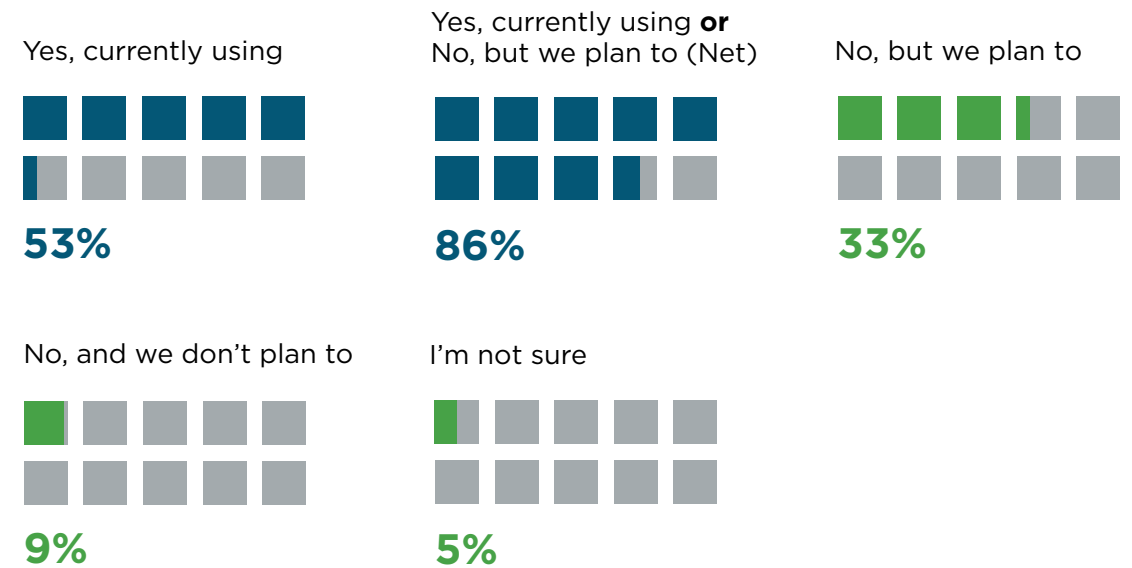
Of manufacturing respondents who said their organization doesn't currently utilize digital twin technology, 55% predicted their organization would adopt it within the next two years.

► **When do you expect your organization to adopt digital twin technology?**



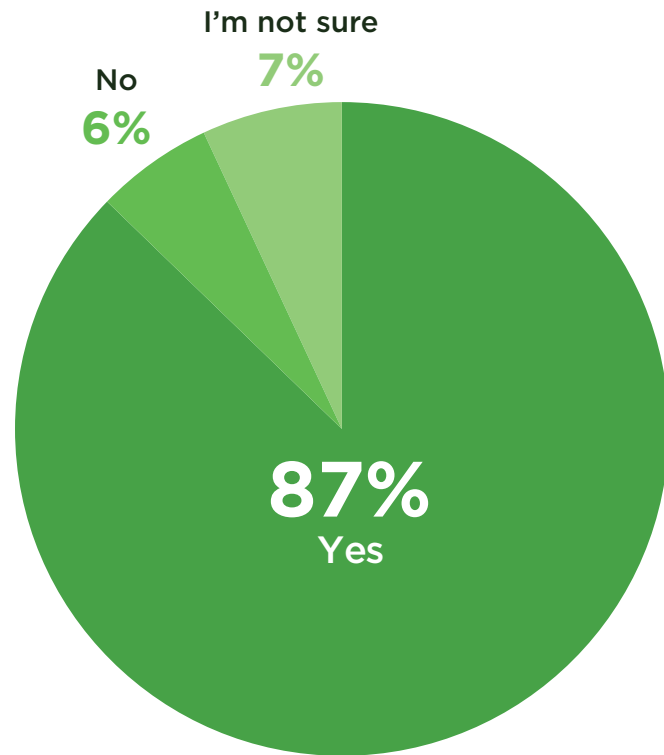
Additionally, 86% of all manufacturing respondents said their organization was either currently using or plans to use digital twin technology to reach organizational sustainability objectives.

