Connectivity is proving to be a real game changer for manufacturing and resources businesses. Connecting people, for example, can drive transformation in more ways than one, as we find out in the special field services feature on page 76 led by Michel Putnik.

Connecting processes, meanwhile, can help facilitate collaboration and breaks down silos, as Anne Asensio from Dassault Systèmes tells us on page 94. And connecting data points, as we discover in the Planet Dryers case study on page 98, can speed up design processes and dramatically improve efficiency.
The release of Microsoft’s Connected Field Service solution this autumn signalled a new dawn for the way that manufacturers serve their customers – giving them information about how their customers use their products so they can pre-empt what they need and identify when parts need to be replaced before something breaks.

“In the manufacturing space, our focus is on enabling connectivity – to customers of course, but also to the products that the manufacturer sells,” says Michel Putnik, worldwide director of manufacturing and resources at Microsoft. “Through this new solution, we are letting manufacturers and their staff identify how their customer uses their product, when they might need a new product, and giving them continuous feedback loops. We’re connecting the internet of things (IoT), with smart devices, so that manufacturers can move beyond customer relationship management (CRM) systems to a new level of service.”

Putnik describes the ability to use IoT for this purpose as something of a watershed moment. “At its core, Connected Field Services is about connecting IoT with field service capabilities, and all the analytics that is required to tease out predictions,” he explains. “But it’s not all about predictions on the equipment – it’s more than that. It’s about filling the funnel for the marketing guy. It’s being able to say, ‘This customer doesn’t have a service level agreement (SLA). The wear and tear is beyond its ordinary life, and three months from now it’ll fail. It’s not economically viable to go in and replace it, so here’s a marketing opportunity.’ All these leads can come in, and a marketing campaign can be run against that.”

Data is ultimately revolutionising the dynamic of the SLA between the manufacturer and the customer.

“All this data from various customers allows a manufacturer to better understand benchmarking – why one company is thriving and another isn’t,” Putnik says. “This can have a major impact on the SLA, as customers want to know how they stack up. What are they doing differently? What steps in our processes are causing this? The entire SLA can be reinvented around providing insight and advice, and nothing will stop a manufacturer from having dynamic SLAs.”

Better visibility is also changing the way manufacturers manage maintenance. Previously, as part of an SLA, a representative may have gone in and carried out maintenance on a piece of equipment very regularly. But with predictive maintenance, that person will only come as required by the predictions.
Connecting data
Mike James of ATS Global explains how the ATS Bus Solution is helping manufacturers harness their data

The industrial internet of things (IIoT), big data, smart manufacturing and Industry 4.0 are making data communication increasingly complex. Manufacturers need a simple solution that can communicate between all your systems, no matter what type of data you’re using.

This is where the ATS Bus Solution comes in. As a manufacturing services bus, the solution connects every manufacturing system a company uses – from the machines on the shop floor to the various systems that oversee production.

The solution turns data into useable information, uses secure connections and checks the ‘known good’ against defined schemas. ATS Bus Solution also remotely monitors data exchanges, checks for processing errors and sends failed messages for reprocessing. The solution is resilient, fast, and is centrally managed while simultaneously allowing intelligent agents to make decisions locally.

A manufacturing service bus such as ATS Bus Solution is an essential part of an Industry 4.0, smart manufacturing and IIoT strategy. I believe IT architectures should include this technology.

Mike James is chairman and CTO at ATS Global
“More things can be done remotely, so a manufacturer may be able to recalibrate or download a new software package or restart equipment without sending a technician,” Putnik explains. “Some critical situations can be avoided through remote working, but it's important to still be able to show the customer, without physically being there, what they are doing with their equipment.”

Putnik believes that manufacturers – many of whom have been successfully built up over the years using tried and tested ways of operating – are now realising that they have to change the way they work, and it can be daunting.

“I was speaking with the CEO of a company looking to adopt Connected Field Service not long ago, who asked me ‘are we in the same boat?’” says Putnik. “I asked what he meant, and he said ‘I’m putting my career in Microsoft’s hands, and I’m putting a big stake of this company’s revenue future in your hands. So are we in the same boat?’ Of course, the answer is yes, but that just signifies the seriousness of a manufacturer who has done very well for many years reinventing how they work. This new service innovation is a big deal for many of these companies.”

But at the same time, Putnik says that what Microsoft can now offer in this space is creating a great deal of excitement in the industry.

“We get companies saying ‘we want that and we want what they have. How do we get there?’” he says. “For manufacturers it often starts around operations. So if it’s internal facing, we look at how to optimise and connect operations. Once that stuff leaves the factory and is in the customers’ hands, then it’s very much a connected field service type engagement. It could be either of the two, but it’s usually both that we address.”

Key to all of this is what Putnik describes as a ‘foundation of data’.

Proactive over reactive

Melissa Topp of ICONICS explains how manufacturers are staying one step ahead using new technologies

Most manufacturers would prefer that their field service personnel are as mobile as possible, without losing access to real-time and historical key performance indicators (KPI) and other relevant business process information. Having this information available at their fingertips enables them to be proactive rather than reactive. This is possible with wireless computing devices connected through comprehensive mobile human machine interface software.

Due to advances in mobile and cloud-based technology, field workers are able to use many new streamlined capabilities. The first is the use of easy to deploy KPI tools. These provide intuitive, process-based, visually rich dashboards to workers out in the field. Another is the use of internet of things-based fault detection and diagnostics (FDD), which uses customisable fault rules that weigh the probability of equipment failures and alert field workers to actions that should be taken to avoid costly downtime.

New technology such as advanced mobile KPI dashboards, analytical tools and FDD have helped many organisations evolve from a traditional break-fix model to a more proactive or even predictive one. This also fosters a sense of connectivity between field service workers and their central locations, especially when required information can be shared more quickly and securely.

Melissa Topp is director of global marketing at ICONICS

The use of smart devices are enabling manufacturers to reach new levels of service
“Data can serve many purposes, with the obvious one being around services,” he says. “But what does that same data set mean for a manufacturer’s sales team or marketing R&D or human resources teams? There are opportunities to affect things like spare parts management, the supply chain, and the entire company ecosystem. There’s an opportunity to make huge advances and more and more CEOs are recognising this.”

Thanks in part to the Connected Field Service offering, Microsoft is able to offer manufacturers not just new technology, but a new way of operating.

