Microsoft

The next-generation manufacturer:

How to transform into a digital business

Introduction

As digitalization takes over the world, manufacturers everywhere need to change to survive, developing new capabilities that can drive competitiveness and growth. But what does this really involve and how do they succeed? In this paper, we discuss the opportunities for the discrete manufacturing industry to grow, adapt and evolve to address the changing needs of its customers and capture new business potential, and how Microsoft can help accelerate its digital transformation.

A rapidly changing landscape

Growth, innovation and operational excellence have long been the business outcomes that manufacturers seek to achieve. And while these priorities haven't changed, the means to attain them is changing significantly.

In today's digital world, technological advancements combined with external market forces—the new connected consumer, increasing influence of emerging economies, a growing skills gap in the manufacturing workforce, complex regulations governing both products and markets, and more—have catapulted the manufacturing industry into a new era, where the path to profitability is shifting.

With Industry 4.0 and the Internet of Things (IoT) now part of every discussion we have with our global manufacturing customers, we look at what's really changed, and how organizations can best take advantage.

Transforming your business

For the first time in decades, technology has outpaced the evolution of business processes. Increasing volumes of data, advancements in data analytics and intelligence, and the ubiquity of cloud computing have shifted both what customers expect as the result of being armed with information in a way not previously possible, as well as what companies can deliver to meet those expectations and reinvent the value they offer.

For manufacturers to sustain competitive advantage, digital transformation is now essential. At Microsoft, we believe this digital shift reflects their opportunity to grow, adapt and evolve to meet the changing needs of their customers, and the new business opportunities of tomorrow, by thinking and operating like a digital business.

To achieve success, we encourage manufacturers to consider transformation in the following ways.

- **Rethink how their organization operates and how it generates value.** The new thinking often starts with the way they help their customers interact with them, establishing connections that extend well beyond the purchase of a product.

- **Transform their business processes with systems of intelligence** that help draw better insight out of data and convert it into intelligent action. This includes building in continuous feedback loops from a variety of channels—sensors in products, connected factories, global supply chains, after-market services, and direct end customer feedback.

- **Enrich their market offerings** to deliver not just a manufactured product, but also value-added business services, to provide a complete, connected customer experience.

- **And remember, it isn't simply about technology.** Systems of intelligence represent the technology, people and processes that enable these feedback loops, and define an organization's competitiveness and ability to change the entire industry landscape.

It's about seizing the opportunity to optimize your operations, to accelerate productivity and responsiveness, to innovate the products and services you offer, and to expand into new business models. This involves giving employees the flexibility and tools they need to easily collaborate with colleagues, partners and customers around the world.
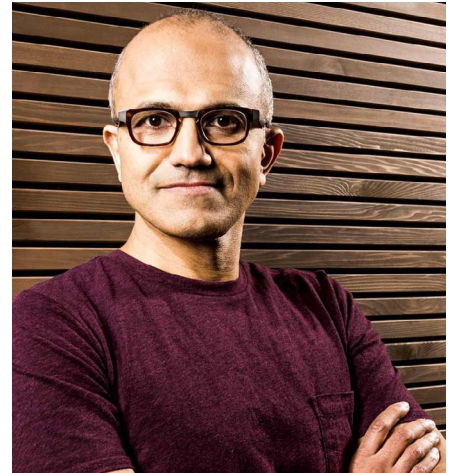
The promise of digital transformation

When information technology and operations technology converge, when products, processes and systems become connected, and when people are armed with data-driven intelligence, revolutionary things can happen. Manufacturers can take their business in directions never before possible, reimagining how they engage with their customers, how they empower their employees, how they optimize their operations, and how they transform the very business models around their products themselves.

And the opportunities to translate this into higher margins and new revenue are significant. Organizations that take the steps to embrace digital transformation to evolve how they leverage data, analytics and the cloud generate an average of $100 million more operating income each year than those who lag behind.[1]

International Data Corporation (IDC)'s latest research shows that discrete manufacturers are leading the charge worldwide in investing in big data and business analytics solutions in 2016 and through 2020[2], and doubling the percentage of their products that are connected in the next three years[3]—all paving the way to potential new revenue streams that will extend the lifetime value of a customer.

