

A hand pointing towards the viewer, overlaid on a futuristic digital interface. The interface features concentric circles, binary code (0s and 1s), and various geometric shapes in shades of blue and purple. The background has a gradient from dark purple on the left to light blue on the right.

SMART starts here

Your guide to
smart manufacturing



**Rockwell
Automation**

Smart manufacturing delivers measurable results by improving safety, increasing quality and optimizing plant performance

Thanks to constant evolution of technology, resulting in free flowing/open connectivity coupled to modern automation solutions, smart manufacturing has morphed from an abstract concept into a technological reality – and is now, arguably, an engineering necessity!

Modern market forces demand levels of flexibility, agility and overall operational equipment effectiveness (OEE) that only smart solutions can deliver. Are you keeping pace?

Many contemporary business outcomes – like reducing downtime – are based around **knowledge-driven operations** and **smart, flexible manufacturing**. But what is smart? How do you get smart? Are you already smart? And what will being smart deliver?

Let's take a look at the various elements of the smart equation: **the people, the process, the technology and the specification**, and how they all mesh and interact to underpin a holistic approach to smart solutions.



The center of your smart manufacturing universe

The first step on any smart journey is to consider the most important stakeholders. **Your people!**

Identifying and clearly articulating the business value that smart approaches can deliver to your organization will make the transition much easier.

Preparation and education will allow you to realize value more rapidly from your investment in smart manufacturing.

Consider workforce evolution! Your most skilled workers and engineers are retiring and with them, their knowledge. Their successors - while more than capable - have a technical mindset anchored in a more efficient connected, digital world where collaboration is global, your workforce can work from anywhere, and problems are solved in the virtual world before they become issues in the real world.

Providing your operators, maintenance technicians, engineers, managers, and executives with actionable insights that optimize everyone's strengths and capabilities is a key element of smart manufacturing.

At its core, the "smart" in smart manufacturing will help you find different ways to relieve people from tedious, repetitive tasks and free them to do more complex, value-adding work. Technology may replace human repetition, but it will never replace human intuition and innovation.



Establishing an optimum combination of people and information should define your smart aspirations.

Why go smart? What's in it for me?

Real-time data taken directly from a machine or operation is a primary benefit of smart manufacturing. However, if that data is not applied properly – or if no action follows – then there's no benefit.

How many times have you walked into your manufacturing area to find operators guessing about an issue?

To give your people the actionable information they need, your machines must provide contextual, actionable insights that improve decision-making.

This starts with your business model, understanding the challenges that impact your OEE, and how decisions can be driven to the appropriate level to improve productivity, quality, safety and sustainability.

CONSIDER THIS: Do you have smart devices at home? Maybe you have a smart thermostat, but not smart lights. You identified that one would give you savings, but the other was not necessary.

Just like home automation, you don't need to jump in with both feet at your plant. Smart manufacturing is a process, not a project. Start with one machine, one cell, one line. Review what data you can collect, analyze and present, and the outcomes of possessing the resulting knowledge. If the impact is negligible, move on to something else. The data and its source are not going to disappear. Note it and come back when it is important.

Being intentional about your data strategy – when you need real-time data, how you will collect it and how you will use it – gives you a metric for action, or a way to enforce what you see.

Once you've decided what to connect, you must collect that data and organize it before presenting it in an actionable and contextualized format that delivers knowledge.

Much of the data will be used by many different people in your organization. What's important to an operator will differ from a plant manager. Identify the best role-relevant format.

Once you become aware of consumption, downtime, expenditure... human nature determines that you start to manage it.

WARNING!! Once people get addicted to data, they're always hungry for more! Applaud enthusiasm, but you may also need to reel them in. Reaffirm the goals and primary targets and do them first.

HINT: Start with downtime causes and quality. When these are tied together, they define OEE. Understanding operating and system parameters that effect downtime and quality allow you to address them before they become a disruption.

What do I need? Where do I start?

Being smart means leveraging historic and real-time operational data in an efficient way to optimize your OEE. And to be smart you must deploy smart technology.

Chances are you already have devices – even commodity low-voltage components – in your plant that can generate and deliver their own little part of this vital operational data mix. Maybe you don't know how to exploit them.

However, simply tapping into these devices will give you **data**, but NOT **information**. Smart devices do not make manufacturing smart on their own; they work with users of the information to make it smart.

Here's a thought...