“Customers don’t come to us and say, ‘Hey, we want Connected Field Service!’” Putnik concludes. “But they know they need to think about things differently. They’re coming to us and saying we want a service and not a product – how do we think about that? What’s your experience? We’ve heard about other companies doing things, we understand you’re doing things differently with your customers and we want that relationship. How do we get there?”
Calculating quality management costs

Quality management is vital in the pharmaceutical industry. Raw materials and finished products must be meticulously tested for quality to ensure patients receive safe drugs in correct doses that do not inadvertently worsen their compromised immune systems. A study by PwC has shown that the average medium or large manufacturing facility spends up to 25% of their total site operating budget (excluding raw materials) to achieve compliance with both internal quality policies and external regulations. Another PwC report found that manufacturers in the pharmaceutical industry often operate their plants at less than 15% capacity, and accept that between 5-10% of their production will need to be scrapped or reworked. They also expect that quality control processes will account for more than 20% of total production costs.

Quality control teams are struggling to keep up with the rising demands of regulators, primarily the US Food and Drug Administration (FDA). Not only is scrutiny likely to further increase over time, but as global markets outside of the US, European Union and Japan continue to become more relevant, pharmaceutical companies will need to contend with multiple quality standards and regulatory regimes.

In the past, integrated enterprises resource planning (ERP) initiatives and quality management programmes have evolved independently from one another. Over the past few years, however, integrated ERP systems have become one of the most powerful tools to support total quality management. Pharmaceutical companies can use integrated ERP solutions to implement and streamline quality control and quality assurance processes, and to track the actual cost of quality management procedures across their organisation.

Cloud solutions, such as the new Microsoft Dynamics 365, eliminate many of the barriers that prevent companies implementing or upgrading ERP systems. These can be enhanced by vertical solutions, such as the Microsoft-based AX for Pharma, which integrates standard features with industry-specific modules including advanced quality management and Corrective and Preventive Action Management (CAPA).

AX for Pharma is built as a foundation for a quality management system and provides managers with an accurate real-time overview of business activities. The solution can capture the cost of quality control for critical raw materials and manufactured products, and offers extensive reporting and real-time online capabilities. Together these functionalities allow managers to use accurate information about the actual cost of quality management to decide how to reduce it.

Solutions like AX for Pharma for Microsoft Dynamics 365 can also reduce operational costs and save users time by eliminating manual, paper-based data entry and data transfer.
processes for Good Manufacturing Processes (GMP) operations.

In a traditional paper-based environment, employees must double-check vast amounts of data to ensure everything is completed correctly and avoid costly repercussions elsewhere in the production cycle. For example, if an employee makes a transcription error and a test result is recorded incorrectly in the laboratory information management system, they will need to rework it once the mistake is discovered. The further down the product development chain this happens, the more expensive the remediation cost. However, when procedures are digitised, companies can capture a complete audit trail of every action in the production cycle, whether in the laboratory or on the plant floor.

AX for Pharma offers configurable approval workflows, a complete audit trail, an electronic signature capability that complies with 21 CFR Part 11 standards, and captures all master batch record elements. This eliminates paper processes, minimising the amount of time employees spend entering, reviewing and approving data.

The ERP system also manages quality controls upon receipt of GMP raw materials and provides in-process quality controls for manufactured products, allowing manufacturers to track each product and lot within a batch. Users can set tight process control limits to identify quality issues as soon as they occur, while the CAPA Management module creates and processes deviations inside the ERP system. Consequently, raw materials and drugs are manufactured more consistently.

In addition, the Advanced Quality Management module supports and enforces environmental control monitoring procedures, and the cGMP Plant Maintenance module allows users to create maintenance plans for cleaning, calibration and other periodic activities.

AX for Pharma also supports suppliers’ quality performance by allowing manufacturers to integrate approved customer and manufacturer lists into the quality management system. The system takes configurable reduced testing policies and sampling plans into account when a quality order is created against a purchase order. Plus, AX for Pharma introduces the concept of quality lead time for better material planning and management of inventory.

To reduce the cost of quality management, pharmaceuticals must be able to capture detailed cost data, and streamline quality control and quality assurance processes. This calls for the implementation of integrated ERP systems, which combines features to support operations with strong industry-specific capabilities. AX for Pharma for Microsoft Dynamics 365 make easy to manage the pharma business more effectively.

Massimo Crudeli is the senior manager and solution architect at AX for Pharma.
From fuel used in individual automobiles to powering entire cities, the oil and gas industry keeps the world running. A conventional business approach is giving way to innovation that optimises employee productivity, business processes and, of course, technology.

Where, when, and how people work is top-of-mind for business and IT leaders in a globalised industry. Dimension Data’s workspaces for tomorrow can reimagine, redefine, and reinvent productivity for your people – from those working in the field right through to your supply chain and your executives.

We believe technology is an integral part of your digital business and that smarter work environments are the catalyst for real change. Dimension Data is here to help transform your organisation.

We understand your needs are unique. Through our partnership we determine your end-user computing current state and provide a roadmap to transition your workspaces for tomorrow. Dimension Data accelerates your ambitions - keeping you one step ahead in your industry.
Working with Microsoft®’s new Office 365 Enterprise E5 suite, we bring you workspaces for tomorrow that prepare you for a digital future... today.

Your environment
- Lower your camp costs and streamline your logistics
- Develop sustainable workplaces
- Real-time billing to ensure agile and accurate transactions

- Delve Analytics: giving you a broader view of users across your organisation on a single dashboard
- Power BI Pro: advanced data analytics for richer business intelligence

Your workforce
- Develop a mobile-ready workforce
- Create an efficient user environment
- Increase workforce productivity

- Skype for Business: brings the familiar experience of Skype with enterprise features of Lync for rapid user adoption - with IM, file sharing, and calls on multiple devices for rapid collaboration

Your meetings
- Increase your collaboration with virtual meetings
- Maximise how you use your real estate
- Create effective meeting and information-sharing tools

- Skype Meetings: high-definition video and desktop sharing in real-time
- Skype Meeting Broadcast: extend your reach to thousands, wherever they are in the world

Your collaboration
- Create prompt transient workforce activation
- Improve access to information
- Ensure highly secure collaboration

- Office 365 Cloud PBX: make calls on smart devices with Skype for Business
- PTSN calling: public network calling plans available with telco operators
- Advanced Threat Protection: O365 creates upgraded cybersecurity

Dimension Data brings workspaces for tomorrow to the oil and gas industry as an end-to-end portfolio of end-user computing services.

Our expertise in systems integration, networking and security enables an end-to-end customised solution. We leverage our partnerships with technology vendors, like Microsoft®, with our consulting methodologies, enterprise services and our global footprint, for rapid deployment and cost savings. We recommend the right platform for each of your applications, be it on-premise, on private cloud, public cloud or hybrid – while offering you the control, security, and flexibility you need in your transformational journey.

Do productivity.
Do better business.