So what role does Microsoft play in digital transformation?

"Helping society move forward is deeply grounded in Microsoft's mission of empowering every person and every organization on the planet to achieve more. For business that means a digital transformation."

SATYA NADELLA
CEO, Microsoft

Capitalize on digital transformation opportunities with Microsoft

With Microsoft, manufacturers and suppliers get the world-class partner they want, with the modern productivity platform they need, the global reach to be where they are, and the security to protect their IP, assets, operations, and data.

Microsoft's mission is to empower every person and every organization on the planet to achieve more. We build agile platforms and services so others can innovate, build their own technology, and create new solutions that make things happen. This platform approach has always been the cornerstone of Microsoft's strategy to deliver technology in ways that help our customers succeed with the help of our partners.

Digital transformation represents the application of Microsoft's three ambitions—create more personal computing, reinvent productivity and business processes, and build the intelligent cloud platform—for organizations around the world. Our ambitions guide both our product innovation and our unique approach to helping businesses along their transformation journey—ultimately changing the way they engage with customers, empower employees, optimize operations and transform their products to create better customer outcomes.

In the next section, we'll look at how Microsoft solutions and trusted cloud support each of these imperatives, as well as showcase leaders in manufacturing that are seeing meaningful results.

Digital Transformation

Engage your customers

Transform your products

Customer Outcomes

Empower your employees

Optimize your operations
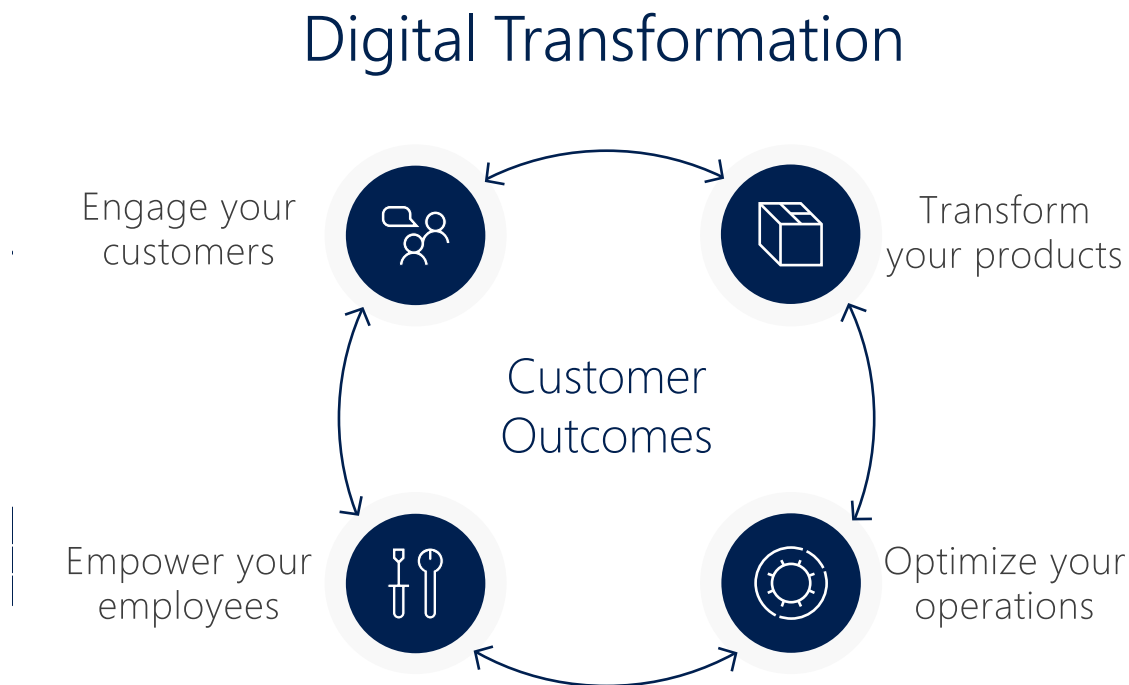
Engage your customers

In today's digital world, customers have higher expectations and more power than ever before. As digital transformation develops, discrete manufacturers are using Microsoft solutions and technologies to help them transform from an asset-focused organization to a customer-centric business in the following ways.

