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Insights

The future of work in manufacturing

What will jobs look like in the digital era?

DIGITAL TWIN ENGINEER

Summary

Digital twin engineers create a virtual representation of both the physical elements and the dynamics of how an IoT-connected product operates and interacts within its environment, throughout its entire life cycle. Ranging from a jet engine or aircraft to a shop floor, an assembly line, or even an entire factory building, digital twin engineers make it possible to virtually see inside any physical asset, system, or structure that could be located anywhere, thereby helping to optimize its design, monitor its performance, predict its maintenance, and improve the overall experience.

Faster computing power, a proliferation of sensors, and exponential growth in the ability to capture data locally are fueling the rise of digital twins—virtual representations of products created with 3D design software. Digital twin engineers play a crucial role in building the relationships and communication lines across silos to create a network that marries the physical and digital worlds throughout the manufacturing value chain.
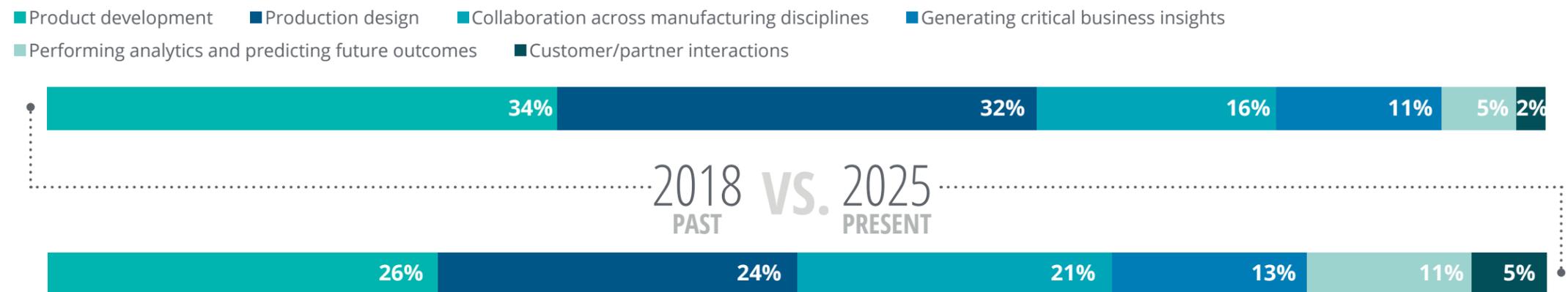
Digital twin engineers leverage engineering tooling along with a product structure (including parts, sub-assemblies, and sub-components) and integrate these with the necessary digital elements (including software, data, and chips) into a single design to produce the highest-quality product. Further, they act as a link between the product twin and the performance twin, revolutionizing how manufacturers work together with asset operators and customers, enhancing collaboration, accelerating innovation, designing smarter products, and creating new services.

By creating virtual models to test in real-world operating environments, digital twin engineers help manufacturers gain an understanding of their product behavior, thereby enabling better performance through enhanced design and predictive maintenance.

Responsibilities

- Create digital twins using 3D software and run simulations to measure product performance in varying conditions
- Draw insights from in-use product data to design new products and business models
- Use machine learning along with real-time usage and performance data to optimize product performance and service
- Work closely with the sales and marketing teams to create data-driven customer insights and go-to-market strategies

Time spent on activities

- Product development
- Production design
- Collaboration across manufacturing disciplines
- Generating critical business insights
- Performing analytics and predicting future outcomes
- Customer/partner interactions

2018 PAST

| 34% | 32% | 16% | 11% | 5% | 2% |

vs. 2025 PRESENT

| 26% | 24% | 21% | 13% | 11% | 5% |

GINTAS DEFRANK

DIGITAL TWIN ENGINEER
AirTrain Engines and Co. | *Danbury, CT*

Proficient in creating virtual replicas of major industrial products and helping companies predict and respond to customer problems using real-time data analysis and advanced technologies

Experience

Digital twin engineer
AirTrain Engines and Co. *Aug 2022–present | 3 years 8 months*
Work closely with customers to calculate time to failure and the remaining useful life of jet engines so that maintenance is performed on a condition-basis instead of a fixed schedule

eEngineering applications manager
Adein Corp. *Jul 2018–May 2020 | 1 year 11 months*
Developed a product data management system that is used to create engineering design applications and worked with engineering managers to deliver applications for product introduction management and design of Six Sigma

Artificial intelligence systems engineer
MITY Technologies *Jun 2016–Jun 2018 | 2 years 1 month*
Conceived, designed, implemented, and delivered multiple decision support systems based on advanced technologies

Education

Fairfield University
Master of Science, Engineering
2020–2022

Trinity College
Bachelor of Science, Computer Science
2012–2016

Skills and endorsements

Simulations · 108
Endorsed by **Janson** and **Harriet**, who are highly skilled at this

Analytics · 99
Endorsed by **Cabe**, who is highly skilled at this

Sensors · 96
Endorsed by **Melissa** and **Jacob**, who are highly skilled at this

