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DIGITAL TRANSFORMS PHYSICAL

Achieving Business Value with Digital Transformation

A Playbook for Manufacturers

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Digital transformation (DX) has risen to the top of strategic agendas for global manufacturers; according to our global survey of industrial companies, 92% are at some stage of their digital journey.

Ongoing digital projects are transforming physical processes across the enterprise value chain for significant financial gains, as well as other important areas, including sustainability, employee safety, and talent acquisition/retention.

McKinsey estimates digital transformation is a multi-trillion dollar optimization opportunity for manufacturers to achieve efficiencies across their operations, including a more productive workforce, improved product quality, and reduced waste.

However, determining which of the transformations your organization should undertake across these opportunities, and in what order, can be the difference between your program's success or failure. Coupled with the need to minimize risk, ensure operational continuity, and drive profitability during digital transformation, the path to achieving business value for manufacturers typically begins with a simple question:
"Where do we start?"

In this playbook, we explore the specific digital transformation applications that are driving value for manufacturers. These applications have direct, quantifiable impact on key business metrics.

By identifying the most pressing problems impacting financial and operational goals, and measuring the value attainable from resolving them, you'll create a solid foundation for your organization's digital transformation.

Identifying the Value of Digital Transformation

Achieve digital transformation that impacts your most important business metrics with PTC's Digital Transformation Framework.

Read the Whitepaper

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The State of Manufacturing

Internal and external forces are influencing manufacturers' production plants and the processes that employees use inside them, ultimately changing how factories operate. Some examples include:

- Fluctuations in market demand, which require **agility** to scale production capacity
- Customers' need for customization, which necessitates built-in **flexibility** to manufacture made-to-order products
- The development of Lean processes and intuitive instructions, resulting in the **optimization** of assets and labor
- Supply chain disruptions from trade wars and global materials shortages, which require **resiliency** to overcome
- Regulatory penalties and the need to make true on 'Net Zero' corporate promises while increasing **sustainability**
- Environmentally friendly initiatives to **reduce emissions**, energy consumption, and waste

With PTC's portfolio of enterprise digital transformation solutions, manufacturing departments are transforming their operations. Let's look at the top four digital transformation value drivers for manufacturers and the most impactful use cases, according to PTC data.

Digital Transformation Value Drivers

Asset Optimization

A key operational performance indicator for factory managers is overall equipment effectiveness (OEE), which includes equipment availability and performance. A best-in-class manufacturer typically has an OEE of 85%, but the vast majority are in the 40-60% range. As such, even marginal improvements in this metric can drive significant cost savings. Improving the availability of equipment means reducing its planned and unplanned downtime during setups and changeovers or during maintenance procedures. For optimizing equipment performance, manufacturers need to reduce speed losses and micro-stoppages, which can also improve overall throughput.

Workforce Optimization

Maintaining high levels of workforce productivity or overall labor efficiency (OLE) is a perennial goal in production facilities, optimizing frontline employees' availability and performance. Implementing continuous improvement disciplines and teams in manufacturing is common, yet many organizations struggle with workforce productivity because frontline employees aren't properly equipped with the tools and the knowledge they need to perform their jobs. To improve employee availability and performance, manufacturers must make it easier for frontline employees to learn, collaborate, and share knowledge with each other, while also keeping them engaged and providing flexible work arrangements.

Digital Transformation Value Drivers

Quality Improvement

Maintaining consistent quality across diverse product families with frequent and rapid design changes is a growing value driver for manufacturing. Whether products are made to stock, assembled to order, or engineered to order, improvement to quality is critical to reducing fallout, scrap, rework, and warranty costs, as well as improving customer satisfaction and net promotional scores. Upholding quality of operations for process industries also impacts downstream processes including product or service delivery to customers.

Speed to Industrialization

Enabling continuity and collaboration across the value chain often starts with engineering but offers significant value for manufacturing as well. Engineering teams seamlessly receiving and transferring data (quality, BOMs, process planning, etc.) to manufacturing departments is the most valuable and highest organizational priority cited in a PTC digital thread survey. Product-as-a-Service offerings also provide the opportunity to send closed-loop feedback back to engineering, with real-world performance and usage data providing opportunities to optimize future product designs and capabilities.

Top Manufacturing Use Cases

Asset Monitoring & Utilization

Attaining better visibility into operations and disparate equipment, lines, and production processes is a common struggle for manufacturers. With asset monitoring and utilization, manufacturers gain real-time shop floor visibility into their equipment's availability, performance, status, health, and overall utilization, increasing throughput while reducing energy consumption.