Reimagine the customer journey.

Today's digital advancements enable manufacturers to establish 1:1 customer relationships, reward and incent the channel in new ways, and deliver new value with connected products. With an integrated, holistic platform, they can design more innovative, faster and personalized experiences by connecting customer insight with every part of their business and having the ability to adjust operational infrastructure.

Increase customer intimacy through better customer understanding and multi-modal connectivity.

A key part of transforming the customer relationship comes from the power of multi-modal connectivity. By uniting data from multiple sources—customer interactions, product performance, social networks—manufacturers can now gain better insight and understanding into market behavior and customer activity across the product lifecycle.

Embrace customer centricity.

Moving away from an asset-focused organization means embracing customer-centricity in all areas of a manufacturer's business and taking advantage of today's digital tools to develop and implement new customer-centric business models. The result is the accelerated creation of modernized products, services and processes that meet or exceed, and sometimes anticipate, customer requirements. It also opens the door to new and increased revenue gains by focusing design resources on products and services with the highest potential returns.

Case Study:

Liebherr

To better serve its customers, Liebherr, a leading manufacturer of industrial and consumer equipment, has teamed up with Microsoft to create a new smart refrigerator.

Liebherr's customers such as pharmaceutical companies, medical labs and food retailers need reliable cooling technologies to ensure that their products stay at precise temperatures during storage. A Liebherr prototype analyzes complex data from many sources in a single dashboard and monitors key performance data remotely, including the accuracy and stability of the fridge's temperature and the state of the compressor and door.

Liebherr demonstrates how to offer the benefits of predictive analytics to its clients and open service tickets before critical damage can alter the valuable contents of the fridge.

Learn More

Engage your customers

Delight customers with richer experiences.

Today's technology innovations provide tremendous opportunities to deliver the kinds of customer experiences that will build brand awareness and customer loyalty. This includes rich and consistent experiences across multiple devices; ensuring customers can engage through their channel of choice; and consistent self-help across all channels with a uniform knowledge base. Advancements like Machine Learning and intelligent assistants are also creating exciting new ways for manufacturers to design innovative and personalized journey experiences. They can also improve customer service experiences with real-time monitoring of product health and more accurate diagnostics.

"Becoming more engaged with customers includes predicting what customers want before they know they want it, based on data intelligence, and offering it to customers in a way that's natural."

SATYA NADELLA
CEO, Microsoft

Engage customers effectively through digital marketing and social analytics.

Microsoft solutions offer integrated insight with CRM, BI, social, and search capabilities, enabling manufacturers to also engage customers more effectively through digital marketing and social analytics. This is especially impactful for the high-tech and automotive segments, enabling dealers and resellers to offer interactive, virtual and social support to customers both before and after a sale—creating more confidence and fostering better relationships.

"We see Microsoft as a technology partner that enables us to create added value for our customers faster and easier. The digital offers and added value from this digitalization are important for everyone."

STEFFEN NAGEL
Managing Director,
Liebherr

LIEBHERR

Empower your employees

In today's discrete manufacturing industry, with organizations, teams and individuals rarely located within a single geographic area, effective communication and collaboration is a difficult task. Manufacturers in all sectors can use technology to transition from the old at-your-desk work styles to new anywhere, anytime, any-device styles; and connect people to the information they need in their role so they can manage assets and processes in real time.

Here are some of the ways discrete manufacturers are using Microsoft solutions and technologies to enhance traditional systems of record with a people-centric system of engagement—offering greater visibility and collaboration to transform their business faster, more frequently, and more drastically than ever before.

> *"It's serendipity at work when you discover someone who has the solution to a problem that stumps you. You don't need to rely on serendipity to get that result. All that knowledge and insight exists inside your infrastructure – in your email, your documents, your line of business applications – it's just waiting to be found using organizational analytics, and provide insight to what is going on."*

SATYA NADELLA
CEO, Microsoft

Increase employee productivity and effectiveness.

