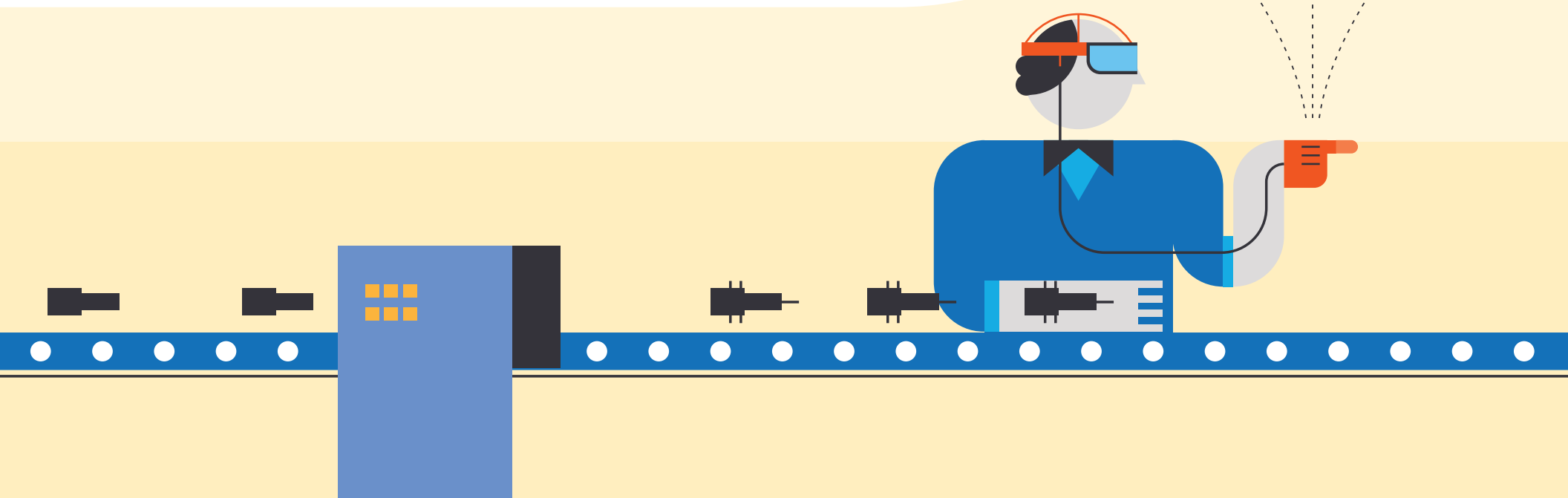
Microsoft with psfk

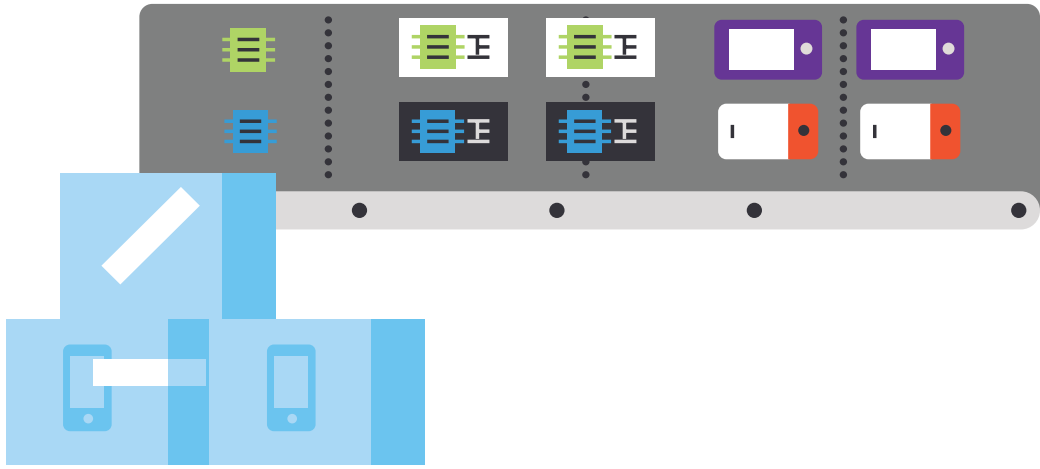
THE FUTURE OF MANUFACTURING REPORT

A Blueprint For An Intelligent Supply Chain



Introduction

Digital transformation is not simply about adding more technology into existing operations, it requires organizations to re-envision their business models and embrace a different way of bringing together people, information and processes to accelerate the speed of doing business, drive growth and anticipate new opportunity. This is especially true of the manufacturing industry where new capabilities and efficiencies are essential to keep pace with the speed of the market and the evolving expectations of customers, employees and partners. To enable this shift, manufacturers must work to unify all aspects of their operations across sales and service, production, supply chain, and beyond. This approach requires data and software solutions with built-in analytics and intelligence that can power shared insights, enable rapid innovation and anticipate change.



Key Shifts Within The Manufacturing Landscape:

- **Manufacturers move towards B2B2C and product-as-a-service models**
- **Digitization of products and processes drives enhanced efficiencies**
- **AI and robotics unlock new jobs and the need for new frontline skills**
- **A push for real-time and proactive insights to power responsive operations**
- **The promise of 5G connectivity to enhance speed and capabilities**
- **Sustainable operations become business (and brand) advantages**
- **3D printing and additive manufacturing make on-demand production and mass customization viable**

Piers Fawkes
President, Founder
PSFK

ABOUT THIS REPORT

The Future of Manufacturing is a report by business intelligence platform PSFK in partnership with global technology and service provider Microsoft. We present the future state of the manufacturing industry through five forward-looking scenarios that highlight the advantage of digital transformation through the adoption of networked data, connected operations, intelligent automation and a digitally-enabled workforce. Illustrating various opportunities to drive digital-first manufacturing strategies, the Future of Manufacturing report will guide organizations of all sizes as they develop seamless, dynamic product and supply chain innovations in a mobile-first, cloud-first world. With expert insights and detailed case studies, industry professionals will learn how to navigate this new cloud-based frontier and drive efficiency throughout every part of the manufacturing journey.

psfk.com/report/future-of-manufacturing

Foreword

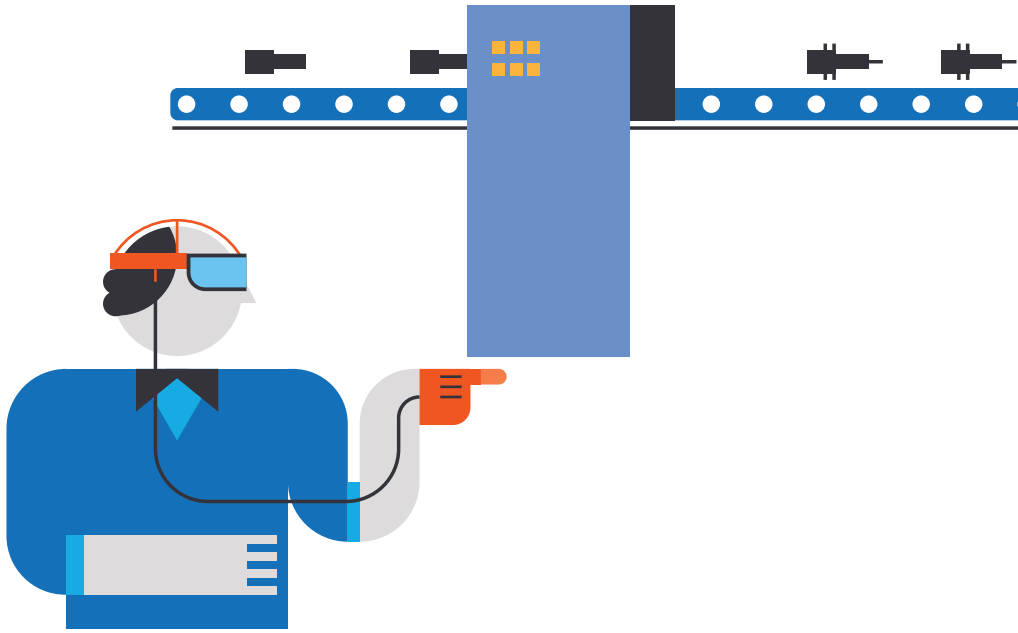
Today's world is powered by advanced artificial intelligence. From music recommendations on our favorite streaming platforms to cars that alert us if we're too close to the curb, humans - at home, at work, at play - are more capable, informed and prescient thanks to modern digitization and AI-enabled software.

Beyond its obvious impact on society and culture, nearly every global industry is being disrupted by the pervasive, ubiquitous connectivity of digital technologies. By connecting people, enabling cross-industry collaboration and bringing holistic, end-to-end value to product and service innovation, entire business models are being transformed to serve evolved global needs and shifting demands.

Within the manufacturing industry, the name of this wave of massive technological proliferation was coined Industry 4.0 a few years ago, but has subsequently been adopted by other industries to become a key tenet of the World Economic Forum's agenda relabeled as the Fourth Industrial Revolution— it's no longer just a catchy manufacturing buzzword. Global industry leaders across all industries are quickly learning that the accelerated pace of change enabled by digitization isn't just resulting in cheaper services and enhanced manufacturing operations, its reshaping society and the world we live in.

Manufacturers impact every aspect of our daily lives, and are shaping a sustainable future powered and fueled by more sustainable energy sources, as they manufacture the building blocks for smart cars, homes, buildings, cities, grids - and even for the precision agriculture needed to feed the world.

For manufacturers, the digital ecosystem isn't just about predicting maintenance needs or connecting machines, it's about restructuring entire business models to become customer-first organizations and transforming insights into relevant, dynamic innovations. It's about eliminating waste and engineering better outcomes for all their stakeholders, designing for sustainability throughout the end-to-end value chain and lifecycle of their products and services.



With a new connected customer, heightened awareness of sustainability, changing demographics and complex regulations, manufacturing refers to more than a production line, but an intricate organizational hierarchy that is based on services and an elevated state of responsiveness—all centering around what the customer wants and needs. Internet of Things, cloud infrastructures and a reliance on big data are crucial for manufacturers to get a digital feedback loop to compete in this state of heightened competition and will allow consumers to experience ongoing support for their products or services, even beyond the checkout line.

Though a digital transformation of manufacturing certainly has monumental economic impact, in order to fully capitalize on the opportunity of digital transformation, they will need to fully examine and analyze their company culture in order to equip employees with the elevated skillset needed for a more strategic role in the manufacturing supply chain, and customer outcomes.

From Microsoft's work with manufacturers, we are seeing recurring focus areas for actualizing a successful digital business transformation in manufacturing:

1. Deliver new services. Creating new business value with services leveraging digital feedback loops and engaging customers with deeply personalized experiences throughout every step of the customer journey from production to product-as-a-service.

2. Empower your workforce. Use technology to attract, train, and retain a next generation workforce. equipping them with the tools and skills to keep up with new speed of business, reimagine manufacturing, and to help create our sustainable future.

3. Optimize operations. Leverage IT and OT to optimize factories and supply chains. Keep pace with the rapid changes driven by your transformation from production to product-as-a-service by modernizing your factories with new disruptive technologies. Sense, shape and fulfill demand with intelligent business applications that leverage digital feedback loops and AI to optimize increasingly complex supply chains.