> Visit www.workspacesfortomorrow.com/industries
SIMATIC IT Preactor APS
Advanced Planning & Scheduling

siemens.com/preactor

SIMATIC IT Preactor is a world leading advanced planning and scheduling software used by a wide range of businesses across multiple industries.

SIMATIC IT Preactor APS products are designed to work alongside and facilitate, rather than replace, existing systems. Products from the range can be used for long term strategic planning covering months and years ahead, medium term tactical planning with a few weeks planning horizon and for detailed sequencing and scheduling.

SIMATIC IT Preactor APS is not a single point solution. It represents a family of products that have different levels of functionality and pricing so that you can select the system that satisfies both your needs and your budget.

SIMATIC IT Preactor APS is a highly customizable planning and scheduling package. Event driven communication scripts can be installed for tight integration with other systems across multiple sites and unique sequencing rules can be created. Its flexibility is unparalleled.

siemens.com/preactor

Realize innovation.
Today’s manufacturers and engineers are facing a series of challenges around design complexity, compliance and market pressure – the biggest of which is around increasing speed and the pace of innovation.

The market is currently incredibly dynamic, and there is pressure to provide exceptional value at a higher rate. Enterprises need a solid roadmap and must look to protect their futures, as changes can be costly and time consuming. This increases the demand on original equipment manufacturers and original design manufacturers to create innovative platforms that can grow going forward.

For product-driven companies, simulating and visualising product design is critically important for achieving certification, compliance and other standards. It is also key to innovation and optimisation. For example, if an engineer is working on reducing the size of an electronics enclosure, simulating and visualising heat transfer and airflow can provide real time feedback to determine the amount of size reduction that is possible.

For certain applications, simulations can be performed during the design process easily, and the computing requirement is relatively low. However, more complex simulations must run within a supercomputing infrastructure to return results in a timely manner.

Today, most engineers must wait in a queue for their simulation to run within their company’s supercomputing infrastructure, due to capacity and availability constraints. Simulation becomes a validation tool as opposed to a design tool. This is leading to a greater demand for high performance computing (HPC) and graphics accelerated applications (GAA).

Microsoft Azure provides a selection of virtual machines that are tailored for this. For HPC, virtual machines such as A8, A9, H16r, H16mr and NC24r may be clustered using RDMA to build any size of supercomputer, from 32 cores to 32,000 or higher. For GAA, virtual machines like NV6, NV12 and NV24 provide increasing compute, memory and storage capacity with the advantage of NVIDIA GRID capability. This allows applications such as computer aided design, rendering and animation, and other graphics-intensive professional applications, to run at optimal performance and be accessed via a remote desktop connection.

Simulation and visualisation tools have become essential to how designers and engineers work, and critical for ensuring compliance with governing standards. The real difference exists in how these capabilities are used. It’s common for most businesses to have on-premise infrastructure for HPC and GAA, but an increasing number are moving to the cloud to obtain the flexibility they need to be responsive.

In the majority of cases, performance is superior in the cloud when compared with on-premise implementations. Microsoft Azure offers the latest in NVIDIA GRID capabilities and higher levels of CPU and memory configuration. Designers and engineers can work remotely and easily, because their device is no longer a limiting factor.

Simon Floyd is director of innovation and product lifecycle management solutions at Microsoft.

“Simulation and visualisation tools have become essential to how designers and engineers work”
Supporting modern manufacturers

Dimension Data’s Steve Blackwell and Raj Mistry explain how a secure and connected IT architecture helps data to flow efficiently across the manufacturing value chain

BY REBECCA GIBSON

Water and steam power mechanised manufacturing during the 18th century’s first industrial revolution, electric power helped to create mass production in the second, and computers automated production in the third. Today in Industry 4.0, robotics, advanced analytics and machine learning are digitising production and bringing a much higher level of automation to the supply chain and production line.

Now that the entire manufacturing value chain is becoming digitised, companies must ensure data flows more efficiently between their internal engineering, design, production, marketing and sales teams, as well as external suppliers and retailers.

“Traditionally manufacturing companies have operated with IT in the background, but because they’re trying to do more for less and compete against new market entrants, IT is now integral to their success,” says Steve Blackwell, senior enterprise architect of manufacturing at Dimension Data. “IT systems are helping manufacturers to streamline operations, implement predictive maintenance processes, track what’s happening in the production plant and much more. Consequently, the faster manufacturers can get information from one part of the value chain to the next, the quicker and more accurately people can complete their tasks, and the sooner a higher quality product can go to market.”

However, notes Blackwell, this can be complicated, especially when you consider that many manufacturers operate on an international or global basis.

“Manufacturing projects might involve engineers based in the US, France, Singapore and Australia, and every team member must be able to access the most up-to-date and accurate information when they need it, otherwise it will delay production,” he explains. “Manufacturers also need to share data with external suppliers and contractors.”

Enterprise collaboration and productivity tools such as Microsoft Office 365 and Skype for Business make it easy for colleagues to share information and communicate, whether they are located in the same building, or a different region of the world.

“Office 365 is effective for sharing documents and other data,” remarks Blackwell. “Meanwhile, Skype for Business is the perfect tool for real-time voice and video collaboration, particularly because it can be used on multiple platforms. For example, an office-based product designer can join a Skype meeting via their desktop PC or a landline, while a field-based engineer can dial in via a smartphone. All of this technology ensures people...”
can speak to the right people and access critical information whenever they need it, regardless of where they are, or what device they use.

Helping manufacturers to make the most of technologies like Office 365 and Skype for Business forms a key part of Dimension Data’s Workspaces for Tomorrow initiative.

“Over the past couple of years, Industry 4.0 has introduced workflow automation, IoT, data analytics, cloud computing and much more to the manufacturing industry; and this has significantly changed how people work,” says Blackwell. “As part of our offering, and to accelerate our clients’ digital ambitions to embrace Workspaces for Tomorrow, we provide a consultation workshop where we identify our clients’ business goals and how technology maps to achieving those goals. We then look at their existing technologies, devices and IT infrastructure to build a roadmap that will enable them to achieve their aims.”

However, according to Raj Mistry, group vertical sales director of automotive, Dimension Data does much more than simply implementing new technologies to boost collaboration or optimise operations.

“We develop the back-end infrastructure that enables manufacturers to get value out of the collaboration technologies, cool gadgets and data analytics software they want to deploy,” he says. “For example, if a client wants to roll out Skype for Business to improve employee collaboration, we might recommend that they switch from a wired network to high-density wi-fi so they have sufficient bandwidth for it to work properly. We also provide monitoring, predictive maintenance and support services to help clients get the most out of their new technology on a long-term basis.”