Microsoft technologies, including modern productivity tools and advancements in holographic computing, offer solutions that are simpler to use and easier to learn, and enable teams to collaborate and communicate in the most natural way possible for big gains in productivity.

Enable anytime, anywhere collaboration and innovation.

There are powerful new collaboration, simulation and design tools that allow geographically dispersed design teams to work virtually side-by-side with immersive 3D experiences. Tools like Microsoft Office, Microsoft Surface Pro 4, Microsoft Surface Hub, Microsoft HoloLens, and Big Compute for engineering and simulation make this possible.

Case Study:

Volvo Cars

As a human-centric company, Volvo Car Group is always interested in technology that helps to make people's lives easier. The company decided to partner with Microsoft to use its HoloLens technology to help its employees visualize and interact with its products in deeper ways than was ever possible and revolutionize the way they plan to market and sell their vehicles.

With HoloLens, Volvo sales associates can give customers a detailed, immersive view of the cars they're interested in—from simply viewing and choosing features, colors, and options to stripping away the outer layers of the vehicle in order to learn more about the engine, transmission, or other technical details. They can also demonstrate the safety features of its cars in action, building trust in its systems.

"HoloLens helps us to push the envelope of innovation for our customers."

BJÖRN ANNVALL
SVP Marketing, Sales & Services,
Volvo Cars

Empower your employees

Enable employees to make better and faster decisions.

Enhanced productivity and collaboration tools as well as business intelligence solutions provide manufacturing employees with the right information in the right place to make quick and sound decisions. Microsoft delivers cost-effective self-service BI tools that any manufacturing employee can use to view and manage data in a visual and intuitive manner, empowering new levels of decision-making in all levels of production, operations and sales. Microsoft cloud-enabled big data hubs drive multi-tier visibility across supplier and customer networks.

Build on advanced analytics.

Advanced and predictive analytics capabilities are opening exciting doors for manufacturers to discover new insights that will drive their business forward. Microsoft provides cloud-based advanced data analytics tools that enable automated predictive models for machine learning. Algorithms find patterns in the data, which are then used to construct models that can predict market demand, customer preferences, product usage, maintenance needs, and more. With the help of machine learning, they can also use guided workflows for service calls and recommendations.

Deliver rich marketing content worldwide on a global platform.

Manufacturers can now provide brand-consistent experiences at lower costs by adopting process-centric tools. With a flexible and scalable infrastructure, marketing and sales processes can be adapted to address changing customer needs. And with mixed reality technologies, employees and customers can experience and work with digital content in relation to the real world, unlocking new insights, capabilities and levels of customer service.

Share confidently.

Modern online conferencing and collaboration capabilities allow manufacturing teams to have more efficient virtual meetings, crowdsource new ideas, and share files more securely. Manufacturers can keep their on-the-go employees productive while protecting sensitive information and documents across multiple device types and geographies using industry-leading encryption, identity, and authorization policies that travel with their information. Microsoft Office 365, Microsoft Enterprise Mobility Suite and Microsoft Azure Rights Management combine next-generation, world-class collaboration and security.
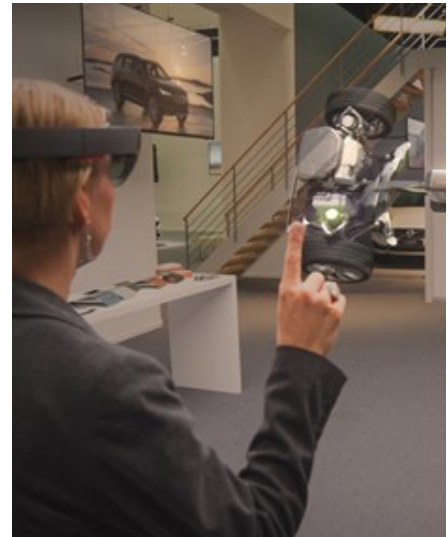
The ability to visualize and interact with its products in deeper ways also positively impacts Volvo's design process, helping designers and engineers more efficiently and collaboratively continue its mission of building the safest car brand in the world. And HoloLens can evolve into other uses, including helping employees improve operations on the vehicle production line.