► **Is your organization using digital twin technology to reach its overall sustainability goals?**



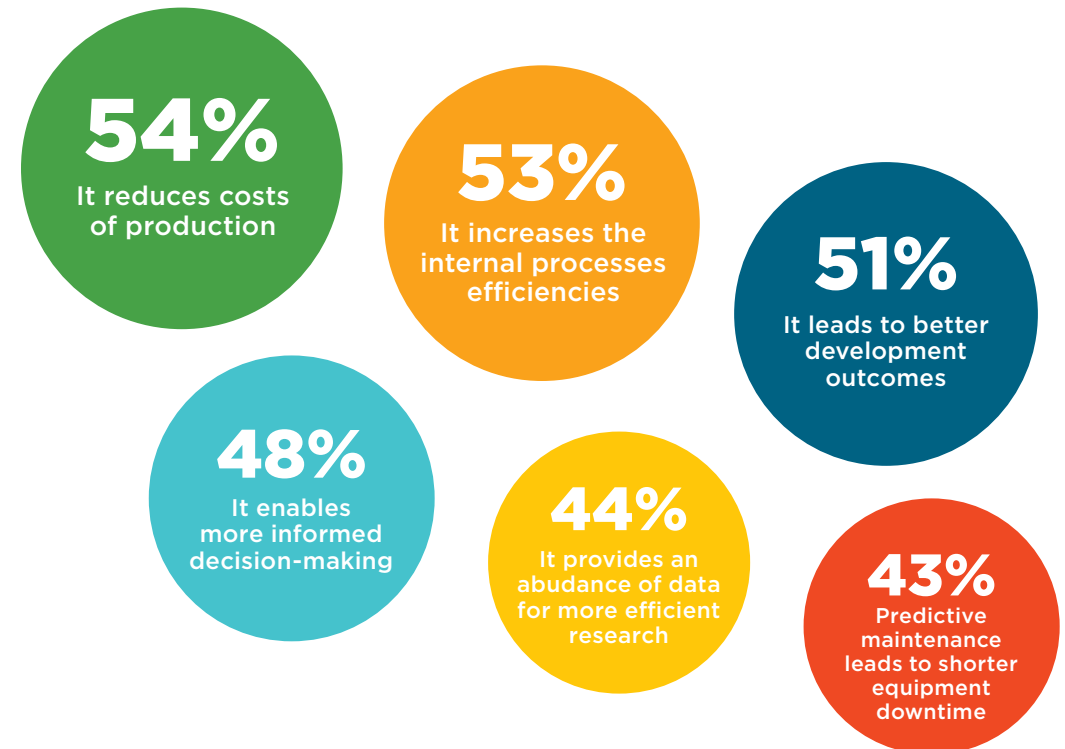
Moreover, of those who said their organization doesn't currently utilize digital twin, 87% of manufacturing respondents said they believe their leadership would be more likely to invest in it if they knew more about its benefits.

► **Do you believe your leadership would be more likely to invest in digital twin solutions if they better understood the benefits of digital twins?**



Lastly, below you can see a breakdown of what manufacturing respondents – who weren't in an executive or management role – wished their leadership understood more about the benefits of digital twins. The most common response (54%) was that it [digital twin] reduces the cost of production. For this answer, respondents could select more than one answer:

► **What do you wish your leadership understood about the benefits of digital twins?**





CONCLUSION

Conclusion

The data suggests that digital twin technology is already transforming the way the manufacturing sector works, and yet is still only just beginning to grow into its potential.



A sizable amount of manufacturing respondents (71%) said their organization already leverages digital twin technology. Far from a “technology of the future,” digital twin is already here, having an impact on firms around the world. Indeed, even most respondents whose organizations didn’t use the technology (55%) predicted their organization would adopt it within the next two years.

The manufacturing sector – with its heritage of physical testing and prototyping – anticipates digital twin technology will make physical testing obsolete. 40% of respondents believe digital twin is already making or will make the need for physical prototyping obsolete within the next four years. This is a massive paradigm shift not just for the manufacturing sector, but for every industry.