To support this, Dimension Data also provides an End User Computing Development Model (EUCDM) consultation.

“Our EUCDM helps companies to create the end-user computing strategy they need to enable employees to collaborate and work efficiently anywhere at any time in today’s multi-device environment,” Blackwell comments. “For example, we’re currently using our EUCDM to support Malaysia-based offshore and marine services provider Malaysia Marine and Heavy Engineering to move services to the cloud and migrate applications such as Microsoft Exchange, Lync and SharePoint to the Active Directory forest.”

Dimension Data’s EUCDM also helps companies to protect their most valuable asset: their intellectual property (IP).

“Manufacturers are currently losing a huge volume of IP because their networks aren’t sufficiently protected, but as hackers are becoming smarter, tomorrow’s digital workspaces will need to be even more secure,” says Mistry. “With an approach that embraces Workspaces for Tomorrow and with our consulting methodology found in the EUCDM, Dimension Data can certainly help manufacturing companies to deploy the technologies they need to modernise processes in the most secure environment possible. That’s the biggest differentiator between us and our competitors.”
Connecting things in manufacturing

Manufacturers are realising the benefits of automation as they look to reduce system integration costs through information modelling standardisation

A growing number of manufacturing and automation companies are looking to lower the cost of system integration by incorporating asset management with devices – this includes all types of industrial automation devices such as radio-frequency identification (RFID) readers, programmable logic controllers and distributed control systems.

There is significant business value to integrating industrial automation device data into IT. Leveraging the OPC UA specification allows vendors to model device data in a consistent standard way for information integration between typically disparate devices and applications.

OPC Foundation collaborates with consortia and suppliers to help them develop OPC Foundation OPC UA companion specifications that allows them to map their data models into an OPC UA information model. Suppliers build OPC UA servers that understand the information model, and OPC UA client applications can seamlessly connect to the OPC UA server and understand the syntax and semantics of the data. This allows for true ‘plug-n-play’ interoperability.

Suppliers are leveraging the OPC UA architecture as a mechanism for moving data and information from embedded devices to the cloud. OPC UA is the infrastructure and solution for the ‘internet of everything’, which includes Industrie 4.0, the industrial internet of things (IIoT), and machine to machine. OPC UA provides multi-vendor, multiplatform interoperability for moving data and information from sensors to the cloud.

It provides a significant opportunity to reduce costs around system integration and writing custom software components to connect data and devices together. Suppliers can take advantage of the rich set of services at OPC UA provides, which go beyond simple connectivity.

With OPC UA, an RFID reader can easily be connected to a manufacturing execution system and cloud systems like Microsoft Azure. This makes it easy to share data and information securely, expand the business value proposition of being able to use the data and information for management of resources, and increase profitability.

Manufacturers and suppliers are no longer limited and constrained by having to write custom software and use custom hardware for all the different connectivity protocols and connectors in their systems. OPC UA provides the easy plug-and-play infrastructure to truly enable information integration and connectivity across devices and machines with the same interface.

I see big changes happening in this space, as more companies realise the obvious benefits – particularly around industrial automation.

“The opportunities for connecting to various infrastructures will dramatically increase”

OPC Hoppe is global vice president of the OPC Foundation
Adding value to the IIoT

MANUFACTURING

As the technology behind the industrial internet of things (IIoT) continues to mature, more manufacturing organisations are embarking on their own IoT or cloud computing journey. The initial hardware investment can vary, but many are trying to connect legacy IT equipment to the cloud via low-cost IoT gateway devices so that no ‘rip and replace’ is necessary. After sorting hardware, manufacturers must choose the right software and sometimes, IoT gateway devices are preloaded with a comprehensive IoT gateway suite of software.

When installed on compatible IoT gateway hardware devices, such an IoT gateway suite allows for publish/subscribe communications with a cloud computing platform or service, like Microsoft Azure. In the case of Microsoft Azure, the Azure IoT Hub acts as a message broker between the hardware gateway and connected subscribers, consuming applications such as an HMI/SCADA, energy management, data analysis, big data historian and mobile applications.

“An FDD software solution, coupled with IoT technology, can save customers 10-20% in annual energy costs”

This combination of IoT gateway devices and IoT gateway suite software is a perfect fit for edge-to-cloud applications.

What are the benefits of such an IoT-based strategy? It helps to ensure IT equipment resiliency and scalability, future-proofs existing IT equipment and ensures global access to accumulated data.

Some early IoT adopters have sought additional benefit by focusing their IoT assets on specific applications, including predictive maintenance. A fault detection and diagnostics (FDD) software solution, coupled with IoT technology, can save customers 10-20% in annual energy costs, with a typical return on investment (ROI) of 12-18 months. Users can deploy IoT-enabled sensors in their facilities, apply a set of fault rules to their existing on-premises equipment, and then accurately measure their ROI. In addition, FDD software automatically calculates potential cost savings and helps users to prioritise facility maintenance tasks. Microsoft saved millions of dollars in annual utility bills by deploying a similar system across 120 buildings at its corporate campus in Redmond, Washington.

Modern FDD software is easy to set up and deploy, plus it integrates with the most popular SCADA, PLC, BAS, CMMS and other systems that are used to monitor equipment conditions. The software should include an extensive library of standard equipment diagnostic models that accelerates setup and configuration, and a flexible rules-based editor so operators can easily customise and add new equipment to the application.

Adopting IoT hardware and software is a good first step for manufacturers who want to immediately benefit from modern technology. However, integrating that technology with the right software solutions – such as FDD – can help these cloud-connected investments maximise ROI and achieve far more than initially expected.

Melissa Topp, director of global marketing at ICONICS
Delivering smarter products, faster

RUSSELL BROOK: SIEMENS PLM SOFTWARE

3D printing isn’t the only way to get consumer durables to market faster – integrated design is just as important

Like every industry, durables manufacturers are under pressure to deliver smarter products to customers more quickly. Being nimble enough to capitalise on new opportunities faster than competitors lets successful companies keep up with consumer trends. That’s not about chasing fads; instead you need to build up innovations and take advantage of the latest technology to speed up product design. And you need to do all that while coping with ever more government and industry regulations and making sure that what you’re delivering are high quality goods rather than cutting corners to get there faster.

3D printing is often hailed as the way to speed up the pace of product design and it’s quickly becoming a key part of manufacturing as well as prototyping; Airbus and Boeing are already using it to cut costs and reduce waste by making parts for passenger jets. But to get the most benefit from new technologies like 3D printing, especially for consumer durables, it’s key to have an integrated design and manufacturing system that enables collaboration and preserves accuracy throughout the entire delivery process. In doing so, what you create is the product you wanted to design, faster and without expensive and damaging recalls.

