DIGITAL TWIN – MEETING CUSTOMER EXPECTATIONS

Srivatsan Padmanabhan
High Tech Industry Practice

accenture technology
THREE MACRO TRENDS FOR CREATING VALUE IN PRODUCT DEVELOPMENT

TREND #1: INCREASING PRODUCT CONNECTIVITY WITH ECOSYSTEM/ENTERPRISE
TREND #2: INCREASING RELIANCE ON SOFTWARE TO DELIVER PRODUCT FEATURES
TREND #3: CONNECTED, SOFTWARE-DRIVEN PRODUCTS CREATING EVERYTHING-AS-A-SERVICE AND INTERNET OF THINGS (IOT) MARKETS
DIGITAL TECHNOLOGIES
ARE REDEFINING BUSINESS MODELS & IMPACTING CUSTOMER EXPECTATIONS ON AN UNPRECEDENTED SCALE

CUSTOMER EXPECTATIONS

- On demand
- Remote diagnostics & repair
- Smart and lower cost products
- Product-as-a-Service
- User Experience
- Software controls versus mechanical

DIGITAL TRENDS

- SMAC
- 3D Printing
- AR/VR
- Connected Everything
- Open Innovation
- Digital Platform
THE EVOLUTION FROM PDM TO DIGITAL THREAD & TWIN
DIGITAL TWIN DEFINED

Digital Twin refers to a digital representation of a physical product / platform modeled to behave realistically.

This representation includes CAD and related engineering information - product specifications, geometry models, material properties, validation results, IoT sensor readings and associated simulation information.
DIGITAL TWIN BENEFITS

- Better insights on product usage and performance
- Simulate impact of proposed changes
- Improve customer service and make better operational and strategic decisions based on these insights
The DIGITAL TWIN is a digital representation of a physical product including product specifications, geometry models, material properties simulation and related information.

The DIGITAL THREAD extends the Digital Twin into a product’s entire lifecycle – Design, Engineering, Performance, Manufacturability and Serviceability and into the contexts in which a product/service operates.
Digital Twin named in Gartner’s Top 10 Strategic Technology Trends for 2017 and 2018.

Gartner predicts that by 2021, half of large industrial companies will use digital twins, resulting in those organizations gaining a 10% improvement in effectiveness.

By 2020, 30% of G2000 companies will be using data from Digital twins of IoT connected products and assets to improve product innovation success rates and organizational productivity, achieving gains up to 25% (IDC, Nov 2017).

Digital twin market is expected to grow at a CAGR of 37.87% during the forecast period, to reach USD 15.66 Billion by 2023.
PILLARS OF DIGITAL TWIN

INNOVATION & GROWTH

- Product/Platform Innovation
- Product/Platform Experience

DESIGN & ENGINEERING

- IoT Platforms, Analytics, Services
- Cyber Security

MANUFACTURING

PRODUCT SUPPORT

DIGITAL ENABLERS

New Services & Experience

Product/Service Efficiency
PILLARS OF DIGITAL TWIN

CLOSING THE LOOP

INNOVATION & GROWTH

DESIGN & ENGINEERING

MANUFACTURING

PRODUCT SUPPORT

DIGITAL ENABLERS

ELEMTNS

• 3D Models (CAD Systems)
• Systems driven Product Development
• BoM
• Analysis models (1D, 2D, 3D)
• Digital Software design & testing
• Electronic Design

BENEFITS

• Eliminates need for Prototypes
• Reduces development time
• Faster reiteration in response to actual usage/ performance

Source: https://www.youtube.com/watch?v=5lgOcWPQP1A
PILLARS OF DIGITAL TWIN

CLOSING THE LOOP

INNOVATION & GROWTH

DESIGN & ENGINEERING

MANUFACTURING

PRODUCT SUPPORT

DIGITAL ENABLERS

ELEMENTS

- Manufacturing Process
- Production facility model
- Production facility automation

BENEFITS

- Virtualize Manufacturing Process
- Optimize Supply Chain
- Improved Speed & Accuracy
PILLARS OF DIGITAL TWIN

CLOSING THE LOOP

INNOVATION & GROWTH
DESIGN & ENGINEERING
MANUFACTURING
DIGITAL ENABLERS
PRODUCT SUPPORT

ELEMENTS
• Field Service
• Mixed Reality
• Artificial Intelligence

BENEFITS
• Predictive Maintenance
• In-process guided interactions
• Immersive human-machine collaboration

Source: mspoweruser.com
DIGITAL TWIN ARCHITECTURE

Source: https://www.youtube.com/watch?v=5lgOcWPQP1A
USE CASES THAT ENHANCE THE DESIGN, MANUFACTURING AND SERVICE EXPERIENCE

Design & Engineer Using 3D Digital Twin

Product and Manufacturing Simulation

Mixed Reality in Design, Service and IoT Analytics
## USE CASES THAT ENHANCE THE DESIGN, MANUFACTURING AND SERVICE EXPERIENCE

<table>
<thead>
<tr>
<th>INDUSTRY</th>
<th>USE CASE</th>
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<tbody>
<tr>
<td>Energy</td>
<td>Windfarm where Digital Twin is used to improve efficiency up to 20%</td>
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<tr>
<td>Telecom</td>
<td>Improve onsite interaction with a product (Tower, switches) using A/R, service data, simulation analysis and results from big data analytics</td>
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<td>Heavy Industry</td>
<td>Steam Turbines - Optimize processes, reduce fuel consumption, control virtually every aspect of the full environment remotely</td>
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<td>Aerospace</td>
<td>An aircraft engine can be viewed in flight including temperatures and stresses on parts. The model can be used to identify safety risks</td>
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<tr>
<td>Semiconductor</td>
<td>The simulation of products with a digital twin, prior to actual manufacturing, can help companies eliminate future processing errors and improve their fabrication throughputs</td>
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<tr>
<td>Industrial Equipment</td>
<td>Digitalization of machine building resulting in reduced risks in commissioning, accelerate new product introduction.</td>
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<tr>
<td>Automobile</td>
<td>Behavioral and operational data of a connected vehicle helps in analyzing the overall vehicle performance to deliver a truly personalized/ customized service for the customers</td>
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**DIGITAL TWIN – FINAL THOUGHTS**

Digital Twin is an exciting Technology that can used across Design, Manufacturing and Service

Can help improve efficiency, get better products to market faster and improve customer experience

* In a 2017 survey by Gartner, majority of organizations (~50%) responded that they are using or plan to use digital twins in the next year.

But.. Digital Twin Technology is complex

Getting various technology to work together is a challenge

Leverage partner ecosystem

THANK YOU