What Is the Business Value of Digital Twin Technology?

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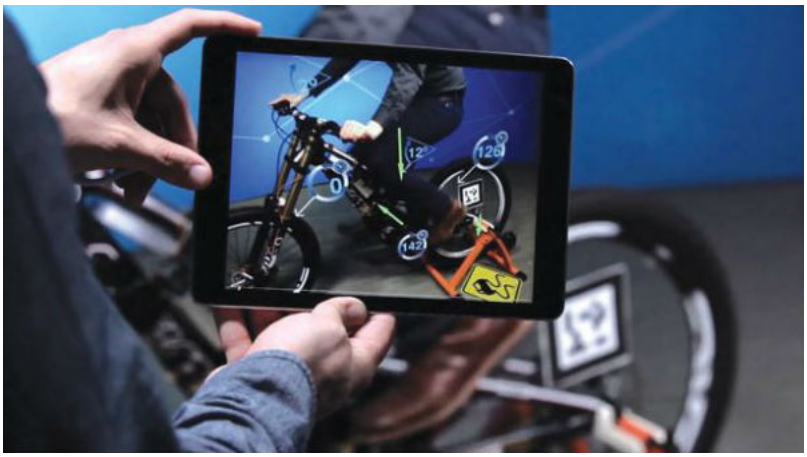
Augmented Reality • 9/6/2018

Traditionally a company develops a product, ships it to its customers or through reseller channels and only receives feedback through unreliable customer service portals, surveys or other verbatim mechanisms. What's lacking in this black-boxed environment are the products actual operational performance and insights.



This prevailing business problem is beginning to be solved by the digital transformation of organizations with their physical systems in the outside world. Specifically, digital twins (https://www.ptc.com/en/product-lifecycle-report/what-is-digital-twin-technology) bridge this lesser-known aspect of the product lifecycle and add value across the organization through IoT, data analytics, cloud computing and AR. Real business outcomes from digital twins are within reach ranging from lowering prototyping costs at the design stage to streamlining field technicians in product servicing operations

What Use Cases Drive the Business Value for Digital Twins?

Through a variety of embedded sensors, connectivity mechanisms and data analytics, connected products with cloud-based remote monitoring applications are the primary IoT architecture for digital twins (http://www.digitaleng.news/de/digital-twins-land-a-role-in-product-design/). Remote monitoring enables a virtual representation of a physical asset's real-time health deployed in the real-world.

The business value of this application stems from the historically unavailable 'voice of the product' and its now widespread availability for prudent business decisions across an organization. These stakeholders can take the form of:

- **Design:** Product designers, architects and engineers using CAD software improve future renditions and engineering models to optimize product performance and efficiency. This real-world operational data saves timely design and testing costs in prototyping product stages.
- **Field Services/Technicians:** Preemptive product malfunctioning alerts through prescriptive analytics (https://www.ptc.com/en/digital-transformation/manufacturing) increase 'problem area' visibility while reducing equipment downtime, routine inspections and maintenance costs. Digital twins also can be virtually displayed through AR glasses or tablets with the digital representation juxtaposed next to physical asset, improving servicing business metrics.
- **Management:** New operational data feeds into production and planning models, dictating pivotal strategic insights, recommendations and roadmaps.
- **Marketing & Sales:** Equipped with knowledge on customer's preferences and actual usage of their product, can tailor messaging to drive revenue.
- **Product Managers:** Improve product insights and PLM systems in-place with digital twin integrations accelerating time-to-market.

What Markets Stand to Gain the Most Value from Digital Twins?

Any industry with assets, devices and other systems deployed outside of company walls stands to reap the benefits of digital twins. However, the costs of these deployed assets can sustainably range; assets that are on the higher-end of this scale will benefit the most from digital twin implementation. These high-end connected assets usually play mission-critical roles in their environments where they must consistently perform

and cannot afford to malfunction.

Examples of value come from heavy-industrial markets:

- **Automotive:** Vehicle sensor data gives automotive OEMs and tier suppliers analytics from deployed fleets enabling OTA patching opportunities. Insurance providers adopting usage-based insurance (UBI) can leverage driver data for setting premiums and accident reconstruction.
- **Aerospace:** Commercial plane's thousands of sensors stream asset data to better system servicing and operational status.
- **Healthcare:** Connected medical systems and tools ensure product integrity and measure patient outcomes.
- **Manufacturing:** Digital factory equipment and machinery increase uptime and production yield, while reducing repair and maintenance rates.
- **Oil & Gas:** Remote rig sends health data limiting routine inspections and servicing.
- **Rail:** View of deployed locomotives and assets health better optimize scheduling and reducing servicing time.
- **Utilities:** Digital representation of systems on the power grid improve demand response functions and energy efficiency.

Final Thoughts

Obtaining tangible business value and ROI is readily available with digital twin implementation through clearly identifying winning use cases and development assistance of trusted technology partners. Lowering costs throughout an organization stem from the design stage up through servicing operations while providing additional stakeholders pivotal performance data.

Enabling this transparency across the organizational value chain through digital and physical world convergence is becoming increasingly necessary as products shift to 'as-a-service' models. This digital transformation and final link of the digital thread (https://www.ptc.com/en/digital-transformation/manufacturing) is capable through the advent and adoption of the digital twin.

Related Articles:

- Coming Face-to-Face with the Digital Twin (https://www.ptc.com/en/windchill-blog/coming-face-to-face-digital-twin)
- Deploying a Digital Twin to Outperform the Competition (https://www.ptc.com/en/windchill-blog/deploying-a-digital-twin-to-outperform-the-competition)
- Better Together: The Power of IoT and AR for Enterprises (https://www.ptc.com/en/product-lifecycle-report/better-together-the-power-of-iot-and-ar-for-enterprises)

Tags: ***Augmented Reality, Industrial Internet of Things***

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David Immerman is a business analyst on PTC's Corporate Marketing team providing thought leadership on technologies, trends, markets, and other topics. Previously David was an industry analyst in 451 Research's Internet of Things channel primarily covering the smart transportation space and automotive technology markets, including fleet telematics, connected cars, and autonomous vehicles. He also spent time researching IoT-enabling technologies and other industry verticals including industrial. Prior to 451 Research, David conducted market research at IDC.

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