IS *MES* THE "*SILVER BULLET*" TO BECOME A TRULY DATA-DRIVEN MANUFACTURING ENTERPRISE?

Today there are several pressing reasons why manufacturers need to act now to become data-driven organizations. At the most fundamental level — data helps manufacturers become better at what they do. Let's look at some tangible ways how data helps connect the dots in driving smart, sustainable and resilient operations:

Energy efficiency
Data helps to operate machines and mixing recipes as efficiently as possible.

Sustainability progress
Collecting relevant ESG data for reporting enables transparency of sustainability improvements and regulatory compliance.

Knowledge preservation
Capturing invaluable expertise of an aging workforce ensures business continuity.

Product quality
Data helps to control production processes more granularly and guide operators better in optimizing machine settings, leading to better quality and efficiency.

Customer experience
Better products lead to happier customers.

Rework and wastage
More first-time-right (FTR) production eliminates the need to repeat unnecessary additional steps, reducing cost, wastage and labor.

Data needs to be accessible and fit-for-purpose

Given the wide-ranging benefits, many manufacturers are exploring how to become truly data-driven enterprises. In my work with manufacturing clients, I find that, broadly speaking, there are those that develop an organization-wide data repository as a foundation to begin their data journey. Others explore and develop experience in advanced data analytics, including machine learning models, to improve product quality and asset performance. While this is a promising start, many falter on the next steps. Where do we go from here? How do we scale successful data initiatives and expand them to other locations?

While there is no shortage of data, data silos across people, processes and machines make accessing and integrating all relevant data difficult. Differences in data historians*, definitions and management frameworks result in data that is not usable, traceable or comparable across assets and plants. Critical information that provides valuable context to machine-generated data may even be "lost" in spreadsheets or other documents.

Here's where a manufacturing execution system (MES) comes in. According to the Manufacturing Enterprise Solutions Association (MESA), an MES is a dynamic Information System or application "that drives the execution of manufacturing operations, and by using current and accurate data, MES guides, triggers and reports plant activities as events."

An MES has two crucial roles to play in a data-driven organization. The first is to collect data in a way that it can be processed to provide insights. An MES gathers data from all the machines and operators and makes the data comparable across plants, production units and machines by standardizing aspects like energy consumption data and reason codes for machine breakdowns. Access to comparable data across plants and machines hugely accelerates the ability to benefit from advanced analytics. The second crucial role is as the interface back to the shop floor. Once you have all the data and use it to optimize processes — from energy efficiency to quality — the MES sends the data back to the machines and production process. Here's where the rubber meets the road. Updated, optimized machine settings are communicated to machine control systems through the MES or displayed to operators to guide them in fine-tuning the production process.

An MES is essential to close the loop — from data to analytics to the production process.