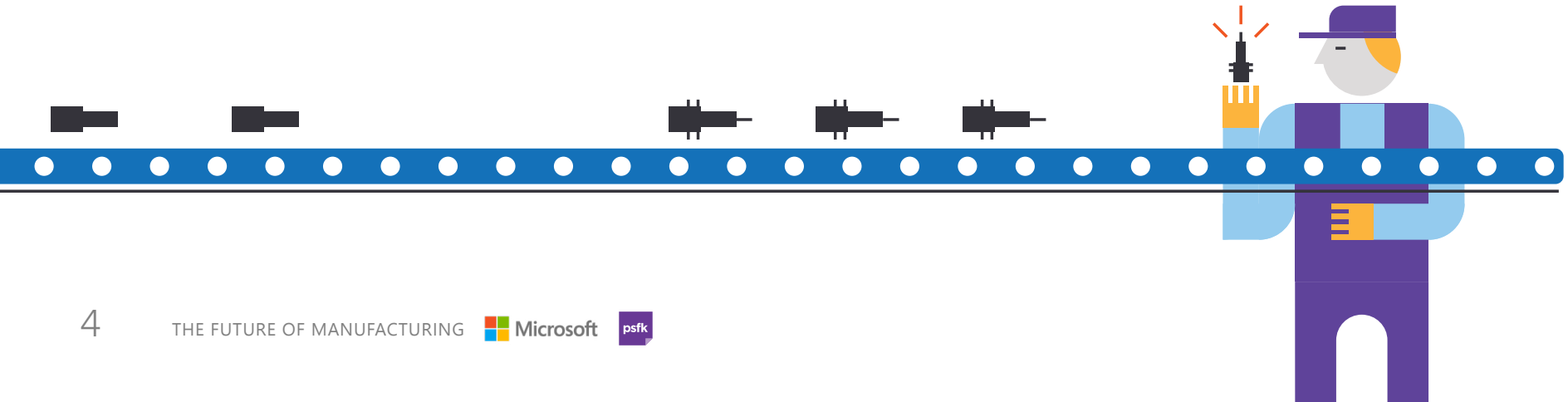
4. Reimagine manufacturing. Innovate with advanced technologies to build the sustainable future. Transforming products by leveraging usage data and real-time collaboration with market needs and development teams empowered by the capacity and capability of the cloud to iterate on product and process designs, designing right first time and for sustainability.

With digital transformation, manufacturers can fully optimize their business outcomes with the ability to transform products into services that can help meet customer's dynamic needs. By connecting people, processes, things and data securely across entire company operations, colleagues and partners will be empowered to deliver their absolute best.

Microsoft is committed to supplying its customers with the security, cloud infrastructures and vast partner ecosystem of its digital-first solutions, empowering businesses with the tools needed to revitalize their operations and fully engage their customers with transformative products. With our mission to empower every organization and person on the planet to achieve more, Microsoft is partnering with a range of global industries and helping them drive end-to-end digital transformation through concrete, secure and efficient systems of intelligence.

Digital transformation forces us to deconstruct what we know about manufacturing. Let's reimagine our products as sustainable services, reconceive our operations and transform our customers' lives.

Colin Masson
Director of Manufacturing Industry Solutions,
Microsoft Cloud & Enterprise



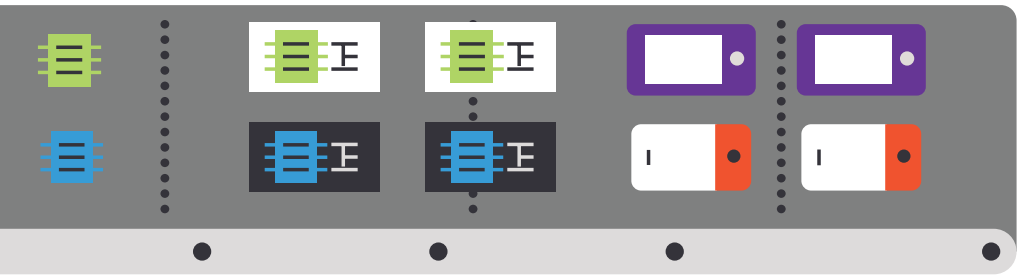
Digital Transformation Imperatives

1 Empower Your Workforce

Use technology to attract, train and retain the next generation workforce

2 Deliver New Services

Stay competitive and exceed customer expectations



3 Optimize Operations

Deliver the right product and service at the right price and margin

4 Reimagine Manufacturing

Improve sustainability and pursue new opportunities

"For manufacturers, the digital ecosystem isn't just about predicting maintenance needs or connecting machines, it's about restructuring entire business models to become customer-first organizations and transforming insights into relevant, dynamic innovations."

Colin Masson
Director of Manufacturing Industry Solutions,
Microsoft Cloud & Enterprise

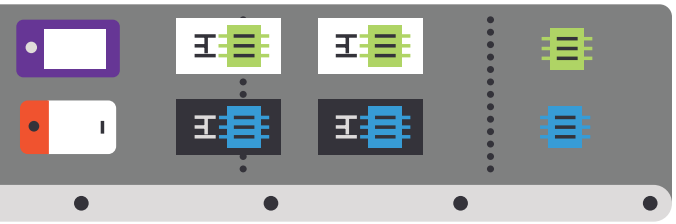
Digital Transfomation Imperatives: Microsoft Expert Point-Of-View

Indranil Sircar
CTO,
Manufacturing Industry
Microsoft

"There are numerous catalytic innovations that are driving how businesses drive transformation. Over the past few years, what we have seen is the Cloud, IoT, AI and Edge computing are creating a digital feedback loop of data and insights across a multitude of dimensions."

"Manufacturers and vendors are now seeing new revenue streams are coming through service based models. New technology is enabling these companies to basically create new business models based on IoT sensing or an AI's ability to better predict things like equipment failures to deliver proactive service or replenishment needs for consumers and commercial businesses."

"One of the things that Microsoft has been doing is working across industries and trying to understand what that landscape in terms of digital twins and simulations looks like. What are customers' expectations? We see that going across from product design to factory layout to supply chain level simulations."



Pat Flynn-Cherenzia
WW Group Product Manager,
Dynamics 365 Supply Chain,
Microsoft

"What we have now is the ability to trace genealogy in the product down to the raw material – either forward or reverse – so that we can use it for quality purposes, design improvements, security considerations, chain of custody or sustainability tracking. Having that 'chain of custody' mindset throughout the supply chain has been invaluable for testing and ingesting the data real-time for appropriate analytics and reporting."

"By moving data from the factory into the cloud, regardless of which MES is utilized, we can quickly push relevant information into dashboards and metrics directly to the factory personnel so that they can evaluate and respond more quickly. Either for efficiency operational controls, or for items that we have identified as 'drifting' (such as a tester machine). While not yet out of tolerance, we can proactively prompt line supervisors to the machine along with typical scenarios that would cause this occurrence, based on machine learning. Once the supervisor has signaled which problem was the cause, that data is then utilized in a persona based mechanism to trigger additional actions (such as an automated maintenance call, or an updated software requirement)."

"Other cases where we have been able to leverage predictive analytics is in our logistics arena, where we give customers and suppliers access to our dashboards, so that they can see their product from time of order drop, to being manufactured, to their destination delivery point. This has dramatically improved our relationships with our customers, while also allowing us to dynamically route our freight to maximize savings simultaneously avoiding disruptions."

Yorke Rhodes III
Principal Program Manager,
Blockchain Engineering
Microsoft

"Blockchain allows us to create digital uniqueness in a way that it's been very hard to achieve before. Part of that digital uniqueness capability takes you on a journey in certain categories. Where do we need digital uniqueness? We need it in provenance. We need it in authenticity of goods. We need it in ownership of goods or custody of goods. We need it in things as mundane as romaine lettuce recalls."

"One of the big value propositions that we've seen in Microsoft's Azure estate is the concept of logic apps and power apps which have already 200 plus legacy system connectors built in. It makes it quite easy for, say, the distribution center in China or the contracted manufacturer factory to do some kind of integration to their system. It's completely independent of any of the integrations with any of the other parties in the supply chain. That flexibility exists within some of the tools that we have in Azure."

"One of the big problems that technology or lack of technology implementations have caused in supply chains is this concept of reconciliation. Any two actors in a supply chain who are sitting next to each other in the value chain don't have the same view of data or the state of goods that are being moved. That is a foundational problem. What has to be true for the data to not be in question? It has to mean that our systems and our processes collaborate with each other and arrive at agreement. As a technology, blockchain helps us arrive at a place where the data is no longer in question."

1. Empower Your Workforce

Use technology to attract, train and retain the next generation workforce

Among the digital disruptions transforming industry norms, manufacturing's workforce is the latest shift underway. As the fourth industrial revolution develops, jobs within the manufacturing sector now require both digital and soft skills, blending advanced technology and digital skills with those that are uniquely human. As it stands, the workforce of today is lagging in these increasingly important skill sets. Taking steps to better align skills and expectations across manufacturing, leaders in this space are actively augmenting their workforce, automating the mundane and repetitive in order to allow for a more engaged customer experience. Innovations to scale workforce training and productivity within the fourth Industrial Revolution has led to a cobot-led era of digital workforces working alongside robotics, as leading manufacturers not only upskill their existing workforce but accelerate training the new workforce to keep up.

- ***Engage*** your workforce by replacing mundane, repetitive tasks with AI and intelligent automation, providing creative and strategic opportunities to connect with customers firsthand in a valuable way.
- ***Outfit*** your employees with the digital tools, from cobots to ML systems, to augment their existing skill set and amplify their productivity.
- ***Utilize*** mixed reality tech to better train employees in a dynamic, efficient and immersive manner, and better provide agility, productivity and safety.
- ***Boost*** productivity and intelligent apps to guide employees through best practices and compliance requirements.
- ***Bolster*** communication and alignment via collaborative platforms. Open traditionally siloed teams across the manufacturing landscape by unifying devices, data, relationships, and processes.

"Being able to use technology to improve our communication makes our lives more efficient and allows us to spend our time on more value-added work."

Katie Will
Designs Engineer
Chevron

SUPPORTING DATA

Industries are entering a period of acute long-term labor shortages, with a shortfall in manufacturing expected to translate to 2.4 million job openings unfilled by 2028, resulting in a $2.5 trillion negative impact on the U.S. economy.

Skills Gap And The Future Of Work Study. Deloitte & The Manufacturing Institute, 2018

The collaborative robot market registered a revenue of $580.8 million in 2018 and is projected to reach $9.13 billion by 2024.

Global Collaborative Robot (Cobot) Market. BIS Research, 2019

Of the top challenges cited by manufacturers that have the potential to derail investments in smart solutions in the future, 36% cited "technical skill gaps" that prevent them from benefiting from their investment.

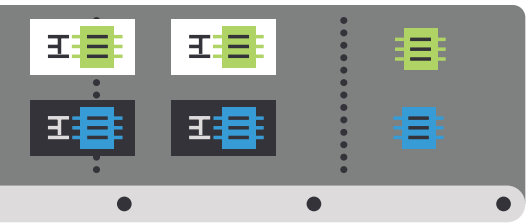
Creating Lasting Value in the Age Of AI And IoT: Futureproofing Your Business, Intel, 2019

2. Deliver New Services

Stay competitive and exceed customer expectations

Moving beyond the point of sale, the relationship between manufacturer and customer is now a circular one. Tapping into today's host of smart, cloud-connected IoT devices, modern manufacturers are now gathering acute customer insights via continuous digital feedback loops. Allowing manufacturers to optimize services offered—from proactive maintenance to remote monitoring—this novel approach to intelligent IoT allows for both greater customer engagement and a hyper-personalized experience via predictive analytics. Within this fully connected ecosystem, personalized recommendations based on unique customer insights and innovative R&D developments now define the manufacturing landscape.

- ***Conserve*** resources and create a sustainable ecosystem by utilizing sensors, connected systems and intel to reduce waste, maintenance costs, and downtime.
- ***Amplify*** the customer experience by proactively engaging with consumers throughout your product's life cycle, in turn creating AI-driven assets that target their desired outcomes.
- ***Leverage*** enhanced services that deliver a unique and immersive experience, differentiating your offering within a competitive space.
- ***Inspire*** loyalty with a customer base looking for more service-based innovation via the hyper-personalized intel that connected and interoperable IoT sensors, products and more can deliver.



"With IoT-enabled Dynamics 365, we learn about—and fix—potential problems before the building maintenance manager or owner even knows they exist."

Bradd Busick
Chief Information Officer
MacDonald-Miller Facility Solutions

SUPPORTING DATA

Companies combining RPA and artificial intelligence has led to an average increase in revenue of 9% as opposed to 3% for those that do not combine the technologies.

Automation With Intelligence Survey. Deloitte, 2019

Global IoT technology investment is expected to reach $1.12 trillion in 2023.