Learn More

Optimize your operations

With vast stores of data generated by supply chain operations, plant-floor systems, and customer-facing activities, finding useful insights quickly is a huge challenge. And it's not enough to get feedback about your products and services days, even weeks later. Optimizing operations, in today's world, is about enabling discrete manufacturers to shift from merely reacting to events, to responding in real time or *even preemptively*.

From a digital transformation standpoint, it's about how manufacturers can use technology to increase capacity, remove dead time, and anticipate and gain agility—all values to any part of the organization and ecosystem. As manufacturers make the shift to digital businesses, they are using Microsoft solutions and technologies to achieve breakthrough insights into business performance and profitability in the following ways.

Get usage insights out of data.

Microsoft's digital solutions help manufacturers lower operating costs by predicting and addressing inefficiencies. Smart sensors with powerful new predictive analytics capabilities let manufacturers learn about production line and component behavior, predict future outcomes, and even fix problems before they occur. They can also reduce the time and expense of analyzing large amounts of customer data with advanced cloud analytics, and reduce product costs with better and faster analysis of product performance and usage.

Transform operational processes.

Microsoft solutions provide powerful ways for manufacturers to enhance and redesign processes across their organization, providing role-based access and real-time visibility into manufacturing applications, including manufacturing execution systems (MES), enterprise resource planning (ERP), human resource management (HRM), and maintenance, repair, and operations. By equipping people with the data and tools they need, they can identify areas of waste; improve cycle times for manufacturing operations; make automation processes faster and easier; maintain equipment more predictability and proactively; dynamically realign production to meet changing customer demands; and increase turn-times for inventory across the value chain.

Drive secure process and regulatory compliance.

Microsoft solutions can empower manufacturers to enhance document review and approval processes, meet regulatory requirements, and reduce violations of data governance and protection policies. Integrated with the familiar Office platform, Microsoft solutions for document management can be used to publish highly formatted and interactive reports that make data easily accessible to a large number of people, while maintaining high security for sensitive or private data.

Case Study:

Jabil

Florida-based Jabil, one of the world's leading design and manufacturing solution providers, wanted to minimize downtime by creating digital, intelligent and predictive factories.

Working with Microsoft, the company created new digital factories at plants in Mexico and Malaysia. These factories are using machine learning, predictive analytics and the cloud to analyze millions of data points from machines to identify errors or failures early in the manufacturing process—before they even occur. The results have exceeded Jabil's expectations, predicting machine processes that would slow down or fail with 80 percent accuracy.

Watch the Video

Optimize your operations

Differentiate through business process agility.

Microsoft offers a modern and agile business platform that can augment or replace legacy enterprise applications, and keep pace with new product/service introductions, joint ventures, acquisitions, and divestures.

> "It's not enough to know what's happening now in your business – you have to anticipate what will happen, then be prepared to capitalize on that insight."

SATYA NADELLA
CEO, Microsoft

Reduce costs and enhance flexibility with the cloud.

Microsoft Azure provides an open, flexible cloud platform with virtually unlimited compute and storage, enabling manufacturers to quickly build, deploy, and manage applications across a global network of Microsoft-managed data centers. Manufacturers can cost-effectively support long-term growth while respond quickly to changes in the business and market with collaboration, productivity, and mobility solutions that span private and public cloud infrastructures. With a flexible solution that can scale globally, manufacturers can also minimize implementation risks and overhead costs.

> "Since deploying the Microsoft predictive analytics solutions, we have seen at least an 80% accuracy rate in the prediction of machine processes that will slow down or fail, contributing to a scrap and rework savings of 17 percent, and an energy savings of 10 percent."

CLINT BELINSKY
Vice President, Global Quality,
Jabil

JABIL

Transform your products and services

In today's fast-paced world of discrete manufacturing, it's not enough for manufacturers to get feedback about their products and services days, even weeks later. Being able to respond, innovate and enact change in real time will allow them to maintain a competitive edge and beat their competition to market.