That product may have to be smarter than it would have been in the past. The internet of things is coming to more household products with sensors that can track changes in the environment like temperature and pressure, monitor usage and deliver information that can help manufacturers investigate problems, and maybe even anticipate failures. But these smart, connected products are also more demanding to design and manufacture. You need to deliver more complex electromechanical designs that incorporate those sensors and electronics into previously analogue products, without increasing costs.

Taking advantage of these trends, and coping with these new pressures, is easier if you have an integrated design system that can cover you from initial styling to prototyping to design to manufacturing. Groupe SEB (who you may know better for their Krups, Moulinex and Tefal brands) went from introducing 140 new products in a year to 200 – a 43% improvement – by using Solid Edge software for computer-aided design (CAD) as an integral part of its overall product lifecycle management (PLM) system. Zumex found similar benefits when it wanted to develop its orange juicing systems faster; the company was able to cut development time in half with Solid Edge.

The first step in getting to market faster is improving productivity with a system that includes tools optimised to speed up every individual stage of your process while still preserving accuracy. These tools should be integrated to take you all the way through the process. When you’re working in 3D CAD (computer-aided design) for example, Solid Edge synchronous technology makes creating and editing 3D models faster and easier. By combining the speed and simplicity of
direct modelling with the flexibility and control of parametric design synchronous technology allows you to rapidly create new concept designs, easily respond to change requests, and make simultaneous updates to multiple parts within an assembly.

As designs become more complex electromechanically, you want a system that lets you prototype the electrical design as well as the mechanical with a complete set of modelling tools. The tool set must extend past part and assembly design and include speciality applications for frame design, capturing welding operations, stylised design, wiring, schematics, cut lists with a precise bill of materials for the product and more. And more importantly, those applications need to be designed for the task at hand.

3D printing is increasingly coming in house rather than being sent out to a specialised bureau or building physical prototypes. Look for a design system that lets you send files to 3D printers for design verification and prototyping without requiring your engineers to become experts in managing 3D printers. That way you’re not just increasing the efficiency of your workforce on the tasks they’re already performing during design, you’re actually creating an environment that improves the design of the final product.

One example of how you might differentiate your product could be industrial design. Premium products need premium industrial design, and if you’re paying for a top flight industrial designer, you need a system that lets you get the most value from the designs they provide. That means getting their original 2D sketches into your design system and converting them to 3D accurately while being confident that you can manufacture the design they envision.

When you do that, you get an additional asset; virtual prototypes that you can use to evaluate and market your future product long before it’s finished. A photorealistic 3D model of your product that you can animate and show in action, even on mobile devices like tablets and smartphones, is a great tool that you can use to get customer feedback and gear up sales promotions before you spend money on manufacturing.

Industrial designers may not take manufacturability into account, so when you build your design to get the look they’ve created you need to think about everything. That includes continuity of curves between different materials, lines that are left by injection moulding, and the need for kinematic and finite element analysis to make sure your materials and design deliver the performance you want. This requires a system that lets you go from sketch and design concept, to 3D model, to design for manufacturing, to managing designs once a product ships. And this needs to happen in one end to end workflow that takes advantage of what you’ve learned in other teams and on other products. The result is you get to market faster, you save money – and you get the design right the first time.

Russell Brook is Solid Edge product marketing manager at Siemens PLM Software
Discover the World’s Most Advanced IoT Software Solution

Watch the video now at www.iconics.com/IoTvideo

<table>
<thead>
<tr>
<th>Date</th>
<th>Building 1</th>
<th>Building 2</th>
<th>Building 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>8/1/16</td>
<td>70 kWh</td>
<td>27%</td>
<td>25 kWh</td>
</tr>
<tr>
<td>8/2/16</td>
<td>High consumption</td>
<td>Average consumption</td>
<td>Below average consumption</td>
</tr>
<tr>
<td>8/3/16</td>
<td>Above average drain from south side</td>
<td>All systems at normal levels</td>
<td>Floor 3 testing power conservation methods</td>
</tr>
<tr>
<td>8/4/16</td>
<td>avg. 399kwh</td>
<td>avg. 250kwh</td>
<td>avg. 270kwh</td>
</tr>
<tr>
<td>8/5/16</td>
<td>avg. 250kwh</td>
<td>avg. 270kwh</td>
<td>avg. 270kwh</td>
</tr>
<tr>
<td>8/6/16</td>
<td>avg. 250kwh</td>
<td>avg. 270kwh</td>
<td>avg. 270kwh</td>
</tr>
</tbody>
</table>

The best of enterprise technology on the Microsoft platform

technologyrecord.com/subscribe

The rise of AI

The modern travel experience

Issue 2: Autumn 2016

£9.00

How the manufacturing industry is moving beyond its traditional boundaries

Steve Guggenheimer from Microsoft on the changes taking place in the media industry

The cloud and mobile technologies that are reshaping law enforcement

Microsoft’s Karen C. Fisher discusses how cloud technologies are reshaping law enforcement

Bill Ford on the future of autonomous vehicles

The Record

The best of enterprise technology on the Microsoft platform

FREE DIGITAL EDITION

Sign up to receive a FREE digital subscription to The Record

Or purchase a subscription to the printed edition

Jason Morris tells Vic Miles how Walmart is winning in retail

The technology enabling the delivery of rich media on demand

How blockchain technologies are reshaping financial services

Toni Townes-Whitley outlines her vision for the future of the public sector

Vincent Bastid tells us how Efma is instigating change in banking

PLUS:

Industry thought leaders share their views on how artificial intelligence will shape the future of enterprise business

The rise of AI

£9.00


FREE DIGITAL EDITION
Smart manufacturing: bandwidth and security

Mike James: ATS Global

In the first of a new series of four articles around the opportunity of Industry 4.0, Mike James looks the need for more bandwidth and greater security.

MESA International is a non-profit organisation for manufacturers and solution providers globally. It has been a major proponent of manufacturing operations management systems. Through the Global Education Program, MESA is the go-to place to learn and become certified in this important area.

MESA also has a Smart Manufacturing Committee tasked with thought leadership. The committee output of white papers and presentation material is then used to share knowledge and provide a basis for discussion. Critically, the committee enjoys membership from global manufacturers, solution providers and standards organisations. As chair of MESA International, I decided to hold workshops at the last board meeting to engage members in the discussion with some fascinating results. While the big thinkers were predicting a future without people in plants, it was clear that the manufacturers themselves were tied down with much more mundane tasks.