Worldwide Semiannual Internet of Things Spending Guide. IDC, 2019

Manufacturers involved in planned maintenance or service contracts were most likely to report service as a profit center with 62% reporting profitable service operations.

Servitization & Aftermarket Contracts Pay Off For Manufacturers. IFS, 2018

Companies offering annual aftermarket service contracts are 24% more likely to report profitability than those doing reactive field service work.

Industrial Servitization and Field Service Technology Study. IFS, 2018

3. Optimize Operations

Deliver the right product and service at the right price and margin

In an increasingly digital environment, customers now expect instantaneous results, from discovery and support to production, fulfillment and delivery. In order to deliver this level of service, manufacturers are looking to the factory of the future, coupling connected devices, machine learning, and automation with today's workforce to drive efficiencies and achieve optimal results. Within factories and warehouses, manufacturers incorporating digital twins are able to design, simulate and test new operations virtually, before dedicating resources and energy toward a potentially ineffectual process or design. Applying this same mindset to the supply chain, innovations around intelligent automation—from predictive maintenance of machines to automated, location-based distribution—are delivering the optimized experience promised by an intelligent supply chain.

- ***Improve*** the productivity of people and assets through hybrid human/cobot production lines. Leverage real-time monitoring and predictive analytics to plan and refine resource allocation and prevent potential interruptions across the supply chain.
- ***Innovate*** using digital twins to offer a more seamless relationship between manufacturer and customer, automatically updating operating systems, remotely isolating problems and continuously bettering the overall product.
- ***Build*** trust within a collaborative connected enterprise, where sensors, software and the cloud deliver an unprecedented level of visibility.
- ***Generate*** data-driven and AI enhanced products and services that differentiate in the new service economy by delivering customer outcomes.
- ***Increase*** revenue and margins by providing a connected sales and services platform that increases productivity and compliance and can keep up with new product and service offerings.

"Our customers are embracing IoT as a core strategy to drive better business outcomes, and we are heavily investing in this space committing $5 billion in IoT and intelligent edge innovation by 2022 and growing our IoT and intelligent edge partner ecosystem to over 10,000."

Sam George
Corporate VP of Azure IoT
Microsoft

SUPPORTING DATA

83% of companies surveyed say they are planning to make investments in smart factory technologies.
Creating Lasting Value in the Age of AI + IoT. Intel, 2019

Companies report as much as 10–12% gains in areas like manufacturing output, factory utilization, and labor productivity after they invested in smart factory initiatives.
2019 Deloitte and MAPI Smart Factory Study

The global manufacturing operations management software market is expected to grow by 10% between now and 2023.
The Manufacturing Operations Management (MOM) Software Report. Absolute Reports, 2019

68% of manufacturers surveyed plan to increase their investment in IoT integration over the next two years. According to the report, manufacturers' current or planned use cases broke down into three key areas: logistics (50%), supply chain (47%), and employee and customer operations (46%).
2019 IoT Survey. PWC, 2019

4. Reimagine Manufacturing

Improve sustainability and pursue new opportunities

A booming global population, globalization of markets, and upward moving economies are creating an unprecedented strain on the natural environment and depleting its resources. Parallel to this reality is the growing awareness around the negative impacts of industrial processes and demand for more sustainable practices and products. Within the rapidly evolving manufacturing landscape, businesses are incentivized to improve the efficiency of their operations to not only reduce costs, but further differentiate themselves from competitors and generate new value with progressive environmental initiatives. By embracing digital transformation enabled by technologies like digital twins, AI, and IoT, manufacturers are now able to monitor, control and better utilize key resources like energy and water across the supply chain, while simultaneously reducing their carbon footprints. On a macro-scale, this seamless connectivity and next-generation of product innovations can contribute to more sustainable futures by powering intelligent infrastructure like electricity grids, cities and transportation networks.

- ***Deliver*** social and economic impact through AI. Decrease supply chain costs by conserving energy, and protect natural resources through sustainable manufacturing practices.
- ***Improve*** performance through intelligent automation. Provide customers with a personalized experience, catered to their specific needs.
- ***Generate*** new returns across all manufacturing industries by implementing custom insights via connected services.
- ***Increase*** revenue and margins by offering connected services that deliver cutting edge performance.

"In today's world, consumers value sustainability, and so do we. By using IoT sensors to measure quality variables like salt and moisture, we reduce the amount of nonconforming product and packaging that needs to be scrapped."

Amit Raniga
Director
Majans

SUPPORTING DATA

The number of climate-related shareholder proposals has doubled since 2011, while the percentage of investors voting in favor has tripled in the same same period.

Carbonomics: The Future Of Energy In The Age Of Climate Change. Goldman Sachs, 2019

More than half of executives (52%) expect at least 50% of their products and services to be low carbon by 2028. Of these, nearly 1 in 5 predict close to 100% will be low carbon in ten years' time.

Science Based Targets Initiative. YouGov, 2018

Almost a third of companies that set ambitious targets on cutting GHG emissions expect to see bottom line savings, with environmental issues seen as one of the biggest factors set to influence business growth over the next five years.

Science Based Targets Initiative. YouGov, 2018

By adopting a continuous manufacturing model, pharmaceutical manufacturer Sanofi will produce 80% less CO2 emissions compared to traditional technologies and reduce water and chemical usage by 91% and 94% respectively.

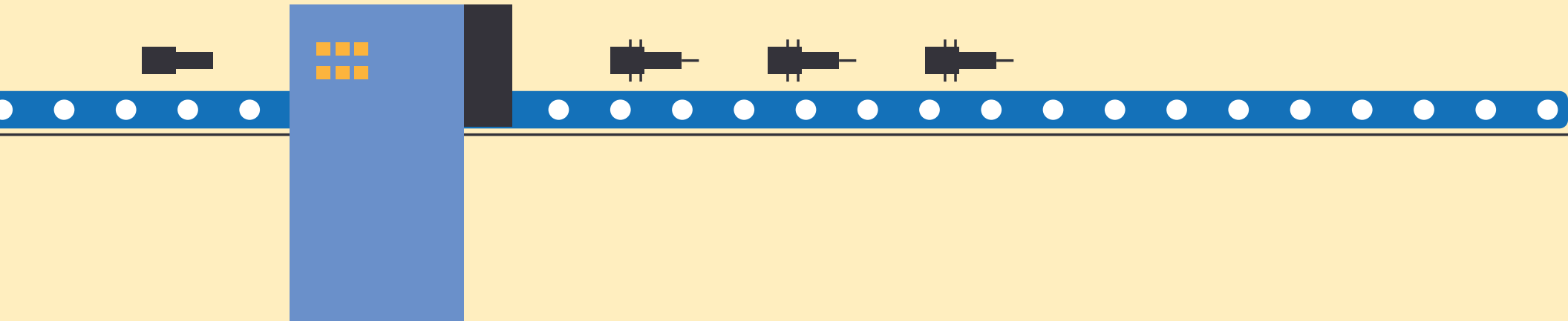
Sanofi Company Press Release, 2019

The global market for sensors should grow from $173.4 billion in 2019 to reach $323.3 billion by 2024.

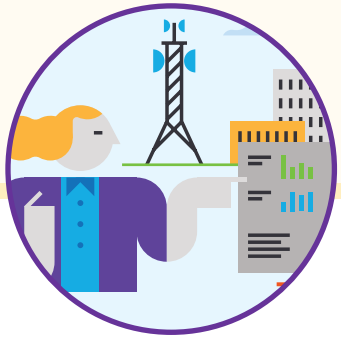
Sensors: Technologies and Global Markets. BCC Research, 2019

DIGITAL TRANSFORMATION JOURNEYS

ACROSS THE INTELLIGENT SUPPLY CHAIN



5 Digital Transformation Journeys Across The Intelligent Supply Chain



Proactive Service & Support

p 13

Access to new sources of data about customers and assets is transforming manufacturing business models from simply selling products to now offering a seamless layer of services as well. This steady stream of insights is empowering all aspects of an organization from sales and support staff to field technicians, to be more responsive to their customers' changing needs and provide increasing levels of proactive service, whether fixing issues before they happen or suggesting beneficial upgrades. Customer relationships move from linear and transactional to become circular and focused on adding value.

Data-Driven R&D

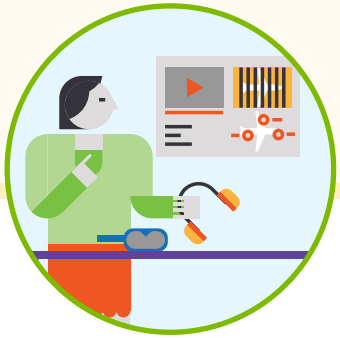
p 17

The product development lifecycle has traditionally been a time and resource-intensive process, requiring multiple stages of feedback and iteration to get to a finished version and launch. And while the process has always been informed by research, much of the available information is limited in timeliness and scope. An emerging R&D paradigm leverages real-time data generated from connected products and other external streams to identify opportunities and unmet needs in the marketplace. Paired with collaborative tools, digital twins and mixed reality tools, teams are able to accelerate the pace of design, testing and approval to take a first-mover advantage and get relevant products to market ahead of competitors.

Agile Production & Supply Chain

p 21

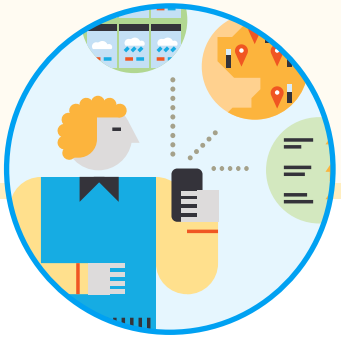
As companies move into the production phase, there are countless variables that must be accounted for, from ensuring that they have the right amount of materials from suppliers in place to manufacturing the correct volume of products to meet market demand and avoid unsold stock. A minor miscalculation can have an outsize impact on the supply chain directly affecting profitability and sustainability. Machine learning and predictive analytics tools are stepping in to help businesses more accurately map out the planning process at every stage. Combined with flexible and on-demand manufacturing capabilities, organizations are better equipped to react to changes in the market or other external factors to scale up or down production in line with need.



Digitally-Enabled Employees

p 25

Despite the power of data and technology to transform business models and operations, an organization's real strength lies in the quality of its workforce. In the face of increased product complexities and market volatility, manufacturers must look to create new opportunities to attract and retain the next generation of talent and drive market-leading innovation. AI-enabled workflows and robotic process automation can offload repetitive, manual, time-consuming tasks so that employees can focus on more strategic, value-add work. Personalized learning platforms and mixed-reality and collaborative technologies ensure that workers are constantly upskilling to keep pace with change, while being equipped with the latest tools to handle the demands of their jobs.



Precision Resource Allocation

p 29

Building more sustainable operations are no longer a nice to have, they have become a business imperative as customers demand stronger environmental stewardship from the companies they support and executives view sustainable practices as a key competitive advantage with a direct impact on their bottom lines. Pinpoint data on every facet of the supply chain and production line is being leveraged to better plan and allocate resources from raw materials to water and energy to maximize outputs and reduce unnecessary waste. Real-time metrics on everything from delivery vehicles and factory-floor machinery to agricultural yields can be paired with intelligent automation to diagnose inefficiencies and make on the fly adjustments to core functions and processes to optimize performance. These micro-actions and decisions based on relevant insights can add up to significant gains across an organization.

Journey 1: Proactive Service & Support

Access to new sources of data about customers and assets is transforming manufacturing business models from simply selling products to now offering a seamless layer of services as well. This steady stream of insights is empowering all aspects of organization from sales and support staff to field technicians, to be more responsive to their customers' changing needs and provide increasing levels of proactive service, whether fixing issues before they happen or suggesting beneficial upgrades. Customer relationships move from linear and transactional to become circular and focused on adding value.

KEY OBJECTIVES

- Anticipate customer needs to reduce costs and ensure uninterrupted operations
- Deliver personalized service and solutions
- Drive sales with upsell and cross-sell opportunities
- Turn service cost centers into profit centers

FEATURED SOLUTIONS

- Advanced CRM
- Mixed Reality
- Remote/Predictive Monitoring
- AI/Cognitive Services

SUPPORTING DATA

50%

By 2022, over 50% of field service providers will offer a digital customer experience that enables two-way interaction and workflow initiation via multiple human and nonhuman channels.