As manufacturers make the shift to thinking and operating like a digital business, here are some of the ways Microsoft's solutions and technologies are helping create a culture of innovation that connect people and information in a way that's intuitive, relevant, natural and time-sensitive.

Engage in collaborative, social thinking to solve problems rapidly, identify high value ideas, and put them into action.

Microsoft provides solutions for every stage of the product development and launch process—from research and development to engineering, through manufacturing, and out to the consumer. Manufacturers can more effectively manage a pipeline of ideas and align them with strategic priorities to bring new and innovative products and services to market quickly, increasing competitiveness and customer value. They can rapidly model, cost, and release new products to production and procurement, facilitated by guided experiences and workspaces that address discrete manufacturing and replenishment models.

Gain better visibility into product performance and customer usage by delivering more connected products.

Manufacturers and engineers can make better roadmap decisions, strengthen product usability, and improve design elements using insights based on telemetry data gathered from actual live product performance and customer usage. Cortana Intelligence Suite and Azure Machine Learning are two of the technologies that help make this possible.

Engage customers in new ways with innovative technologies.

The value of today's connectivity is tremendous. In addition to improving the overall quality and value of a product by capitalizing on connected product data, manufacturers can provide superior connected experiences for the customer by utilizing connected consumer devices as a service deployment platform. New subscription-based service offerings help provide a competitive advantage, at the same time opening up new revenue-generating opportunities throughout the lifecycle of the product. They can also differentiate product and service offerings by developing new production capabilities on demand.

Case Study:

Rolls-Royce

A leading manufacturer for the airline and business aviation market, Rolls-Royce wanted to improve aircraft efficiency and reduce maintenance costs in their engines powering more than 50,000 flights around the world each month.

Rolls-Royce chose to build a powerful and scalable data analytics system based on the Microsoft Azure platform, transforming how it uses data to better serve its customers. By collecting and aggregating on-engine health data, air traffic control information, and fuel usage and processing information in real time, Rolls-Royce is able to help its aviation customers improve fuel usage and maintenance planning and reduce flight disruptions with a potential savings of millions of dollars per year.

Watch the Video

Transform your products and services

Shorten design cycles.

Today's technology advancements enable manufacturers to test a greater volume of ideas through less expensive iterations, reduce product costs with better insights into performance, and build better products via speed and quality of simulations. Big Compute for engineering analysis and simulation is one example of how digital technology can transform traditional processes. The high performance computing capabilities of Azure enables engineers to actually utilize simulation as a design tool rather than a validation process. And with a pay-as-you-go model, Azure enables organizations to easily scale up and down their subscription in order to optimize capacity needs and costs.

> *"All companies everywhere are becoming data companies – from farming to finance, from New York to New Delhi – businesses are using data to connect everything from cars to cows."*

SATYA NADELLA
CEO, Microsoft

> *"We can use data and insight in new ways to refine our customers' operations to add more value to them and allow them to do more with less."*

NICK FARRANT
Senior Vice President,
Rolls-Royce

Why Microsoft

Microsoft has a track record of helping manufacturers realize the business value of digital transformation. We do this by first learning about their organization with a curious mind; understanding their industry, business strategies and needs; and bringing unique insights that help unlock new opportunities at the intersection of business performance improvement, differentiated experiences, and technology integration.

Microsoft's holistic platform and advanced technologies, open and flexible approach, enterprise-grade solutions, and partner ecosystem help manufacturers build on their existing technology investments and deliver results quickly and cost-effectively. Working with Microsoft brings a distinct set of business advantages that no other provider offers:

A trusted, flexible, and open cloud platform.

Today, the Microsoft cloud infrastructure supports more than one billion customers in more than 140 countries. With this unique experience and scale, Microsoft cloud services can achieve higher levels of security, privacy and compliance than most customers can on their own. Azure has received more compliance certifications than any other cloud provider, including major global, national, regional and industry standards and regulations. Microsoft's extensive global datacenter footprint covers more regions than any other provider, to better meet data sovereignty requirements. Azure is the only platform that supports a fully hybrid architecture, giving manufacturers complete flexibility and control of data and applications delivered between public and private clouds. The Microsoft cloud works with any operating system, database, middleware, and application framework, enabling them to use the tools and platforms of their choice.