For instance, a global player in the food and confectionary business and a niche petrochemical plant were both taking steps to upgrade their internal networks. After taking a look at the opportunity which Industry 4.0 and smart manufacturing offers them, they both concluded that their IT infrastructure on the shop floor needed strengthening. Not only did they need more bandwidth but also more security. Bandwidth is needed for intelligent machine/robot operation with heavy requirements upcoming for machine to machine and product to machine, augmented reality, and so on. Security is the Achilles heel of networked systems and examples now abound of hackers penetrating security barriers and upsetting production.

My own company, ATS Global, regularly receives warnings and examples from the US Homeland Security helping us to build secure systems.

MESA does not create standards but does recommend the use of standards. That makes sense but already we have standard proliferation which increased the cost of complexity of delivering the self-organising plant. Our own solution to this problem is a manufacturing service bus, which supports the various communication protocol standards and provides in-built security at very high transaction speeds. It's called the ATS Bus and may offer a way forward in this complex world.

Mike James is president of the Manufacturing Operation Management Institute

The Manufacturing Operation Management Institute runs events for manufacturers to provide a platform to discuss actions which can be taken today:

<table>
<thead>
<tr>
<th>Date</th>
<th>Location</th>
<th>Host</th>
</tr>
</thead>
<tbody>
<tr>
<td>9 - 10 February</td>
<td>Richmond, MI, US</td>
<td>ATS Applied Tech Systems</td>
</tr>
<tr>
<td>8 - 9 March</td>
<td>Cork, Ireland</td>
<td>ATS Applied Tech Systems</td>
</tr>
<tr>
<td>18 - 19 May</td>
<td>Breukelen, The Netherlands</td>
<td>Nyenrode Business School</td>
</tr>
<tr>
<td>19 - 20 July</td>
<td>Coventry, UK</td>
<td>Lloyds Bank Advanced Manufacturing Centre</td>
</tr>
</tbody>
</table>
Prototype your future

Dassault Systèmes’ DESIGNStudio is being used to help turn good ideas into a tangible reality

Disrupt or be disrupted – that’s the dilemma facing today’s companies. Some industries are being redefined on a fundamental level, with new business models, unforeseen competition, wavering brand loyalty, and unexpected usage emerging. Time to market is of the essence, and digitisation opens up fantastic opportunities for business transformation.

To help corporations address complex, systemic innovation challenges, with immersive digital experiences at the core, DESIGNStudio was established by Dassault Systèmes in 2008.

Employee empowerment is key to any transformation, and every member of a company must sing from the same hymn sheet. DESIGNStudio aims to embed itself with corporate teams and focus on helping them co-develop their point of view. Employees of all backgrounds and expertise can help define a shared future for their organisation and the services they offer to their customers.

"Digitisation opens up fantastic opportunities for business transformation”

To enable such a transformation, companies must move from concept to action. Here, prototype design is a powerful tool, and a vision of the future can quickly be made more tangible. Innovation teams can connect with their end-users, and prototypes can be demonstrated, leading to better decision-making.

Concepts such as augmented reality and virtual reality can enhance prototyping even further.

Dassault Systèmes’ DESIGNStudio is determined to take advantage of the fantastic opportunities these present: full immersion into the scenarios of the future.

However, the key challenges around these technologies, such as adoption and ease of use, must be tackled head on. DESIGNStudio has launched a number of initiatives to address this, some of which use Microsoft technologies such as HoloLens and Surface Hub.

Prototypes need to make their way to the market seamlessly. A major hurdle is moving from a perfect prototype to large-scale implementation. It is essential to ensure that a systemic approach is adopted and maintained throughout the innovation process. Products, services and experiences do not exist in a vacuum – they are inter-dependent and must move forward hand in hand.

Dassault Systèmes is a pioneer in addressing the gap between the concept stage and industrialisation. Our 3DEXPERIENCE platform helps facilitate collaboration, and breaks down silos. Team members are empowered, informed and aligned, and can be involved throughout the innovation process.

Combining powerful tools with a focus on users and their experiences, DESIGNStudio has developed a remarkable ability to tackle complex and systemic problems, aimed at prototyping desirable futures. The projects conducted by the DESIGNStudio are prototypes of how corporations can now start transforming the way they work. With customer and user experiences transformed, brands are in a better place.

Anne Asensio is vice president of design experience at Dassault Systèmes
From commodisation to servitization

Sean Dudley speaks to Colin Masson, director of Manufacturing Industry Solutions at Microsoft Cloud & Enterprise Group, to find out how manufacturers are transforming the way they serve customers

How is the manufacturing space evolving?
In the past, manufacturers naturally focused on sales of their products as standalone offerings. Servicing those products was considered a cost centre for those businesses – an expensive, back-end operation required when products failed in the field.

Today, servicing opens the door to better customer outcomes, decreased operational costs and even potential new revenues for manufacturers. As formerly offline tools become connected, and service moves from reactive to predictive, the manufacturing sector is moving towards services as a core business model.

Moving from standalone products to services creates a win-win situation for manufacturing organisations and their customers: organisations can rely on recurring revenue and customers benefit from greater reliability and lower risk. This evolution is known as ‘servitization’, which covers the bundling of goods, services, support and knowledge.

Which technologies are driving this?
Many forward-thinking companies are already using the internet of things, the cloud and advanced analytics to identify and create new service lines. The more they are able to create this contrast between themselves and their competitors, the more of the market they will capture.

What work is Microsoft doing in this space?
Microsoft has customers already seeing transformational results, including Rolls-Royce, an industry leader in the airlines market. Its TotalCare service range is being digitised by collecting and aggregating data on engine health, fuel usage and other data points using Microsoft Azure IoT Suite, and uncovering new insights using Cortana Intelligence Suite. TotalCare allows airlines to pay for the time they were able to fly their planes rather than for repairs. Under TotalCare, Rolls-Royce assumes the risk and responsibility for engine maintenance, providing engine health monitoring, overhauls and other service options.

Microsoft enablement of servitization goes well beyond the remote monitoring of devices, and predictive maintenance algorithms. Learn how you can expand your services and enhance customer relationships with Dynamics 365 for Field Service, and our Azure IoT Connected Field Service capabilities.
The variable speed drives produced by Siemens Drives every year in the town of Congleton, UK, travel across the world to be used by manufacturers looking to increase their productivity, reduce time-to-market and cut costs.

One major challenge for Siemens Drives is that the Congleton plant does not sell directly – it supplies a warehouse in Germany that fulfills orders from distributors and customers all over the world. With no pipeline of confirmed customer sales on which to base production, Siemens Drives must manage spikes in demand and sometimes need to replenish warehouse stock with just four or five days’ notice.