Magic Quadrant for Field Service Management, Gartner, 2019

12%

In 2018, manufacturers surveyed saw a 12% reduction in repair costs from predictive maintenance.

Manufacturing The Future. Accenture, 2018

90%

Deep-learning-based systems can provide defect detection improvements up to 90% compared to a human inspector.

AI In Production. McKinsey & Company, 2019

"The goal is to assist humans by aggregating and digesting data, then creating insights from it. The control room will provide information and predictions, but the human has to make the decision. As the systems become more intelligent, we can move to full automation by AI. That can relieve humans to focus on things that AI can't do: relationships, supply chain or customer issues, and managing workers."

Stuart Wong, Senior Group Manager, Advanced Remanufacturing and Technology Centre

SCENARIO: Enhancing the end-to-end customer value chain with a 360-view of customer needs and proactive levels of service

Jenna leads field service and support for a construction firm that builds telecom infrastructure for municipalities and real estate developers. She relies on a sophisticated CRM platform that enables her to keep tabs on projects in process and manage ongoing relationships with her customers. This platform leverages machine learning to look at historical and real-time usage data to anticipate when machines are likely to break down and recommends when to deploy technicians to fix them. AI-enabled mobile software pushes detailed information to technicians in the field and helps maintain a tight communications loop with Jenna's team back in the office.

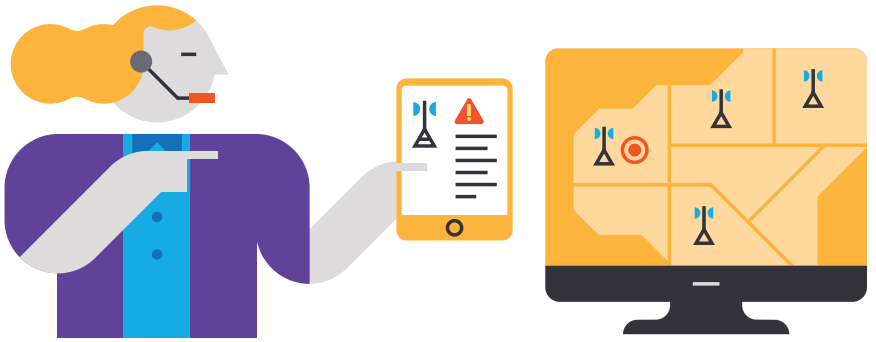
4. Jenna receives a critical alert about an interruption in service at one of the company's cell towers. Remote diagnostics point to a malfunctioning transistor.

1. Qualitative and quantitative customer data from across the organization's touchpoints - call centers, sales people, field technicians, connected end-products, etc. - deliver valuable insights that are fed into a central dashboard.

2. Jenna can review this customer dashboard to get an overview of the status of current projects and alerts on any potential issues related to ongoing customers. She can dive deep on any project or profile to start a new work order or connect with a customer or relevant team member for follow-up.

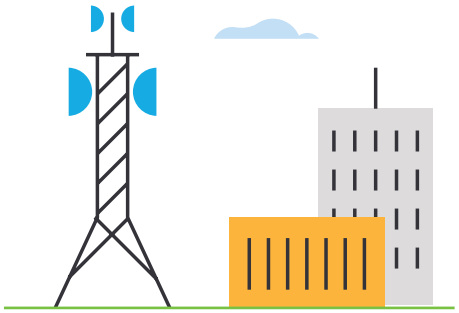
3. Her field technicians receive information about designs, repairs and other content onto their smartphones that help direct their daily workflow. The AI-enabled platform is capable of automatically routing work status, change orders and other key records in real-time to keep everyone aligned.

5 Jenna is able to see in real-time where her technicians are located to dispatch the closest worker to begin the repair, while the right part is routed from a nearby worksite.



6 While looking into the usage data of one of the luxury high-rises where their network technology is installed, Jenna notices that they are reaching capacity. She sends a note to her sales team to suggest an upgrade.

7 The relevant sales lead can reach out with a customized plan and pricing for expanding the network's capabilities to keep pace with Wifi usage volume in the building.



The Impact Of Proactive Service & Support

NEXT STEPS FOR KEY DECISION MAKERS

- Develop a centralized dashboard where employees are able to access both indexed and real-time customer data gathered throughout the entire customer journey.
- Automate workflows by applying AI to the process, alleviating employees from the mundane aspects of project management, and creating space for high-touch customer care.
- Build out intelligent automation processes in order to remotely predict, pinpoint and resolve both internal and customer facing malfunctions.
- Create a seamless customer experience by leaning on AI to coordinate separate departments within an organization and provide teams with accurate, real-time information.
- Leverage data-driven and AI enhanced insights to preemptively reallocate resources, allaying potential problems and reducing customers' costs.
- Differentiate offerings by creating customized products and services based on customer intel synthesized from an AI-enabled CRM platform.

Microsoft Case Study: *Thyssenkrupp AG*

Empowering Employees And Streamlining Operations With Connected Solutions

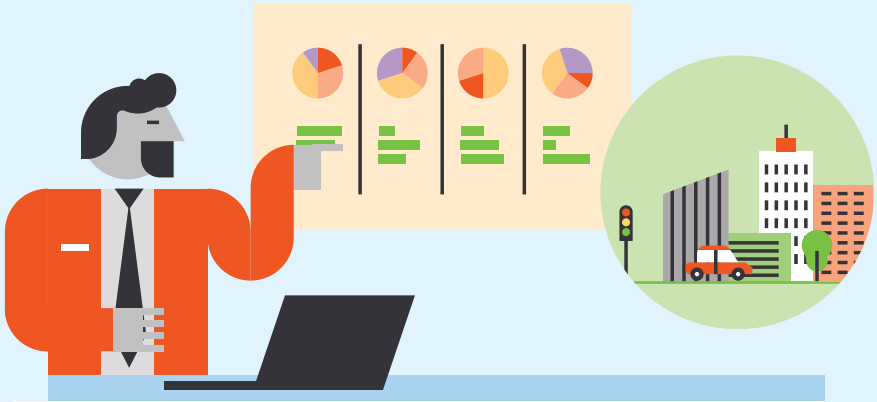
In order to empower employees and optimize production, multinational industrial group Thyssenkrupp AG partnered with Microsoft to integrate Internet of Things and the latest in technology advancements into its employee workflows and building management systems. To better connect onsite and remote elevator technicians, Thyssenkrupp outfitted its elevators with IoT sensors, simplifying the diagnostic and repair process. Combining IoT and ML in this way, Thyssenkrupp is able to more accurately predict future part or system failures, resolve issues before they evolve, and increase elevator reliability across all of their locations.

In order to optimize employees' time and customer relationships, Thyssenkrupp's sales representatives use Microsoft HoloLens to digitally measure consumers' homes for stair lifts, replacing a traditionally manual process with a digital solution to accelerate its delivery process by 4x. Additionally, within its manufacturing facilities, Thyssenkrupp employees are equipped with Microsoft HoloLens to better determine when a machine will need repairs and efficiently locate the necessary parts, effectively streamlining operations. Applying digital twin technology, Thyssenkrupp is able to create digital replicas of any environment to collect and analyze data in real-time and seamlessly create optimal experiences for residents, employees, equipment and materials.

"One key area is being able to improve skills or skills enhancement. This is all about addressing the growing skills gap in manufacturing through reskilling and advanced capabilities, things like utilizing mixed reality, cognitive search to point to information faster and in many cases, automating certain processes. It's all about equipping manufacturing organizations and their workers with powerful and intuitive tools that deliver connected and integrated business experience."

Indranil Sircar
CTO, Manufacturing Industry
Microsoft

Journey 2: Data-Driven R&D



The product development lifecycle has traditionally been a time and resource-intensive process, requiring multiple stages of feedback and iteration to get to a finished version and launch. And while the process has always been informed by research, much of the available information is limited in timeliness and scope. An emerging R&D paradigm leverages real-time data generated from connected products and other external streams to identify opportunities and unmet needs in the marketplace. Paired with collaborative tools, digital twins and mixed reality tools, teams are able to accelerate the pace of design, testing and approval to take a first-mover advantage and get relevant products to market ahead of competitors.

KEY OBJECTIVES

- Respond more quickly to shifts from customers/marketplace
- Shorten product life cycles and development timelines
- Add value to the end-product experience
- Expand into new markets/categories

FEATURED SOLUTIONS

- Digital Twins
- Mixed Reality
- Networked IoT
- Cloud Services
- Collaboration Platforms
- AI/Cognitive Services

SUPPORTING DATA

75B

By 2025, it's expected that 75 billion devices will be connected to the IoT.

How Connected Devices Are Shaping Consumer Behavior. ContentStack, 2019.

$38.6B

By 2019, the global IoT chip market is expected to grow to $38.61 billion.

Global IoT Chip Market. BIS research, 2020

$1.7T

Global spending on R&D has reached a record high of almost US $1.7 trillion. About 10 countries account for 80% of spending.

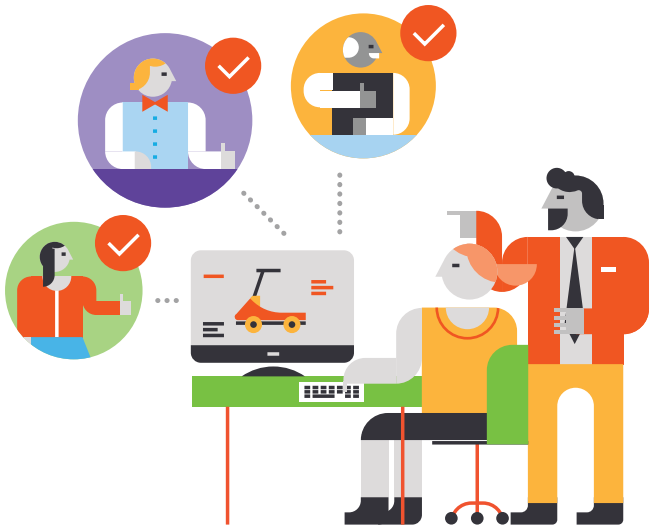
How Much Does Your Country Invest In R&D? UNESCO Institute of Statistics, 2020

"Every engineer should be incorporating sensors into their products and systems. Using them to create "digital twins" is changing the way manufacturers monitor their products and assets. They also further increase data collection to provide that valuable user feedback and enabling incredible control throughout the entire manufacturing process."

Martin Back, Managing Director of BigRep GmbH

SCENARIO: Accelerating the pace of innovation with digital operations and insights from connected products

Mohammed heads R&D for an automotive manufacturer that is looking to move into alternative mobility solutions for urban environments. Its current line-up of sedans feature sophisticated sensors that log individual vehicle and driver metrics along with environmental data, and the company maintains a number of information-sharing partnerships with municipalities running smart city initiatives. He is able to leverage all of this data to understand performance trends and usage patterns on a macro scale and identify potential unmet needs. This foundational knowledge enables Mohammed and his team to approach the innovation lifecycle with an informed point of view. They can begin the concepting phase with digital simulations, enabling them to test, iterate and refine their designs before moving into physical prototypes.