Comprehensive, enterprise-ready solutions.

Microsoft solutions span the full spectrum of business needs from data access, high performance computing, advanced analytics, visualization and business process automation. Windows 10 offers unprecedented universal application capability across devices, including innovative devices like Surface, Surface Hub and HoloLens. Individual and enterprise productivity is increased by ensuring that the right information is provided to the right people at the right time for actionable insights and decisions. This is accomplished through a holistic suite of collaboration, knowledge management, work process, mobility, business insights, and advanced analytics capabilities.

Industry-specific manufacturing solutions.

To ensure you get the most value out of Microsoft technology and accelerate digital transformation, we also provide best practices, end-to-end solution design, and delivery services for common manufacturing industry scenarios including Remote Monitoring and Predictive Maintenance, Mobile Worker and Connected Field Service, Asset Management, and Connected Operations. Solutions for Engineering include Mobility for Design Engineering and Big Compute for Visualization and Simulation. End-to-end platforms are also available for Connected Car and Connected Consumer Devices, as well as Customer Experience Management, especially in the automotive industry.

Advanced technologies designed for ease of use.

By building technologies such as Power BI, Cortana Analytics and Azure IoT Suite for users with wide-ranging skills, Microsoft helps enterprises apply advanced technologies to business challenges once deemed too costly or complex to solve. For example, Microsoft's Industrial IoT capabilities enable manufacturers to ingest data from any source, in any format; apply machine learning models and data visualization; and integrate those results into collaboration and work process solutions. This drives informed actions, as individuals take advantage of tailored, actionable insights to make better business decisions and deliver better business outcomes.

Commitment to manufacturing industry standards.

At Microsoft, we believe there is a critical set of work our industry must undertake in order to make sure we deliver the right set of platforms and services to realize today's digital transformation opportunities. That's why Microsoft has been a longtime supporter of standardization organizations which will play a critical role in driving the technology interoperability needed for today's systems of intelligence. One example is our work with the OPC Foundation and its standards for open connectivity of industrial automation devices and systems. To further help reduce barriers to the industrial IoT adoption and make it easier to create systems of intelligence, Microsoft recently extended support for the OPC UA standard in Azure IoT and Windows IoT.

Largest ecosystem of industry-leading partners.

Microsoft has a broad ecosystem of prominent systems integrators and independent software vendors. This ecosystem takes advantage of existing technology investments and offers the flexibility to select the best solutions for each business. Our partners design and deploy innovative, industry-focused solutions built on a Microsoft foundation, so manufacturers get best-in-class technology coupled with deep industry expertise.

No other technology provider offers a comparable end-to-end portfolio as well as an open and flexible approach. Together, it's this unique perspective that helps Microsoft drive digital transformation across all aspects of a manufacturing organization and change the way it optimizes operations, empowers employees, transforms products and services, and engages with customers.

Get started today

Through a series of mission-driven engagements, Microsoft Services can help you extend and develop solutions that will transform your business today. Use our knowledge and expertise in a business outcome workshop, deeper solution session, private preview or customer focus group—or develop a proof-of-concept or pilot to drive the right implementations and solutions that meet your specific business needs.

No matter how you start, you can count on Microsoft to provide the solutions and resources to help you drive digital transformation in all areas of your business. For more information, visit our Discrete Manufacturing Solutions webpage.

Microsoft

[1]Keystone Strategy interviews Oct 2015 – Mar 2016. Based on interviews with 340+ leading enterprises comparing data platform maturity with business performance, controlling for company size and industry. Incremental operating income of $100M is based on median company revenue of $3.4B.

[2]International Data Corporation (IDC), Worldwide Semiannual Big Data and Analytics Spending Guide; October 2016

[3]IDC Manufacturing Insights, IDC MaturityScape: Manufacturing Service Innovation; October 2016