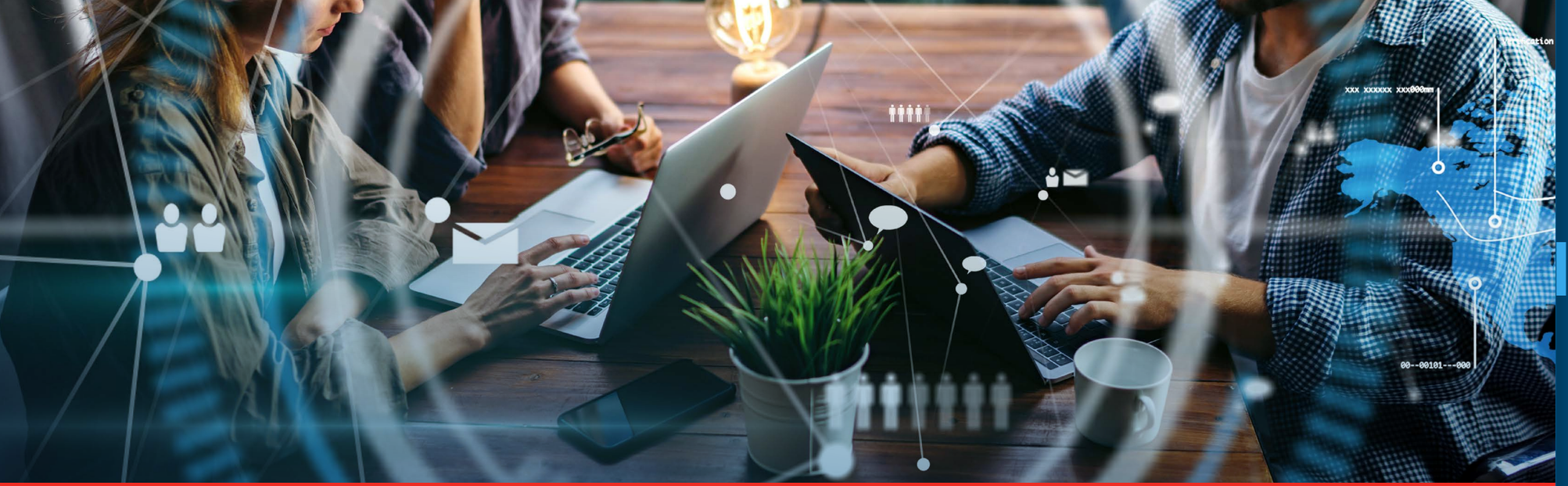
3 STEPS TO START YOUR SMART MANUFACTURING JOURNEY

INTRODUCTION

Small to midsized manufacturers are struggling with a litany of issues impacting all aspects of their businesses today. Supply chains disruptions, a growing skills gap, and increased global competition are making it hard for manufacturers to remain profitable and grow their businesses.

Achieving greater efficiencies with less resources and people, and conquering the problems that that can stall production requires that small to midsized businesses (SMBs) adopt Smart Manufacturing initiatives, and the good news is they can start today without a huge initial investment.



WHAT IS SMART MANUFACTURING?

Smart Manufacturing—also called the Industrial Internet of Things (IIoT), Industry 4.0, smart factory, connected factory, factory of the future, and digital transformation—essentially involves extracting, monitoring and connecting data from industrial equipment and its related processes in real-time to optimize production and maintenance.

With machinery and processes connected to a Smart Manufacturing network, manufacturing executives and leaders can make the crucial decisions faster because they have 24/7 access to real-time data from their shop floor. Identifying and fixing issues quickly leads to increased agility, accuracy and efficiency, which helps reduce risks and lowers costs.

STEP 1:

EMPOWER WITH DATA BUT NOT TOO MUCH TO START.

The value of Smart Manufacturing lies in collecting and analyzing data that's flowing in from various data-enabled machinery and devices on the shop floor and then acting on those insights to make improvements to production and maintenance processes. That data is very useful, but when one machine can send thousands of different data points per second, it becomes impossible to analyze. First you have to determine what data is valuable and worth collecting.

For instance, a machine within a manufacturing process that is producing parts on the shop floor can send hundreds of different data points per cycle. Of those data points, the user needs to decide what are the 5 to 20 data points that are worth collecting. The user also needs to decide how often it makes sense to capture it. For example, there may be data points a user may want to monitor at certain times, such as the pressure yield within the machine barrel when first putting plastic into the mold during injection molding. An evaluation of the peak pressure during this time can help determine that the plastic has been correctly melted, that the mold is at the right temperature, that the mold is functioning correctly, and that the part is made to specifications.