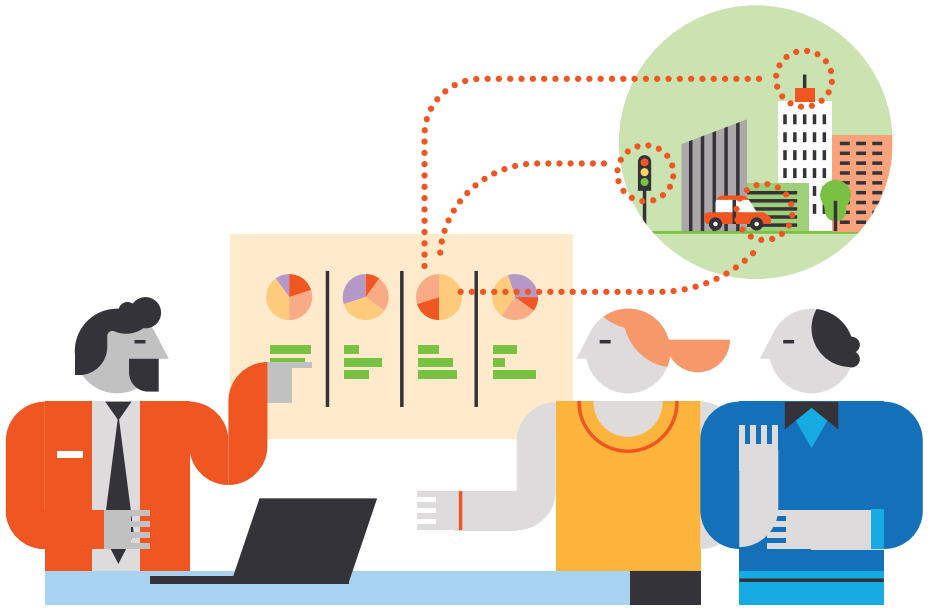


1. As Mohammed approaches the mobility project with his team, he takes stock of the available data. Recognizing that these solutions will be for use in urban environments, he segments the information that pertains to cities.

2. He is able to use machine learning to run analyses against the data to identify traffic volume and usage patterns for private vehicles and public transportation options and compare that across various factors like times of the day, days of the week and seasons. He can also look at aspects like average trip times and distances traveled to better understand how people make their mobility choices.

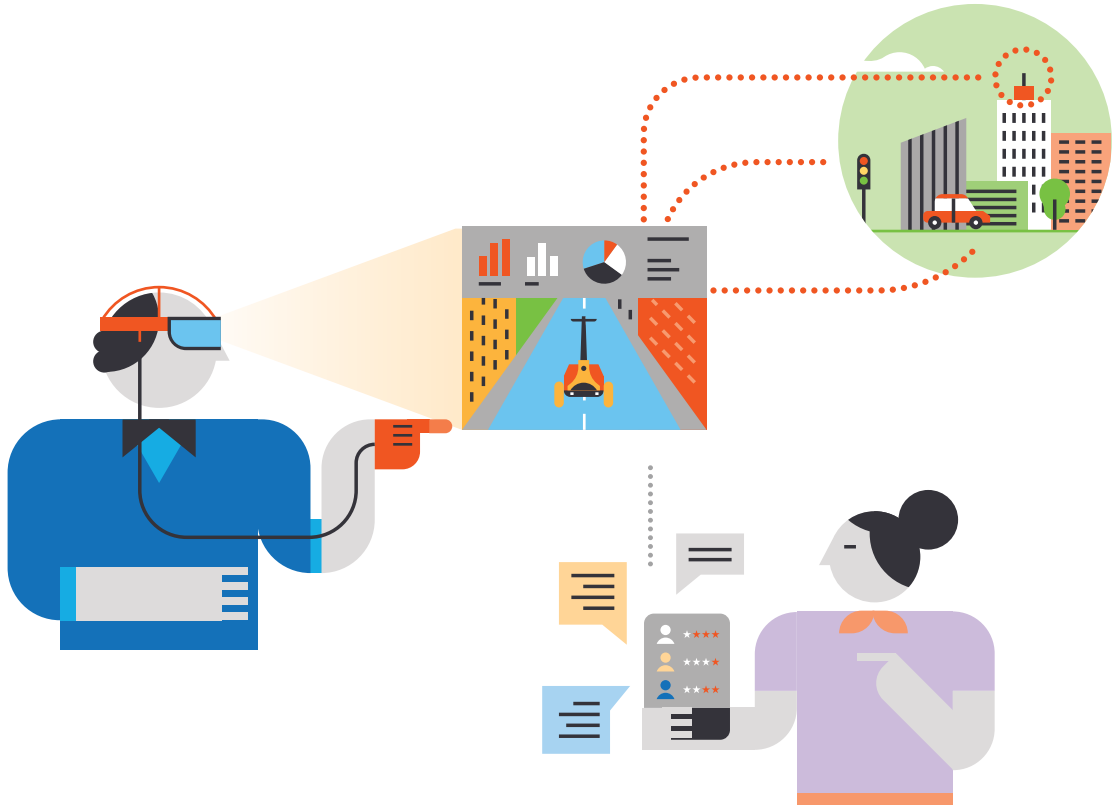
3. Based on this analysis, he and his team can make more informed decisions about potential unmet needs in the marketplace as they set out to develop new solutions.

4. In an effort to accelerate speed and increase buy-in from key stakeholders within the organization, Mohammed's team creates early prototypes in digital environments. This facilitates real-time collaboration from any location and ensures everyone is aligned.



5 The team is also able to test early designs in simulated environments using real data pulled from smart city infrastructure like traffic lights and sensor-embedded roadways to further refine the concepts.

6 As the team hones in on final solutions, they engage their consumer insights teams to gather user feedback on the digital prototypes through online forums and social media, ensuring that their solutions match customer needs.

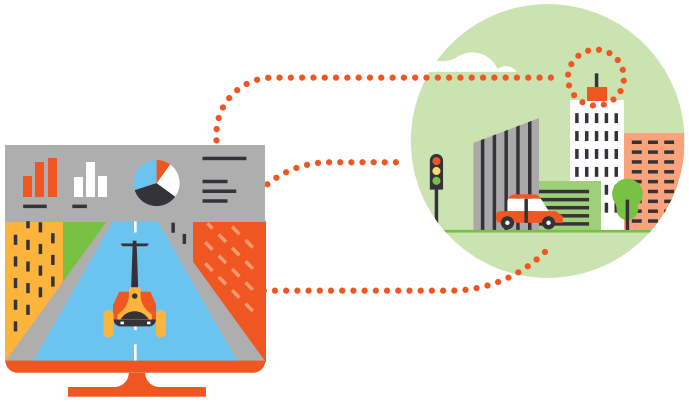


7 With streamlined design, testing and collaboration in place, Mohammed's team can quickly arrive at polished solutions that can then be physically manufactured for further testing and refinement.

The Impact Of
Data Driven R&D

NEXT STEPS FOR KEY DECISION MAKERS

- Leverage smart sensors and the aggregated data to identify patterns, explore potential unmet customer needs, and develop personalized solutions.
- Create a collaborative workspace where team members are able to communicate and align on projects in real-time no matter their location.
- Transform the traditional R&D workflow by enabling seamless integration of customer insights, AI-driven data and continuous updates provided by connected devices.
- Accelerate go-to-market timelines and optimize resources by implementing digital simulations throughout the R&D timeline, testing ideas and concepts pre physical prototypes.
- Incorporate machine learning capabilities into products to amplify the post-purchase experience for customers, applying insights gained to continuously refine and improve products and services.
- Consider open-source options in order to make updates in real-time, creating a truly connected, module system that is capable of interoperability.



Microsoft Case Study: *The Audi Group*

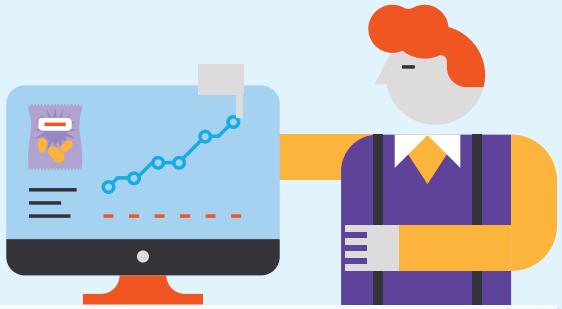
Leveraging Digital Simulations To Advance Autonomous Development

The Audi Group, manufacturer of premium automobiles and motorcycles, has partnered with Microsoft to help drive its next-generation autonomous vehicle development. While fully autonomous driving may still be a ways off, Audi's vehicles still contain sophisticated cameras, sensors and navigation systems capable of capturing valuable data related to driver, automobile and external environments. Testing how this volume of information is processed and communicated between systems within a vehicle is critical to advancing autonomous innovation, while also ensuring safety and accuracy. While real world testing is one component of this, in order to achieve thousands of hours of research, digital simulations that leverage actual data pulled from connected vehicles and infrastructure are becoming essential to accelerating the pace of innovation. Audi ultimately chose Microsoft Azure as the platform to power these simulations. In addition to its processing power and storage capabilities, the cloud-based solution delivered accessibility, flexibility and security for Audi's global teams, allowing them to focus their efforts on creating a next-generation driving experience.

"Connected solutions are causing the industry to rethink the product across the entire lifecycle, from how it's designed, assimilated, manufactured and delivered. Manufacturers can now future proof the product in a way that they can support for many years to come by being able to update the software on a regular basis through a Cloud model. Then create more of a digital feedback loop in terms of using the data to create better products down the road."

Indranil Sircar
CTO, Manufacturing Industry
Microsoft

Journey 3: Agile Production & Supply Chain



As companies move into the production phase, there are countless variables that must be accounted for, from ensuring that they have the right amount of materials from suppliers in place to manufacturing the correct volume of products to meet market demand and avoid unsold stock. A minor miscalculation can have an outsize impact on the supply chain, directly affecting profitability and sustainability. Machine learning and predictive analytics tools are stepping in to help businesses more accurately map out the planning process at every stage. Combined with flexible and on-demand manufacturing capabilities, organizations are better equipped to react to changes in the market or other external factors to scale up or down production in line with need.

KEY OBJECTIVES

- Anticipate changes in customer demand and marketplace forces
- Maximize inventory and reduce waste
- Build agility and efficiencies into operations

FEATURED SOLUTIONS

- Blockchain
- Cloud Services
- Data Analytics
- Collaboration Platforms
- Networked IoT

SUPPORTING DATA

$2.52B

The global manufacturing predictive analytics industry was estimated at $535.0 million in 2018 and is expected to hit $2.52 billion by 2026.

Manufacturing Predictive Analytics Market. Allied Market Research, 2019

$15.8B

Worldwide spending for all 3D printing products and services will hit $15.8 billion in 2020 and continue to accelerate, reaching $23.9 billion in 2022 and $35.6 billion by 2024.

Wohlers Report 2019. Wohlers Associates, 2019

$1B

After the largest funding round in recent years, 3D printing funding increased significantly from 2018 to 2019, closing the year with $1 billion raised.

3D Printing 2019. Venture Scanner, 2019

"It's not widespread yet, but we'll see a shift from real-time analytics to predictive analytics next year."

Brian Solis, Principal Analyst and Futurist, Altimeter

"Organizations are largely still finding a path that balances improving current operations with the opportunities afforded by Industry 4.0 technologies for innovation and business model transformation."

Tim Hanley, Global leader, Industrial Products & Construction, Deloitte

SCENARIO: Building a more resilient supply chain with predictive analytics and on-demand manufacturing

Ruben leads planning and production at a snack foods company that is in the process of launching a new organic brand of potato chips. The release date is scheduled to coincide with a marketing campaign that will air during the NFL's Super Bowl. Ruben relies on data from competitors and internal sales to understand market size and forecast demand for six months following launch. He also receives regular updates from the marketplace to track consumer sentiment and to make tweaks to product or production in real-time. This helps him bring together all the right products from the right suppliers at the right time, so that production processes operate at maximum efficiency, with minimal downtime and waste.