Not all that long ago, if you had a slow leak in your car tire, you would eventually have a flat and have to spend an hour replacing your tire. Then, cars got smarter. Sensors could tell you that one of your tires was under pressure. A few years later and they could tell you specifically which tire; and a few years after that they could tell you the individual pressure of each of your tires.

Which would you prefer: five minutes addressing an under-inflated tire, or one hour replacing a fully deflated tire with highway traffic buzzing by?

This simple analogy highlights the route from data... to contextualized information... to knowledge.

Let us consider an industrial example that is more than likely in your plant right now. Imagine a sensor in a production environment. Without proactive cleaning, it would eventually stop working causing a stoppage. Message: "The line has stopped". **This is data.**

Sensors then evolved to let you know their signal strength was degrading. Message: "I am getting dirty". **This is information.**

Now, because of the information, you can better predict or plan how soon the likelihood of a cleaning is necessary. As soon as you start to see "I am on this belt and my signal is degrading at the rate of 3% per day" it's time to schedule maintenance. **This is knowledge.**

Which would you prefer...

One minute cleaning the correct sensor?
Or an hour or more of unproductive downtime, trying to figure out what has stopped your line?

The application of knowledge gained from smart systems is key to preventing downtime, one of the core definers of your OEE

This sensor analogy illustrates how the devices and sensors on your line can deliver valuable insights when their data is collected, interpreted and delivered – to the right person, in the right format, at the right time.

Higher-tier products can generate and deliver much more data, covering a much broader set of performance metrics.

How you use them and how you choose to leverage the data they supply could make all the difference in your OEE.

With smart systems – from component to PLC, coupled to information gateway solutions designed specifically to work between OT and IT systems – the data you collect can be shared throughout your enterprise.

With analytics you can monitor trends, spot weaknesses, highlight training gaps and predict downtime often well before they negatively affect your operations. **But only if you have the right information!**

Smart manufacturing can be defined as a system of connected devices that produce contextual information, allowing people to make the right decisions to drive the desired manufacturing outcomes and reach targeted improvements.

Any smart manufacturing system must include software packages that support:

- VISUALIZATION.** This includes MES layer integration, machine data visualization, and business unit alignment.
- OPTIMIZATION.** Focuses on operational efficiency and productivity, application of analytics, and risk management.
- USER EXPERIENCE.** Considers the abilities of any user, scalability from plant manager through operator, and operational intelligence.



Safety is a vital element of holistic improvement programs and is a core tenet of any smart application. Safety should always be seen as an opportunity to improve and prevent and, as such, plays just as big a role as your automation infrastructure.

SMART AND SAFE GO HAND IN HAND. In a functional stop: Which gate was opened? Who opened it? Why was it opened? Is it opened regularly? How long was the line stopped? Could downtime be substantially reduced using safe speed monitoring or other technologies that reduce the need for complete shutdowns? Smart will tell you all of this and human intervention will solve the issue, preventing it from happening again.



Challenge your suppliers to match your smart aspirations

No matter where you are on your digital journey – whether it is just six months in... or three years down the line – the one thing you should be doing right now is asking your OEMs and suppliers for smarter, safer, more connected and secure machines, equipped with smart components and smart objects at the controller level – so, when connected, all data is there, organized and instantly useable. **Get value the moment you connect.**

As an end user, you must engage, specify and question OEMs. Ask yourself, “What additional value would I get if this machine deployed smart technology?” **Then ask your OEM exactly the same question.**

Price should not be the primary metric upon which you base your purchasing decisions. You must consider the whole-life cost of the asset, including its operation and consumption, and **the extra value that the data it generates can deliver.** Ultimately, you will bear the cost of your decisions. Saving pennies up front will cost you dollars in the next year...

Explain your smart aspirations to your suppliers, talk about past experiences and less-than-favorable outcomes and then challenge them to exploit technology that helps you prevent similar issues.

Consider this: How much would an hour of downtime cost your company vs. how much extra is that smart sensor?

Smart manufacturing is a journey, not a destination.

As technology evolves, so do the opportunities.

