



9 advantages and disadvantages of digital twin technology

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Using digital twin technology can help manufacturers improve their operations in a variety of ways. Here are several.

Digital twins can give manufacturers more current insights into their operations.

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A digital twin in industrial 3D printing enables visibility into the performance of facilities and assets, but faces steep climb ahead, said David Williamson, who used digital twins in previous IT manufacturing roles and is currently CIO at Abzena, a life sciences company located in San Diego. Industrial 3D printing vendors are bolstering their products just as use

The physical representation of an item and its software counterpart are usually connected by an [IoT](#) sensor, and that data gives users insight into the status of the physical object. For example, a user can learn through digital twin data that a piece of equipment is operating more slowly than usual and look into the problem.

2. Increased insight into employee performance

That increased visibility also gives supervisors more information about, for example, [the performance of workers on an assembly line](#).

Digital twins enable manufacturing supervisors to identify problems with manufacturing processes, said Karen Panetta, dean for graduate education at Tufts University's School of Engineering, located in Medford, Mass., and fellow with IEEE.

For example, digital twin technology can share that a piece of equipment is only operating once every 15 minutes instead of once every five minutes like it should. A supervisor can examine the issue and find out why an employee is behind on their duties, which will improve overall facility performance.

3. Improved insights through scenario simulation

Digital twin technology can also tell users [how their facility could perform in the future](#) if a certain change is made.

For example, a user could use digital twin elements in a warehouse to predict the ways in which a robot would interact with warehouse equipment, said Shreyas Shukla, principal research director at Info-Tech Research Group, an IT consulting company located in London, Ont. Users could also add prescriptive analytics to the digital twin, which suggests the best actions to take in a particular scenario.

For example, if the most important consideration in a certain situation is building a product quickly, [prescriptive analytics can](#) suggest what steps to take to make sure that process is carried out as fast as possible.

4. Cost savings

Digital twin technology can also reduce company costs because users won't have to carry out as much real-world testing with physical [prototypes](#).

"You can ensure a product meets compliance requirements or the customer's needs in the digital world before you build it in the physical world, saving you a [lot] of money," Shukla said.

5 challenges of using digital twin technology

However, using digital twin technology can bring some potential problems as well. Manufacturing leaders should learn about these issues so they can prepare for and hopefully prevent them.

1. Higher-than-expected complexity

"[We] found [using digital twins] was much more complicated than we expected," Williamson said of his experiences with digital twins.

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Industrial 3D printing matures but faces steep climb ahead



Companies that are building new factories, processes or products might find it easier to create a digital replica, he said. However, organizations with existing IT infrastructure might need to update their existing systems before they can build digital twins in a cost-effective manner.

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2. Poor data quality

A digital twin requires the right data to work, so poor [data quality](#) can negatively affect digital twins' operations.

Lack of data or poor quality of data will limit the use of digital twin technology or make it impossible altogether, Shukla said.

Manufacturing leaders must confirm their data quality is optimal before adding digital twin technology to their operations.

3. Customization requirements

Company leaders must plan for the fact that they will need to make their digital twin fit their organization and its needs.

"People try to jump in and just have a one-size-fits-all solution, and you can't do that," Panetta said. "[A digital twin] should be customized to your purpose and goals."

Doing so requires more work and time, so leaders must plan for those additional expenditures.

4. Prohibitively high costs

Organizations might find digital twins and the process of implementing them more expensive than leaders predicted.

The costs associated with creating and effectively using digital twins could delay a positive ROI for many organizations.

"I do think this technology will become standard and will drive benefits," Williamson said. "But for many [companies], it is still down the road."

5. Lack of knowledge about the right applications

Manufacturing leaders must also make sure they are only [applying digital twin technology](#) to the right processes rather than viewing the tech as a good solution for everything.

"One of the biggest challenges [with digital twins] is understanding what the technology is intended for and what it is not intended for," Shukla said.

For example, many manufacturers believe that digital twin technology can serve as a substitute for real-world testing, which is not correct, Shukla said.

"It is meant to complement real-world testing," he said.

As with many other technologies, manufacturing leaders must confirm information themselves rather than unquestioningly trusting digital twins' insights.

"If you believe in [the technology] without question, that's when it comes back and bites you,"

Panettieri said.



Industrial 3D printing matures but faces steep climb ahead



Mary K. Pratt is an award-winning freelance journalist with a focus on covering enterprise IT and cybersecurity management.

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