Predictive Maintenance

A few hours of unplanned maintenance downtime can translate to millions of dollars in lost operating costs. To minimize downtime, manufacturers will invest significantly in programs, systems, and technologies to reduce these events. However, reactive 'break-fix' methods have done little to predict future failures. Therefore, planned maintenance schedules have pre-empted some unplanned downtime but still drive-up maintenance costs and unnecessary planned downtime when no fault is found.

Predictive maintenance is an emerging goal for manufacturers; Industrial Internet of Things (IIoT) enabled systems identify the timing, severity, and location of potential failures based on analysis of historical data (asset failures, machine degradation), real-time IIoT data (vibrations, temperature, etc.), and other related information (technician proximity, spare parts, etc.). When paired with digital twin technology, manufacturers are able to translate these IIoT data sets into easy-to-understand and actionable insights that enable them to significantly reduce maintenance downtime.

Top Manufacturing Use Cases

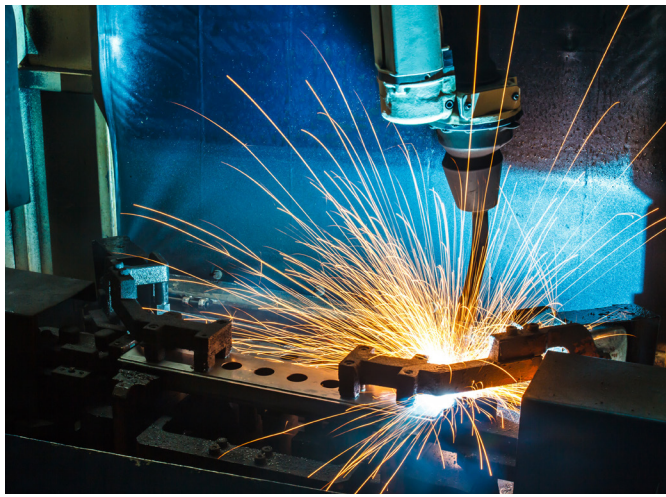
Augmented Work & Training Instructions

Time-to-productivity is a cost to businesses when training and onboarding new employees. Additionally, adjusting existing employees to process changes from new workflows or new product designs takes money and time. The more manufacturers can equip less experienced workers with the right information at the right time, the more productive their workforce can be.

Augmented reality work instructions put digital information, such as step-by-step assembly or maintenance instructions, into the worker's field of view, which adds instructional and directional context to the physical location where their task exists. This added physical context – as opposed to simply looking at a printed manual – makes it easier (and efficient) for workers to quickly process complex information and processes, so they can complete manual workflows safely and accurately.

Digital Performance Management

Traditional on-floor manufacturing performance systems are analog and siloed, making them ill-equipped to maintain production resiliency and agility in today's world, where responses to market changes affect the bottom line. Workers seldom receive timely feedback to their actions. Equipment management systems are often disconnected, contributing further to bottlenecks and downtime. A Digital Performance Management system unifies analog and fragmented industrial systems with real-time operational performance insights, identifying and issuing corrective issues, and improving factory capacity utilization and cycle times. With more data free and available to production workers, different roles can take advantage of the insights to guide further digital transformation initiatives.



Case in Point: ACME Manufacturing

ACME Corp's manufacturing business segment is responsible for $2 billion in operating costs. The business unit consists of 20 factories and experiences significant unplanned downtime, resulting in poor equipment availability and underperformance. Specifically, a single factory with operating costs of $100 million has an average utilization rate of 50% OEE on their production lines. ACME calculated that improving OEE from 50% to 55% (a 10% process efficiency improvement) in a single factory would save $5 million in operating costs.

Using PTC's value-led approach to digital transformation, the manufacturer implemented the Asset Monitoring and Utilization use case to gain operational visibility of production assets, quickly identify bottlenecks, root causes of micro stoppages, and generate the 10% process efficiency improvement desired. ACME quickly recognized scaling this high value solution across its 20 factories could save $100 million in operating costs.

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Start Your Value-Led Digital Transformation

There are clear pockets of value attainable when implementing digital transformation; however, business leaders need to aim for a cohesive digital transformation to realize its value in a way that's recognizable and matter to their unique organization.

For manufacturers, creating digital transformation at scale involves implementing changes across all areas of the business – with a focus on aligning improvement efforts with the use cases that have the biggest impact on their bottom line.

PTC's broad solutions portfolio, inclusive of CAD, PLM, IoT, and AR technologies, transforms the organization across four key areas – asset optimization, quality improvement, workforce productivity, and speed to industrialization – resulting in increased manufacturing efficiency and more valuable transformation at scale.

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