“Stock levels, open customer orders and sales forecasts for monthly planning had all become the responsibility of one person using separate spreadsheets with numerous formulae,” explains Simon Evans, head of operational supply chain at Siemens Drive. “Delivery performance was very high but any manual approach is prone to errors, and with responsibility all on one employee, we had a potential single point of failure.”

Siemens Drives decided to implement Siemens’ SIMATIC IT Preactor Advanced Planning and Scheduling tools – which run on a Microsoft SQL database. The factory now has a graphical planning tool that works on real data.

Sally Bright, planning team leader at Siemens Drive, says: “Instead of looking at the amount in stock, we can see how much we want to keep in stock and we get a clear answer about our capacity.”

“What is impressive is the speed with which the system takes raw data and puts it in a plan,” says Evans. “Information is instantly pulled through from forecasting and we get a visible alert to changes. If we need to make an adjustment, we can do it very quickly.”

Better planning has led to immediate improvements in Siemens Drives’ days to cover, and an instant rise in delivery capability has been achieved. The plant has also seen a 20% reduction on inventory of finished goods, from €11 million to €9 million.

Complete clarity on the nature and sequence of production tasks means that operators can now set machines up more effectively. This has resulted in a 14% improvement in operational efficiency, and work in progress costs went down from £45,000 to £15,000.

Evans says that the Preactor products have made a very clear strategic contribution for Siemens Drives. “Our new planning and scheduling tools are changing the way we think as a factory, enabling us to focus more on customers and taking us to the next stage of lean production,” he says.
With a vision to revolutionise human interactions using mobile solutions, Mobile Technologies Inc (MTI) – which has over 850 employees spread across four locations – has established itself as a pioneer in mobile device display technologies.

Operating in an industry like this requires a huge amount of flexibility as designs can go through multiple iterations during development. However, until recently, MTI’s engineering change order (ECO) process was largely manual. “Initiators were literally running around the office to collect all required signatures,” explains Anna Toloeva, system integration lead at the company. “We were rarely able to collect all required signatures in a timely manner and so ECOs often created significant delays.”

What’s more, the ECO log, which was a manually maintained spreadsheet, did not show all part numbers under revision. “This meant that two people could change the same part numbers under different ECOs without knowing it,” Toloeva says.

On top of this, MTI’s ECO process was time and cost intensive. “And that’s just the tip of the iceberg,” Toloeva explains. “Our systems didn’t integrate with our Dynamics AX software, we faced many documentation issues and our quoting process took days. Collaboration was weak – a big issue considering how geographically dispersed we are.”

With all this in mind, MTI looked to Bluestar PLM, a Microsoft partner focused on product lifecycle management (PLM) solutions integrated within Microsoft Dynamics AX. “The team at Bluestar PLM impressed us,” says Toloeva. “Having a solution running from AX meant that we wouldn’t have to learn a whole new system. It would also make future upgrades easier because everything is contained in one place.”

The implementation took five months from start to finish. “It included the install and configuration of Bluestar PLM inside AX, customising a lot of features to meet our needs and creating training documentation,” explains Toloeva. “We also did on-site training in our US and Hong Kong offices.”

“The biggest challenge was the amount of code that we needed to generate and insert to customise the process to fit our needs. For example, there was specific AX data that needed to be updated upon ECO implementation.”

The results have been worth it. “We achieved our goals,” Toloeva says. “We’ve reduced time spent on ECO processes by 80%. We’ve reduced document control time on ECO tasks by 60%-80%. We’ve achieved multi-site engineering collaboration and created one central place to store and manage our data. And we have true revision and lifecycle control.”

“We are very happy. Communication and collaboration was very smooth and we’ve had great support during the implementation. We look forward to working with the team at Bluestar PLM long into the future.”
The removal of humidity is a key stage in the production of foods such as breakfast cereals and savoury snacks. Without an effective drying process, there would be no satisfying crunch. In addition, food with moisture left in it will have a shorter shelf life – crisp breads, pasta and pet treats must be stable.

To ensure that food items dry out evenly to the correct level, there has to be complete control of warm airflow. Planet Dryers specialises in this area, designing customised drying, cooling, roasting and cutting machines that are used by large well-known companies producing globally familiar brands. The largest unit is more than 40 metres long, with even the smallest models measuring at least six metres. The company offers a range of airflow systems with single-pass, multi-pass and multi-stage conveyor band dryers, and conveyor drives of variable speed.

Each machine is designed as a framework covered by sheet metal, which has to be shaped at various junction points and cut out where parts such as gas burners are bolted on. “Our products are essentially conveyor belts with warm air blowing through them and one of the critical challenges is containment of the product,” explains John Cresswell, engineering manager at Planet Dryers. “We have to manipulate sheet metal to create effective side guards and transfer chutes.”

It was this specific design requirement that led Planet Dryers to adopt Solid Edge software from product lifecycle management (PLM) company Siemens PLM Software. Following the delivery of a particularly large order that indicated the potential for future international growth, Planet Dryers decided to review its overall design process. As a result, the company established an in-house design team and began to assess the engineering design software on the market.

“I was not familiar with Solid Edge and was quite surprised by how well the software met our needs,” says Cresswell.

Solid Edge was implemented in January 2015. “Solid Edge is very intuitive for new users and I was able to get to work immediately designing a triple pass dryer,” says Planet Dryers’ designer Daryl Collins. “Solid Edge is much more flexible than the software we had before. I can relate faces to each other or constrain angles yet still manipulate a plate without losing form.”

For Planet Dryers, the ability to use historical design data was a fundamental requirement. Solid Edge is fully compatible with any other format; it also provides the option of synchronous technology. Collins explains that he began by looking at old 2D designs and remodelling them using Solid Edge. “The flexibility that synchronous technology provides is astonishing. It enables me to accept files from any format, transfer data and amend a design without any reference to its history. It gives intelligence to a dumb shape, allowing me to change or remove attributes. I can, for example, see a circle, identify it as a hole and recognise the size and thickness so I can quickly amend a sheet metal pattern.”

“I estimate that for each new machine, we’ve taken 15% off the design cycle, that’s six business days”

Collins particularly appreciates the choice that Solid Edge offers. “If I know a product is always going to be similar in shape, then I use the ordered approach because we can control aspects of the design very clearly by making assumptions, automating processes and locking in definitions. On
the other hand, synchronous technology is like working with clay, it allows more freedom during the design process. For example, after I'd designed a particular discharge chute, our process engineer advised me to taper the sides. This would have taken two hours in the ordered environment. With synchronous technology, it took one minute.”