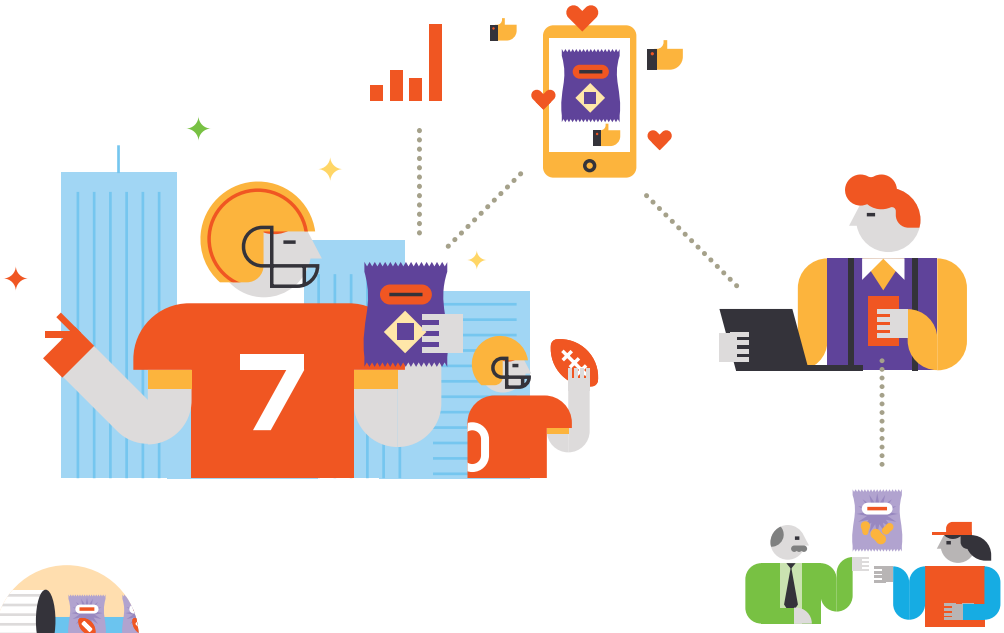
1. Ruben collaborates with members from sales, marketing and manufacturing within his organization to coordinate for the upcoming launch.

2. Shared data on competitors and internal sales projections helps Ruben plan his raw ingredient orders six months in advance. He works with suppliers to ensure that they have the capacity to meet his needs.

3. In an effort to support organic agriculture, the company is working with a number of small-scale farms to provide potatoes. A new blockchain solution will ensure end-to-end traceability of every shipment and enable the company to connect the provenance of every bag of chips back to individual farms.

4 Following a successful launch campaign, the QB from the winning Super Bowl team is shown on camera eating a bag of the new chips during the celebration parade. Resulting social media memes lead to a spike in consumer demand for that flavor.

5 To capitalize on the positive press, the company scrambles to roll-out a special-edition flavor and package featuring the celebrity athlete.



6 Ruben reviews current capacity and runs a digital simulation to test out changes to the manufacturing line and impacts on production outputs for both the current and new products.

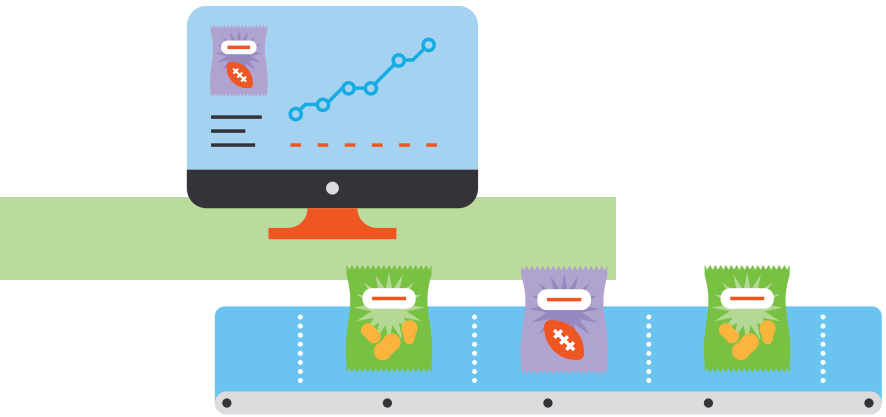
7 A flexible manufacturing line enables him to shift production of the new packaging to a different part of the facility and ensure that they have the right resources in place to support the expanded operations.

8 Updated sales projections highlight the need for a higher volume of certain raw ingredients. Ruben's supplier platform is able to highlight which partners have capacity and place additional orders to compensate.

The Impact Of
Agile Production & Supply Chain

NEXT STEPS FOR KEY DECISION MAKERS

- Leverage real-time customer insights via connected IoT devices to predict demand within the marketplace, ensuring necessary materials are stocked and available for production needs.
- Cultivate customer loyalty and create an agile and transparent supply chain by offering customers total visibility via intelligent, connected platforms.
- Incorporate cloud-based tools like intelligent robotics applications in order to create personalized goods, without disrupting mass production.
- Enable a more collaborative environment throughout planning and production by providing real-time production updates.
- Utilize data collected via IoT devices to continuously refine and adjust materials and sourcing needs.
- Create a closed loop and dynamic logistics solution by flowing AI-adjusted sourcing and production data into shipping and delivery predictions.



Microsoft Case Study: *Majans*

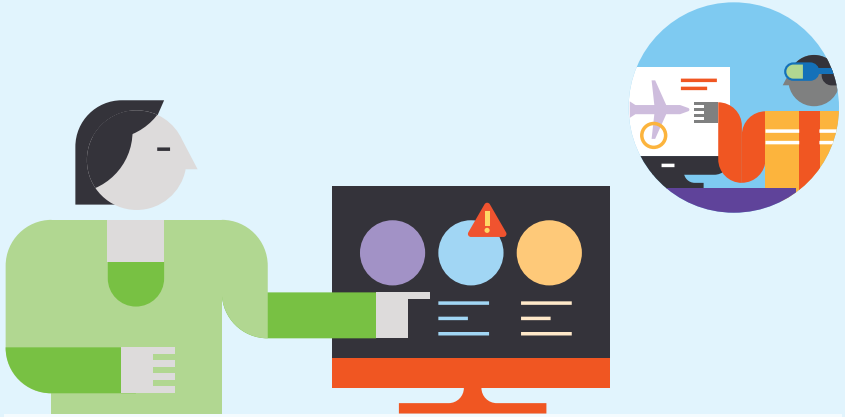
Using Data-Driven Insights To Optimize The Manufacturing Experience

Consumer goods manufacturer Majans partnered with Microsoft to transform data collected from its IoT-connected systems into actionable insights. With Microsoft Dynamics 365 Supply Chain Management and IoT intelligence, Majans was able to provide each employee - from production line to C-suite - with real-time data and create an interconnected supply chain management system. In doing so, Majans' employees and systems are able to operate with maximum efficiency and preemptively alleviate potential pressure points within the supply chain. With real-time information like late shipments, machine malfunction, or overproduction, key employees are equipped to make informed decisions to redirect product, time and labor. By eliminating waste and improving efficiencies, Majans is able to reallocate resources toward innovative developments and product offering. Along with daily operations, the insights provided by Dynamics 365 allow the snack goods manufacturer to ensure quality control down to the minute, eliminating the time cost of manual processes as well as the potential for human error and product loss by alerting employees of potential inconsistencies in real-time.

"One of the biggest issues still is reliable, timely data visibility with an analytics bent. It's taking the data in its raw form and being able to connect the ecosystem of the entire factory conglomerate. Rather than managing each factory individually through Excel spreadsheets, for operational efficiency we recently embarked on what we call the connected factory program, which is taking data from one factory and moving it to the cloud. We can use that for real-time operational efficiency within that factory, but also start to push that data to the next factory above it so that we can bypass the inspection process and move it directly to the production line - a process we call dock to stock."

Pat Flynn-Cherenzia
WW Group Product Manager, Dynamics 365 Supply Chain, Microsoft

Journey 4: Digitally-Enabled Employees



Despite the power of data and technology to transform business models and operations, an organization's real strength lies in the quality of its workforce. In the face of increased product complexities and market volatility, manufacturers must look to create new opportunities to attract and retain the next generation of talent and drive market-leading innovation. AI-enabled workflows and robotic process automation can offload repetitive, manual, time-consuming tasks so that employees can focus on more strategic, value-add work. Personalized learning platforms and mixed-reality and collaborative technologies ensure that workers are constantly upskilling to keep pace with change, while being equipped with the latest tools to handle the demands of their jobs.

KEY OBJECTIVES

- Attract and retain top talent
- Build a culture of continuous reskilling and upskilling
- Improve safety and productivity within the workplace
- Streamline communication and collaboration
- Simplify complex processes
- Replace redundant/mundane tasks with creative/engaging ones

FEATURED SOLUTIONS

- Mixed Reality
- Intelligent Apps
- Digital Twins
- Collaboration Platforms
- AI/Cognitive Services

SUPPORTING DATA

$2.5T

By 2028, the manufacturing skills gap may leave an estimated 2.4 million positions unfilled and put $2.5 trillion in manufacturing GDP at risk.

Deloitte and The Manufacturing Institute Skills Gap and Future of Work Study, 2018

"The most consistent thing we see that's changing is the need for some level of technical skills in any job. More jobs now involve working with advanced software or machines, even in fields that might not have traditionally required such digital acumen."

Beth Galetti. Senior Vice President Of World-Wide HR, Amazon

"As part of our digital transformation, we're working to put more information into the hands of our first-line employees so they can be more connected to products and processes, giving us information that helps us continuously improve in what we call an operator-centric approach."

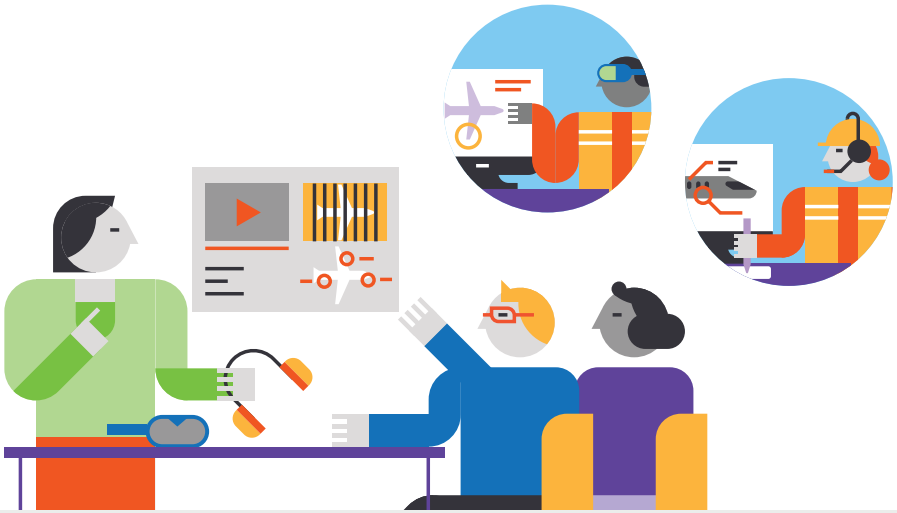
Peter Stamp, Chief Information Officer, Alcoa

"How we've invested and how we will continue to invest in tech supports continuous capability training — one of our core missions. We believe that tech will ultimately improve the work life of our employees, positively impacting safety, reducing stress and improving processes. And as we upskill and continue to enable workers, they rise up the value chain."