Software Development · 88
Endorsed by **Tina**, who is highly skilled at this

Systems Engineering · 81
Endorsed by **Jacob** and **Tina**, others who are highly skilled at this

Research and Development (R&D) · 76
Endorsed by **Milli**, who is highly skilled at this

Algorithms · 75
Endorsed by **Janson** and **Cabe**, who are highly skilled at this

Image Processing · 75
Endorsed by **Melissa** and **Rajat**, who are highly skilled at this

Cross-functional Team Leadership · 73
Endorsed by **Scott** and **Mary**, who are highly skilled at this

Program Management · 72
Endorsed by **Jackie** and **Nihil**, who are highly skilled at this

TOOLBOX

THE TOOLBOX SUPPORTS THE WORKER AS A WHOLE—IN ACHIEVING EXTERNAL OUTCOMES SUCH AS PRODUCTIVITY AS WELL AS INTERNALLY FOCUSED ONES SUCH AS DECISION-MAKING AND LEARNING.

Productivity

Venus
This artificial intelligence (AI)-powered, voice-enabled digital assistant provides a conversational interface for all productivity-related tasks, from scheduling to finding answers to questions and checking the status of products and projects.

WeAR
It is an augmented reality (AR) wearable device that connects digital twin engineers to IoT devices, and receives work instructions and training. These smart glasses, paired with Bluetooth-enabled scanners and voice guidance, respond to commands and open a pop-up on monocular display, which help boost productivity.

InstaCap
It captures data automatically using digital technologies such as radio frequency identification (RFID) and speech recognition. It helps collect information from machines, images, or even sounds without manual data entry.

Symphony
This software suite runs simulations and connects digital twin engineers with other resources— people, machines, and systems, for data-driven digital manufacturing. Using advanced real-time analytics, it helps digital twin engineers create models and optimize manufacturing production performance.

Share Smart
It is an enterprise social and mobile technology tool that helps in sharing digital 3D designs and images as digital files, to improve the collaboration necessary to build a new product or assembly line right the first time.

Rosetta
It is an AI-based real-time language translator that listens to speech, converts it into text, and then translates that into the desired language, enabling collaboration among different regional markets.

Decision-making

Smart Dash
It is a visual display that presents data, live information, and analysis from multiple sources to facilitate informed decision-making.

Envision
This tool uses machine learning to identify potential problems as well as opportunities to devise solutions that make a positive business impact.

RealConnect
This application enables an engineer to seamlessly interact with suppliers, partners, customers, and the broader ecosystem.

Sixth Sense
It is a tool that incorporates machine learning, cognitive computing, and artificial intelligence to detect macro trends in the broader environment.

Learning

SkillsPro
This smart learning assistant helps digital twin engineers refresh existing skills as well as learn new and emerging skills. Its conversation mode shares tips and tricks about the tools/ techniques that an engineer has learned recently. When synced with an engineer's project planner, it shares a list of skills to be learned for implementation in upcoming projects.

SmartLab
It facilitates classroom learning using virtual reality headsets and simulation. It tests trainees on a defined skill framework and measures subjective aspects based on their response style. Each trainee receives customized learning objectives.

A DAY IN THE LIFE

07:30 AM
Gintas begins his work day from his home office and accesses Share Smart to share the digital files of his 3D product prototypes with Carlos, a mechatronics software engineer based in Frankfurt. Gintas puts on WeAR before beginning his working session on a new engine design that his company is developing in collaboration with Carlos' company CAI, a leading cloud services provider specializing in the manufacturing industry.

09:00 AM
As soon as Gintas completes his meeting with Carlos, RealConnect sends out an alert reminding Gintas to update the latest prototype model and all the analyses of mechanical and other engineering systems so that AirTrain's customers can review and provide their feedback by the next morning.

10:30 AM
Gintas logs in into Smart Dash to share live information and analysis with Adam, his senior project manager, as they prepare for their upcoming call at noon with the head of R&D to go over the status of the project.

12:00 PM
Adam and Gintas open the new module of Sixth Sense to discuss the results of all the analytics that ran and they detect a few major challenges identified during the build stage of the new engine prototype.

01:30 PM
After his review meeting with Adam, Gintas goes for lunch with his wife at a Peruvian restaurant a couple of blocks from his home. On the way, Gintas asks Venus, his AI-powered voice-enabled digital assistant to find out how the latest review results compare with the earlier version of the prototype.

03:00 PM
After returning from lunch, Gintas speaks to Rosetta in English to convert all the key findings from the differences in results of the two versions of the prototypes, provided by Symphony. Rosetta translates them into Japanese and sends it over to Ankari, the head of materials division at Yuna, an Osaka-based supplier of advanced pistons.

04:30 PM
As Gintas begins wrapping up his workday to pick his daughter up from school, he receives a pop-up from SkillsPro suggesting a new course on hardware-in-the-loop (HIL) and software-in-the-loop (SIL) technology is now available. Gintas asks SkillsPro to enroll him into the course, which he plans to take using SmartLab next week.

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