The move to 3D is enabling Planet Dryers to design industrial machines that are effective and economical to run as well as easy to clean and maintain. It is also speeding up the design process. “With Solid Edge, we can quickly convert a design to a flat pattern of parasolids ready for sheet metal fabrication,” says Collins. “Working with large assemblies is also much easier.”

A typical lead-time is 16 weeks from order to delivery, with design time accounting for half of that. “I estimate that for each new machine, we’ve taken 15% off the design cycle, that’s six business days,” Cresswell explains. “The time and resources this frees up allows us to work to a higher level of detail, checking and optimising to produce a more complete design and a more competitive product. In addition, we can confidently give our customers accurate lead times. We can also rationalise parts, make cutting simpler for our fabricator and minimise our costs.”

For Cresswell, one of the major benefits of using Solid Edge is the ability to visualise the end product. “Our renderings are excellent and enable me to give a much better presentation to customers,” he comments. Visualisation is also important for Ian Carter, managing director at Planet Dryers, who is responsible for sales: “I keep renders on my tablet and laptop and can describe a machine in great detail. For example, I can remove parts to reveal what goes on inside and really demonstrate the thought that has gone into a design. For a customer who is not an engineer, a picture is much more meaningful than a line drawing.”
Connecting a global workforce

Avanade helps safety equipment manufacturer uvex group migrate more than 2,000 employees to Microsoft Office 365

Founded in Germany in 1926 to manufacture safety goggles, uvex is now an international company that develops, produces and distributes protective equipment for both the workplace and the sports industry.

Today, uvex group has 2,000 employees and operates multiple subsidiaries and branches across Europe, North America and South Africa. However, the company’s globally dispersed employees found it hard to collaborate because they were using a number of disparate productivity and identity access solutions, as well as ageing on-premise versions of Microsoft Office.

A few months before the end of its financial year in 2016, uvex group decided to upgrade its communication platform to provide employees with a ‘workplace for the future’, enable them to collaborate more easily, and adopt new ways of working. It opted to roll out Microsoft’s cloud-based productivity platform, Office 365, to all employees.

“We want to improve the digital communication and collaboration of all people in the uvex world and get ready for the future,” says Alexander Voggenauer, who is responsible for online solutions at uvex group. “That’s why we are building a worldwide, seamless platform to communicate and unlock new ways of working.”

After evaluating various proposals, uvex group selected Avanade as its implementation partner. “We were impressed by Avanade’s experience and approach,” explains Voggenauer. “The plan [Avanade] proposed to us struck all the right notes so we moved forward.”

To create a modern workplace, Avanade coordinated a phased roll out of Office 365, upgrading older Office platforms and migrating uvex group’s identity management processes to a unified Active Directory solution. Avanade also provided intensive training, as well as change management and technical support throughout the platform implementation.

Office 365 and Active Directory have already had a significant impact on uvex end users, administrators and the company’s bottom line. All employees have easy access to a unified modern solution that enables them to work more efficiently and productively. Meanwhile, the new solution has simplified account management and support services for the IT team. This has enabled greater self-service opportunities for employees and reduced costs.

Most importantly, uvex group can scale the platform as it continues to grow in the future, allowing it to remain innovative. For example, the company plans to migrate to Microsoft Skype for Business and harness Office Sway for interactive reporting.

“It can’t be done is not even in our vocabulary,” says Voggenauer. “Thanks to the work done with Avanade, our people are better set to innovate than ever before.”
**Advance your Quality Management processes with one full-featured solution**

**Advanced Quality Management for Microsoft Dynamics AX:**
a natively integrated platform that supports quality across your business.

For pharmaceutical companies, best-of-breed quality management is centered in laboratory processes, but impacts all areas of your business - planning, manufacturing, project management production scheduling, and more. Companies invest significant time, resources and money implementing add-on solutions to ensure product excellence, cost control and compliance with stringent regulations.

What if you could address those challenges at a fraction of the cost you expect, with effortless integration across your total operations system? Advanced Quality Management delivers a complete platform that works as a native part of Microsoft Dynamics AX and helps you drive results built on productivity and compliance:

- The built-in connection of information and processes ensures accurate monitoring of the value vs. cost of quality, real time communication and visibility across departments.
- Quality processes comply with GxP guidelines and regulatory requirements, in particular 21 CFR Part 11 and EU Annex 11, simplifying Computer System Validation.

**WHAT’S NEW IN AX FOR PHARMA**

- **New release for Microsoft Dynamics AX 2012 R3 CU9 since August 2015.**
- **Many new features** including: Quality inquiries, Trend for quality results and Test group versioning …
- **Upcoming release** of Stability Studies.

---

**The Advanced Quality Management Platform**

**Sample Management**
- Sample login
- Statistical sampling plans linked to supplier qualification
- Barcode labels
- Retest/retain samples
- In-process samples

**Results Entry**
- Multi-level tests based on mathematical functions
- Reduced testing/skip testing
- Results validation vs. internal and customer specifications
- Test sheet management

**Batch Approval**
- Configurable graphical workflow engine
- Analytical review and quality assurance (QA) approval with electronic signatures
- Conditional release
- Batch management

**Project Management**
- Quality activities integrated with project management and accounting
- Stability studies and analytical services
- Value of Quality/Cost of Quality

**Work Assignment**
- Skill management for quality, production, projects, maintenance
- Production scheduling including quality control
AX for Pharma: a complete package that combines proven software with proven expertise from a trusted advisor

Pharmaceutical companies face challenges that go well beyond standard enterprise resource planning (ERP) - complex operations, advanced project and quality management, compliance with stringent regulatory requirements - and much more. Too often, companies spend too much time and money struggling to build and customize a system that meets their needs and achieves FDA validation.

There is a solution. AX for Pharma is designed to meet the full range of needs for pharmaceutical companies, minimize customizations and implementation challenges, and give you expert, proven consulting and support from a trusted advisor. This complete package includes:

- AX for Pharma, built on Microsoft Dynamics AX. This industry-tailored, integrated ERP solution enables businesses to carefully monitor processes from research and development to sales, planning, purchasing, production, and quality management.
- The AX for Pharma validation package, including functional documentation and test protocols that support the validation process.
- Industry-specific expertise and best practices for delivering the ERP implementation that fits your business and achieves FDA validation.

A more complete view of AX for Pharma functionalities is summarized in the “circle of excellence” below.

WHAT’S NEW IN AX FOR PHARMA

✓ New release for Microsoft Dynamics AX 2012 R3 CU9 since August 2015.
✓ Many new features including: Physical movements control, Batch copying, advanced Batch dating and Batch numbering.
✓ Others features like: Approved manufacturer list, Time and Temperature tracking …

www.axforpharma.com