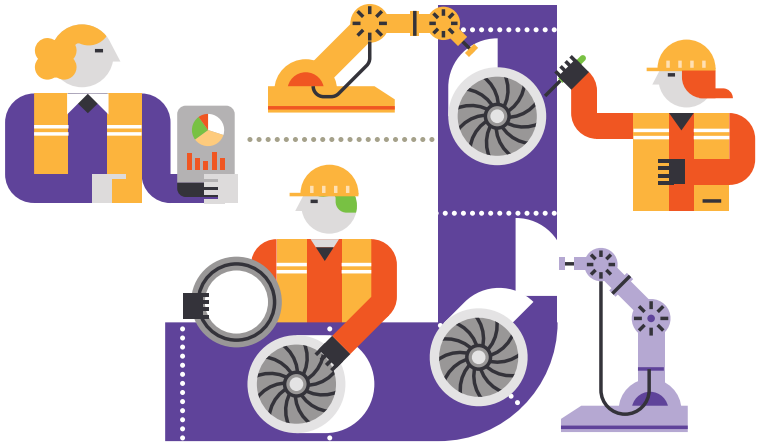
Deboleena Bose, Vice President Of Human Resources, North America, Whirlpool Corporation

SCENARIO: Transforming production capabilities and speed to market with an empowered, digitally-enabled workforce paired with intelligent automation

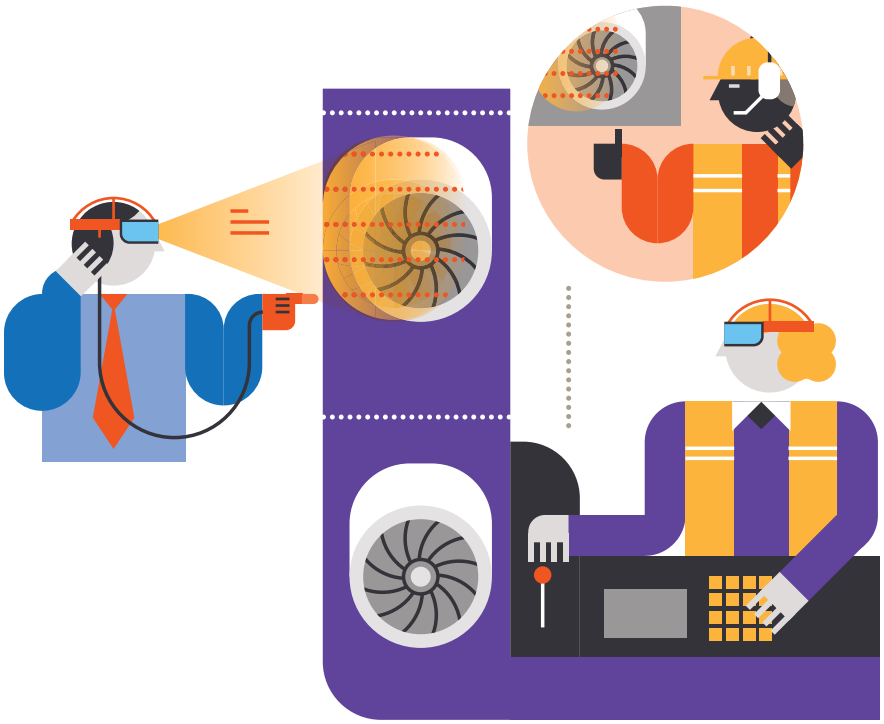
Sun is the Director of Manufacturing for an aerospace company that is preparing to ramp up production for a new airplane model that will require a number of new processes be added to their existing capabilities. New federal regulations will require the organization to adhere to a stricter level of safety standards, putting added pressure on the frontline workers to comply with the guidelines without reductions in efficiency. By leveraging cutting edge solutions like mixed reality, digital twins and intelligent apps to enhance the skills of her workforce, alongside next-generation co-bots to offload highly repetitive tasks, Sun can ensure that she has the right capabilities in place to meet delivery deadlines.



1. In anticipation of the next phase of production for their new airplane model, Sun works with her HR teams to develop a new training platform for her factory workers that will help prepare them for new manufacturing processes and machinery.
2. The platform combines AI and mixed reality to create an immersive personalized curriculum for each employee. Audio, video and interactive simulations allow workers to learn and test new skills in a safe environment before putting them to use in a live environment.

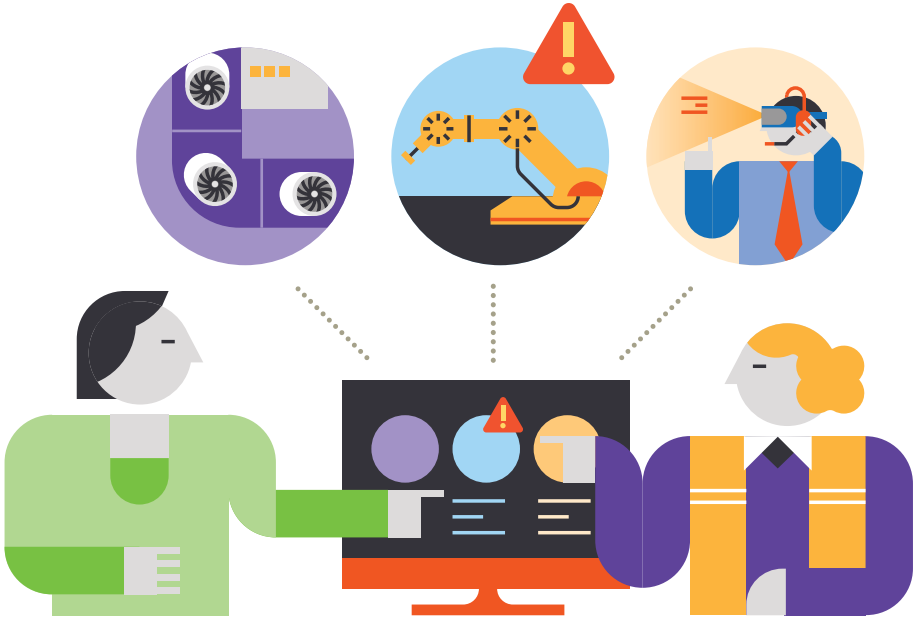


3. On the factory floor, a hybrid production line leverages robotics to offload highly repetitive tasks from human workers and co-bots to work alongside their human counterparts to create new levels of efficiency around highly complex tasks.
4. Workers leverage a suite of intelligent apps that unify devices, data, relationships, and processes to guide them through best practices and new compliance requirements.
5. The flexibility of the software ecosystem also enables workers to easily program functional apps where none exist to help further streamline their workflows.



6 Within the QA team, workers wear mixed reality headsets to overlay information onto newly manufactured parts, ensuring that they aren't missing any important steps as they perform their quality checks.

7 As questions arise, these workers can remotely consult with engineers and experts who can share their knowledge in real-time to ensure that no critical mistakes are made.



8 All of these discrete tasks are monitored and logged, providing Sun with real-time updates on productivity and safety and highlighting potential concerns, allowing her to make necessary adjustments to staff levels or refinements to machine operation to ensure smooth operations.

The Impact Of
Digitally-Enabled Employees

NEXT STEPS FOR KEY DECISION MAKERS

- Transform the training process by utilizing both AI and mixed reality to create a customized curriculum that allows employees to test situations digitally before translating to real world applications.
- Leverage cutting edge solutions like mixed reality, digital twins and intelligent apps to complement and enhance workforce skills.
- Offset highly repetitive tasks by augmenting your workforce with next-generation co-bots to ensure delivery deadlines.
- Empower employees with AI-backed support in order to create custom and unique customer interactions.
- Incorporate live platforms to encourage real-time collaboration between employees and experts to eliminate potential mistakes and speed go to market developments.
- Convert data gathered from daily employee interactions and productivity to better streamline staffing needs and schedule machine updates.

Microsoft Case Study: *Airbus*

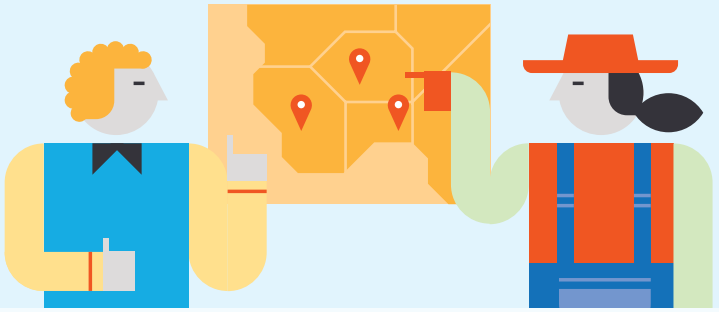
Transforming Industrial Processes And Training With Mixed Reality

Airbus, a leading aerospace manufacturer, is transforming its traditional industrial processes and empowering its frontline workforce through use of mixed reality. The company has partnered with Microsoft to use Azure mixed reality and HoloLens 2 to accelerate the design and manufacture of aircraft and create professional development opportunities for its employees. Airbus designers can use HoloLens to virtually test their designs to see if they are ready for production, drastically reducing development timelines. On the manufacturing line, Microsoft mixed reality solutions enable workers to overlay digital information, such as instructions or diagrams, onto machinery or parts to facilitate complex tasks. Mixed reality also allows trainees to learn in an immersive 3D environment without the need for an actual physical aircraft or parts, creating unprecedented learning opportunities and futureproofing its workforce.

"One of the key challenges that we have heard from our customers is, "How did you create an environment that enables innovation for the newer generation of workforce that is coming in today, the Generation Z workforce, who are a lot more adept to using newer technology that is not prevalent in manufacturing today?""

Indranil Sircar
CTO, Manufacturing Industry
Microsoft

Journey 5:
Precision Resource Allocation



Building more sustainable operations are no longer a nice to have, they have become a business imperative as customers demand stronger environmental stewardship from the companies they support and executives view sustainable practices as a key competitive advantage with a direct impact on their bottom lines. Pinpoint data on every facet of the supply chain and production line is being leveraged to better plan and allocate resources from raw materials to water and energy to maximize outputs and reduce unnecessary waste. Real-time metrics on everything from delivery vehicles and factory-floor machinery to agricultural yields can be paired with intelligent automation to diagnose inefficiencies and make on the fly adjustments to core functions and processes to optimize performance. These micro-actions and decisions based on relevant insights can add up to significant gains across an organization.

KEY OBJECTIVES

- Drive efficiencies and conserve resources
- Strive for sustainability
- Outsource tedious/ time-consuming processes
- Design responsiveness into key operational aspects

FEATURED SOLUTIONS

- Remote/Predictive Monitoring
- AI/Cognitive Services
- Networked IoT
- Intelligent Automation

SUPPORTING DATA

$1.1T

Precision data and technologies have grown in total venture capital funding to $1.1 trillion over the last three years.

Precision Consumer 2030. Sparks & Honey, 2019

"We're actually working very specifically on being able to, for instance, calculate and quantify how many cases you're going to buy [of any item]."

Arti Zeighami, Global Head of Advanced Analytics & AI, H&M

"Our partnership with SMS digital was created to make efficiency improvements that not only help steel manufacturers' bottom line, but to rid the world of unnecessary industrial waste that often plagues this industry."

Stephen Pratt, Founder and CEO, Noodle.ai

"Improved communications between machines due to 5G will not just lead to increased efficiency, but rather to the ability to automate more complex manufacturing models including configure-to-order and make-to-order. Levels of automation formerly associated only with long-run, repetitive manufacturing will now be able, thanks to the high speed of 5G, to automate multivariate production runs that may result in custom products, regional mass customization or highly configured products, all with less human involvement than is currently the case."