Digital twin technology is a game-changer transforming the way organizations think about their traditional manufacturing efforts and sustainability initiatives. 89% of respondents said it helped their organization create more sustainable products and processes, and compared to other sectors’ averages, manufacturing was the most likely industry to say digital twin made their company more sustainable by making materials and products less wasteful and easier to refurbish/reuse. This is crucial as organizations and governments around the world seek to drastically cut carbon emissions and reduce pollution and waste in the fight against climate change and ecosystem degradation. In many ways, digital twin technology is poised to play a key role in the fight against climate change.

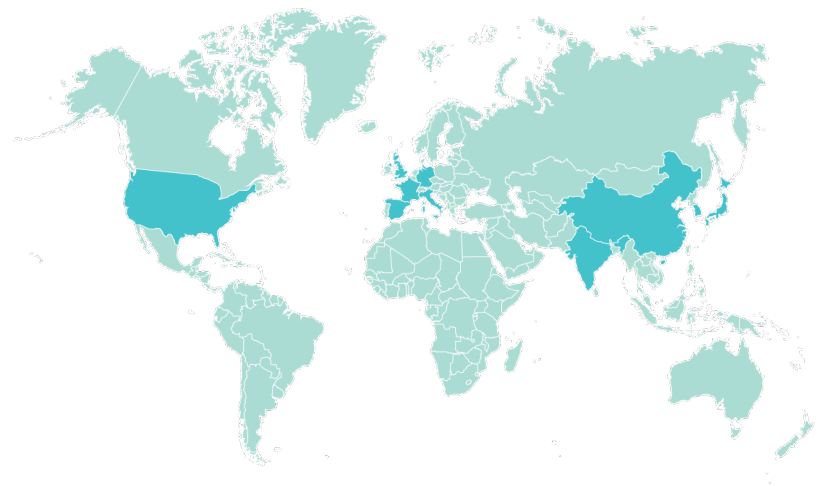


METHODOLOGY

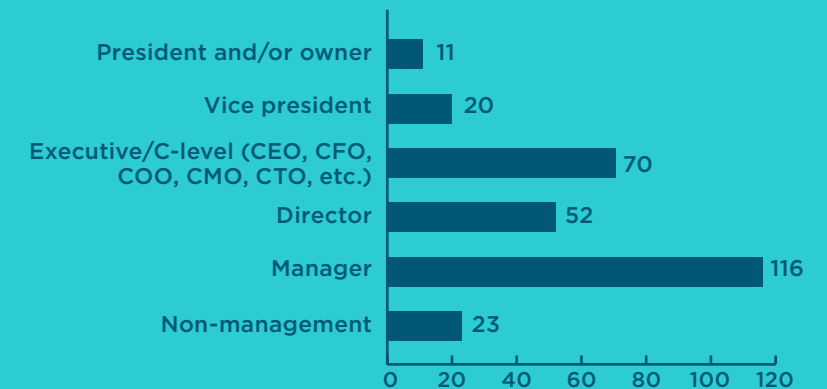
Methodology

Altair commissioned an independent, international online survey of 2,007 professionals employed throughout many target industries who perform job functions related to data science, IoT and analytics, software engineering, research and development (R&D), engineering, information technology (IT) and information systems (IS), product development, and executive management. While the original survey targeted 11 key industries, this report focused on the respondents only from the manufacturing sector (N=292). Below is a breakdown of the overall survey’s respondents (N=2,007) by geographic region:

- United States (N=200)
- China (N=200)
- France (N=200)
- India (N=206)
- Germany (N=200)
- United Kingdom (N=201)
- South Korea (N=200)
- Italy (N=200)
- Japan (N=200)
- Spain (N=200)



Below is a breakdown of these 292 respondents’ position level within their organizations:



The overall sample’s margin of error was +/- 2% with a confidence interval of 95%. Fieldwork was conducted in May 2022 by Atomik Research, an independent market research agency.



#ONLYFORWARD

© Altair Engineering Inc. All Rights Reserved. / altair.com / Nasdaq: ALTR