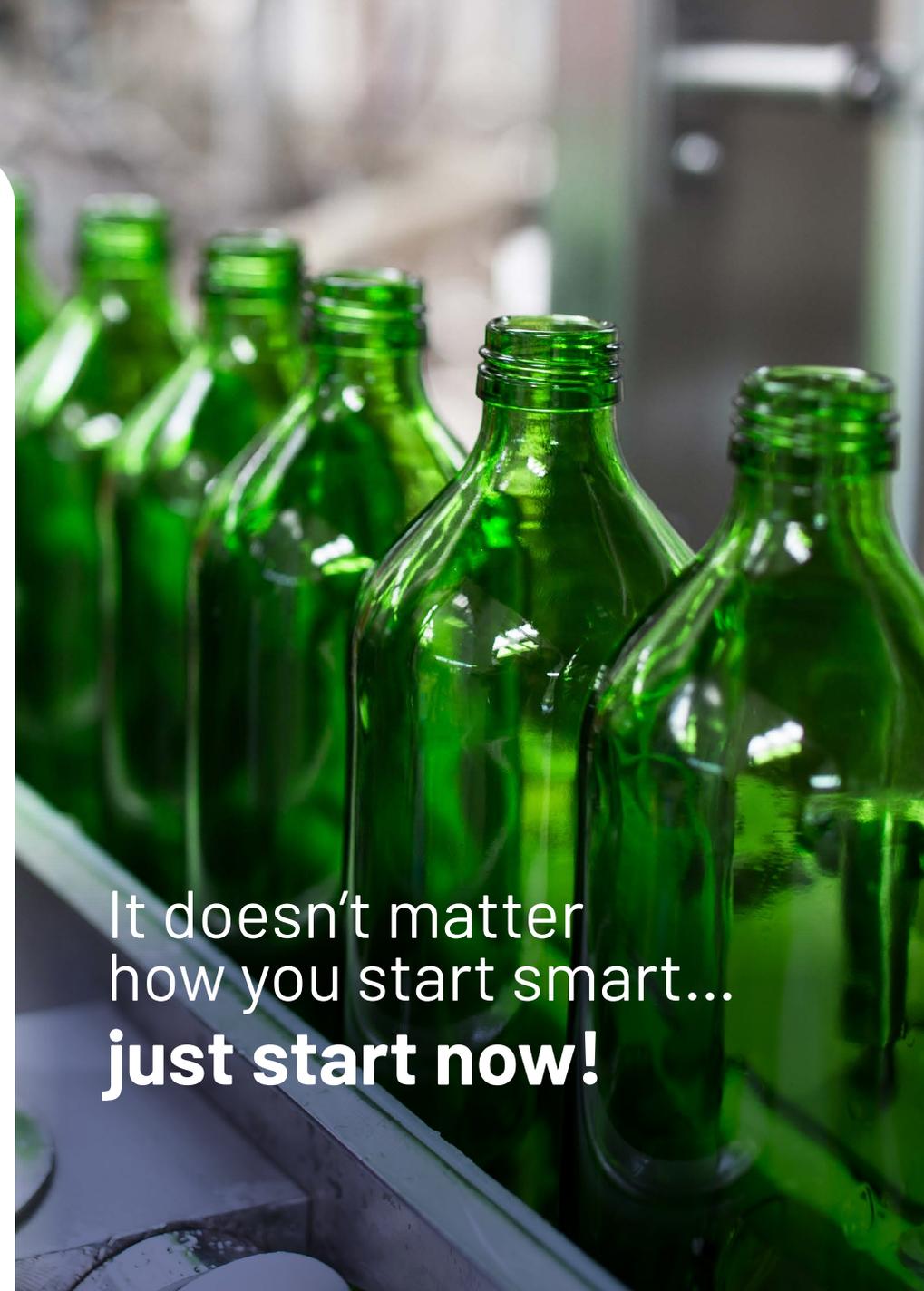
Ask for smart solutions. Solutions that give you:

- Operational data that allows users to be more proactive and gain insights into their operations
- Faster return on investment and greater uptime
- A framework of design and operation tools that will simplify system integration, operation and maintenance
- Integration on a common platform
- Safety features that enhance both safety and productivity by improving machine access, reduce downtime and reduce restart time
- Secure remote access to speed diagnostics and troubleshooting – and minimize worker exposure to hazards

But you don't have to start big or broad. Start where it makes the most sense, on a single machine or cell, then scale as needed. As information grows, so does your knowledge and capabilities to make further improvements.

As data volume grows, consider analytics and historian solutions. Be smart yourself in the way you leverage the data.

Let us help you make sense of this data and make it more actionable to optimize productivity, safety and profitability.



It doesn't matter
how you start...
just start now!



Connect with us.

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