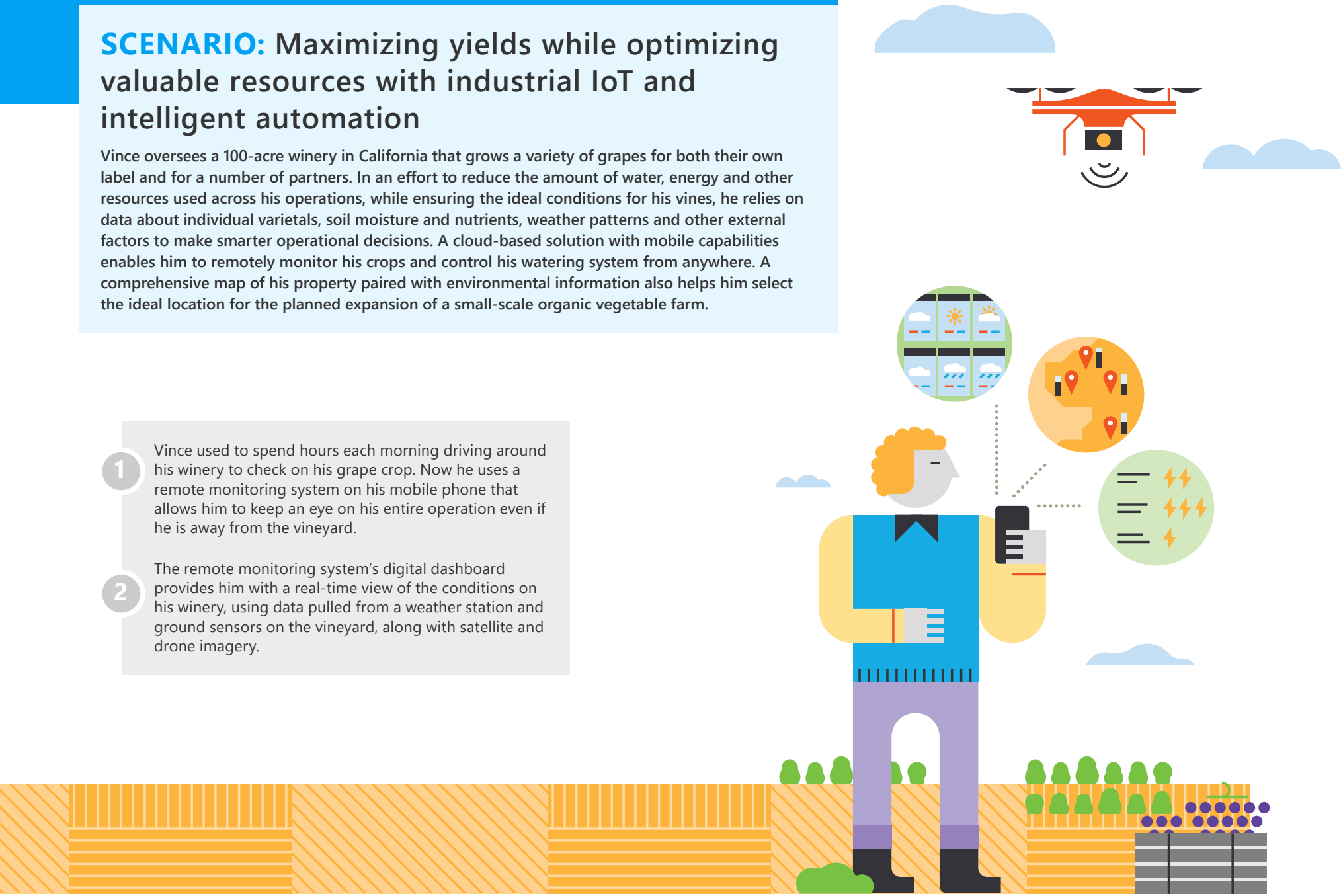
Antony Bourne. President, IFS Industries

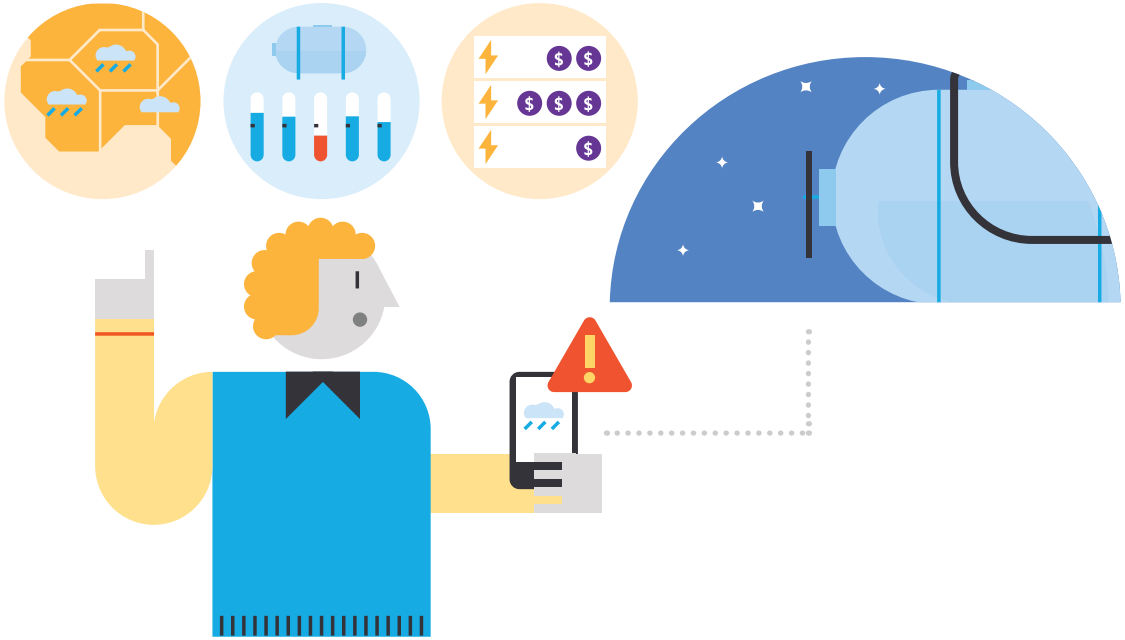
SCENARIO: Maximizing yields while optimizing valuable resources with industrial IoT and intelligent automation

Vince oversees a 100-acre winery in California that grows a variety of grapes for both their own label and for a number of partners. In an effort to reduce the amount of water, energy and other resources used across his operations, while ensuring the ideal conditions for his vines, he relies on data about individual varietals, soil moisture and nutrients, weather patterns and other external factors to make smarter operational decisions. A cloud-based solution with mobile capabilities enables him to remotely monitor his crops and control his watering system from anywhere. A comprehensive map of his property paired with environmental information also helps him select the ideal location for the planned expansion of a small-scale organic vegetable farm.

1. Vince used to spend hours each morning driving around his winery to check on his grape crop. Now he uses a remote monitoring system on his mobile phone that allows him to keep an eye on his entire operation even if he is away from the vineyard.

2. The remote monitoring system's digital dashboard provides him with a real-time view of the conditions on his winery, using data pulled from a weather station and ground sensors on the vineyard, along with satellite and drone imagery.





3 Vince receives an alert that a storm is approaching. He is able to react quickly to the changing weather conditions and remotely shut off his irrigators, ensuring that his soil maintains ideal moisture levels in order to prevent water stress on his grapes and conserve water.

4 Using the system inputs, Vince is able to create custom plans for each varietal of grapes that his vineyard grows, optimizing soil type and irrigation schedules and allowing him to increase yield without the use of pesticides.

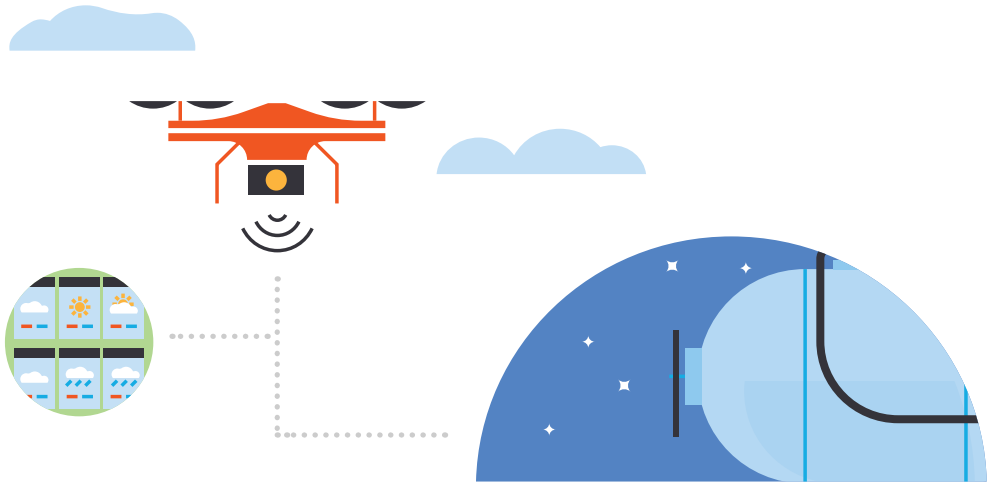
5 The system allows Vince to monitor his water storage and analyze energy price trends, so he can determine how much water he will need at a given time and when he should pump. Vince decides to automate the task, setting his pumping for nighttime, when electricity is cheaper.

6 Vince meets with his foreman to discuss their plans to establish a small-scale organic vegetable farm, reviewing the comprehensive map of the acreage created by drone imagery and the soil quality information relayed by the ground sensors. After analyzing current soil nutrient levels, they decide on a parcel that would work well and start planning their selection of vegetable crops.

The Impact Of
Precision Resource Allocation

NEXT STEPS FOR KEY DECISION MAKERS

- Adopt cloud-based solutions with mobile capabilities to enable real-time, remote monitoring and adjustments.
- Monitor real-time updates of environmental conditions and other external factors that may affect production levels or quality.
- Utilize intelligent connected systems and devices to remotely manipulate conditions within a factory, plant or field in order to conserve resources and reduce waste.
- Automate traditionally time consuming tasks to specifically delegate when, where and the amount of resources used throughout the manufacturing supply chain and process.
- Utilize the custom data collected via cloud-based tools to better predict future conditions, and automate sourcing and supplies replenishment.



Microsoft Case Study: *Bühler AG*

Optimizing Supply Chains And Eliminating Waste Through Cloud-Based Devices

Bühler AG, a global supplier of food processing equipment, incorporated Microsoft cloud and analytics software along with UV lighting technology to create a safer global food supply chain. Within the grain industry, Bühler and Microsoft are collaborating to identify toxic substances that are known to colonize crops such as mycotoxins or aflatoxins, a carcinogenic fungus that is difficult to detect. In order to locate and address this issue on a global scale, the supplier integrated LumoVision into its equipment, an optical sorting machine that takes pictures of individual kernels and effectively removes contaminated maize grains to ensure food is safe for consumption. Through real-time identification and elimination, LumoVision is able to cut down on the potential of widespread contamination as well as inefficiencies, in turn eliminating waste and optimizing resources. Looking beyond the grain supply chain, Bühler and Microsoft's approach to sorting and monitoring has the potential to be applied to other food chains across the globe to ensure the same level of safety and efficiency.

"Data visibility is what will help transform supply chains and change the current hundreds of bodies that are in place to try to reconcile these problems at the end of the month when people are trying to settle a bill. That's a problem in the physical supply chain. It's also a problem in banking and every other industry. If you think about it from the waste that's happening, the stress that it's putting on business relationships that should be quite collaborative and supportive, there's a fairly sizable value associated with fixing this problem."

Yorke Rhodes
Principal Program Manager, Blockchain Engineering
Microsoft

About PSFK

PSFK is the world's leading business intelligence platform for innovation in retail and along the customer experience journey. Across every major industry vertical, we help the most progressive brands identify and leverage new shopper experience opportunities through a mix of trend reports, immersive events, insight-rich content, ideation workshops and on-demand research services.

Piers Fawkes
President & Founder
piers.fawkes@psfk.com
+1 646.520.4672

Scott Lachut
President of Research & Strategy
scott.lachut@psfk.com
+1 646.520.4672

Research & Strategy
Lauren Lyons

Design
Alex Brooks

Illustrations
Romualdo Faura

PSFK
536 Broadway, 11th Floor
New York, NY 10012 USA
psfk.com | @psfk

Version 1.1 | Published 2020

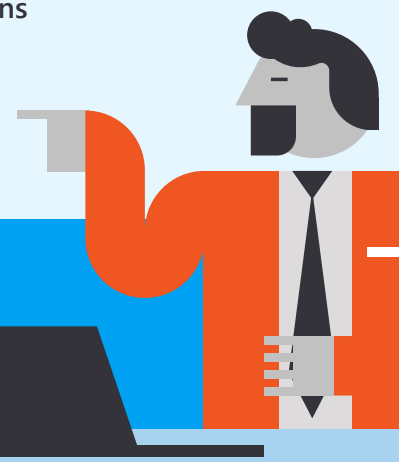
Download this report at: psfk.com/report/future-of-manufacturing

About Microsoft for Manufacturing

Microsoft enables manufacturers to drive business transformation and achieve growth and greater social responsibility through digital technology—enhancing digital factories, monetizing connected products, and creating intelligent value chains, through an empowered workforce. With Microsoft, manufacturers get the world-class partner and ecosystem with the modern productivity platform they need, the global reach to be where they are, and the security to help protect their IP assets, operations, and data. By uniting productivity, intelligent cloud, intelligent edge, AI and big data platforms and tools to solve business problems, Microsoft helps the industry innovate fast, and achieve better customer and social outcomes.

Learn more about Microsoft solutions for manufacturing at:

https://www.microsoft.com/en-us/industry/manufacturing




Microsoft
with
psfk