The data being collected will also need to live somewhere and, of course, the more data collected, the more the storage costs increase as well as the time spent having to examine it all. If a user finds they are examining data with very little gain, it may reduce further uptake and buy-in from the business.

STEP 2:

START SMALL. THE SMALLER THE BETTER.

Rather than implementing Smart Manufacturing across the entire factory and then looking for problems to solve with the huge influx of data streaming in, start small with an immediate problem that has been difficult to solve. Alternatively, identify the critical processes in a production line that you'd like to measure to gain insight. If 80% of a factory's revenue comes from 20% of the equipment, start by measuring the inputs and outputs of these critical processes, which are key to the success of the business. This will provide greater gains than measuring everything to start with.

For example, ABC Plastics, a manufacturer of electronic enclosures, determined which machines or machine lines produce enclosures that earn the most income for the company. Selecting just a couple of machines to collect process data, they determined, together with the process engineers, the peak pressure, cycle time, fill time, shot size and cushion that provide the best information to ensure a part is made correctly and any irregularities are easily spotted. The company recognizes that while it could collect data from 60 or 70 processes, collecting data from just a couple of processes provides them with the greatest insight with the least amount of data.

Starting small and selecting those critical areas that matter the most to the business will provide a manageable start for a Smart Manufacturing journey. Once that first critical process has been proven, the user can use the lessons learned for the next implementation and keep moving forward. Additionally, by limiting the scope to start with and proving out as quickly as possible, will also mean more successful buy-in from the rest of the business.

STEP 3:

DATA IN THE RIGHT CONTEXT

A trap that companies often fall into when embarking on an implementation is thinking they need to monitor everything within their industrial environment. The result is a huge influx of data, but often this data is meaningless without any context. Data has to be considered in the context of how it is going to be used. On its own it will not provide all the information needed to make decisions; it's the context that changes the meaning of that information.

Using a process monitoring system as an example, the more context that is embedded with that information, the better conclusions can be drawn from it. For instance, there could be a variety of reasons for the power consumption of a particular cutting machine, which starts really low and then rapidly rises. Is it because the machine is heating up during the day? Or is something in the machine rubbing? Or is it because it changed jobs? Or is it down to a higher load on the spindle?

Just monitoring the process itself doesn't provide any information to help uncover the underlying reasons, but if a user knows that this machine is making a particular widget in a particular way, they can start making various comparisons and inferences based on the data. Whereas without that context, they will merely have to rely on assumptions.

Another example is monitoring the cycle counts. Knowing how many times a machine cycles during a shift or a day or a week is in itself not that useful. It may be cycling at a certain rate but is it producing quality parts? With an ERP system, such as DELMIAWorks, users can start getting real-time Overall Equipment Effectiveness (OEE) information fed in for each machine. If, for instance, there are two machines and the data shows that a particular job runs better on one of them, the user

can run the best data to autoload the schedule so that the job always runs on that machine. The result being that the production operation runs faster overall.

As a result, monitoring one process variable when combined with the proper context can produce major improvements. Continuous improvement can be implemented around the results that are shown. A key example of this is unplanned downtime. If the user knows the reasons why a machine is down, they can start looking at corrective actions, such as preventative maintenance. Data in the right context may also drive the user to redesigning a part completely because there may be something not quite right with it structurally or with the materials used.

The power of data in the right context is that it keeps multiplying the value gained from Smart Manufacturing. Tying smart manufacturing data to the metadata of the business itself means that the user will gain greater insight, the benefits of which will be felt across the entire business.

TIME TO GET STARTED

There's no better time to start your Smart Manufacturing journey as increased agility, efficiency, accuracy and a reduction in downtime can help all manufacturers be more competitive and profitable. Many smaller manufacturers and SMBs, however, have yet to implement Smart Manufacturing as many perceive that it will entail radical change and disruption to their operations, as well as a steep investment.

By taking Smart Manufacturing one step at a time and bearing in mind certain considerations, the benefits of Smart Manufacturing can be realized. While it will, of course, take an initial investment to get started, this investment will prove to be a fraction of the cost that's been experienced due to downtime, low quality and inefficient manufacturing.

Are you ready to learn more? Be sure to download **How Real World Manufacturers are Using IIoT Today**

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