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A data historian is software that automates the collection of time-series data from sensors across the plant for operators and engineers to use as and when required.
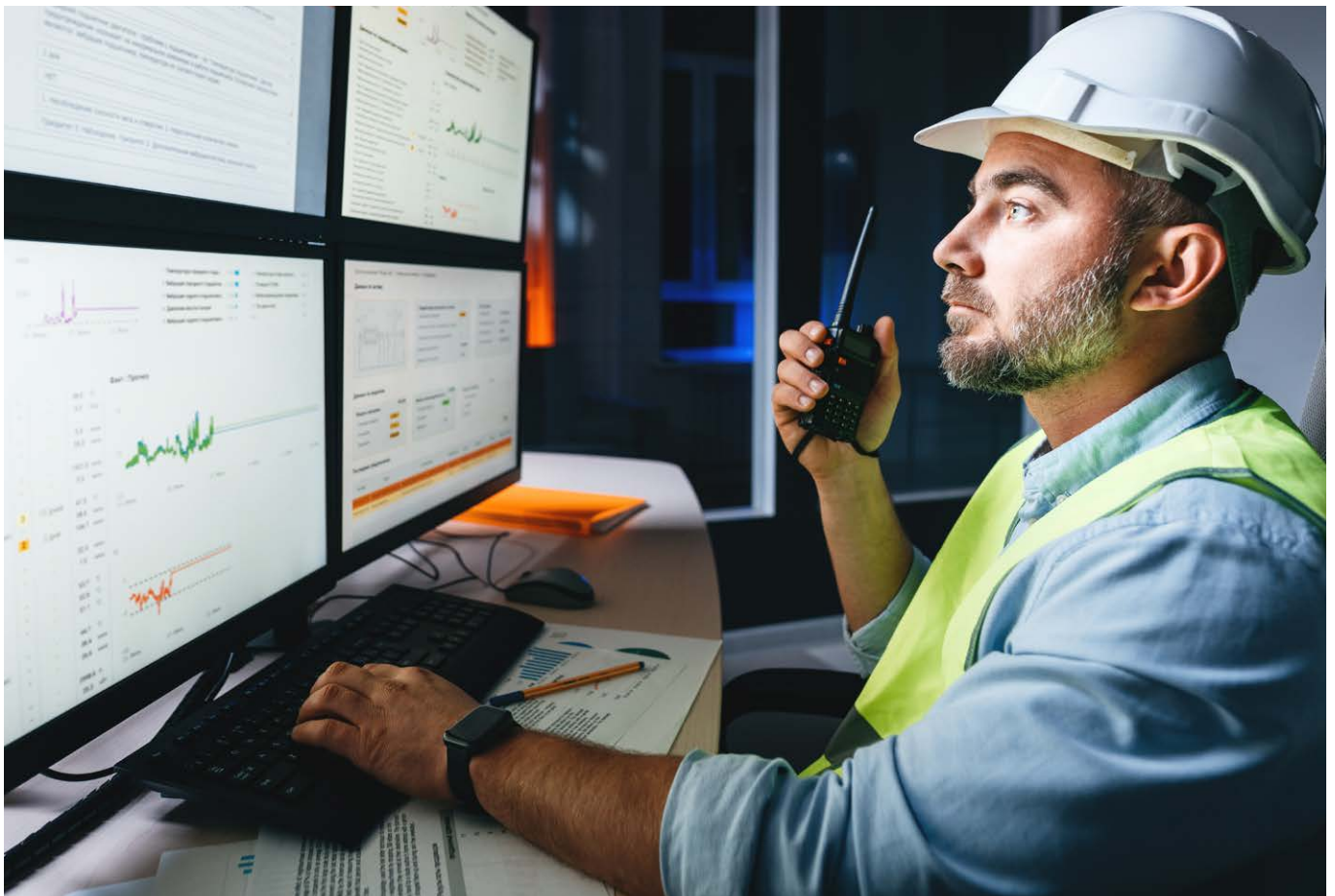
Key benefits of an MES

An MES ensures manufacturers have the right information and insight to make the best possible business decisions and improve performance levels across the supply chain. Apart from being the starting point for implementing data-driven manufacturing, the top five benefits of an MES include the following:

Improved quality control typically leads to a reduction in product defects.

Faster identification and implementation of changes to the production process based on evolving market, customer and business needs.

Faster deployment of innovation as a result of comparable processes and MES implementations across all your sites.

Less work in progress (WIP) and reduced lead times through better operational visibility and control.

Significant reduction in data entry time, paperwork and typing errors through automatic and on-the-spot data capture.

Critical success factors for implementing an MES

- **Secure organization-wide buy-in** so that everyone in the organization (not just the OT department or a few plant managers) understand the rationale, the program's size and scale, as well as the required resources and change management.

- **Get your data in order** by connecting or replacing existing historians, making sure all data definitions are clear and a governance structure is in place, including data ownership.

- **Don't boil the ocean** by starting with the basics, such as monitoring production orders and gaining better visibility of your production process.

- **Ensure you have the right talent pool** for making sure you assign or hire the right people with the skill sets to run an MES or collaborate with a trusted partner that has the skills and capabilities to support you or, ideally, a combination of both.

Unfortunately, there are no "silver bullets" or known shortcuts to improve your manufacturing performance; however, implementing an enterprise-wide MES is one of the most prominent must-haves and a key step in becoming a data-driven manufacturer.

Connecting the dots in manufacturing involves leveraging various strategies to facilitate data-driven innovation and collaboration. Encouraging collaboration between different departments, supported by strong relationships with suppliers and customers, enable data sharing opportunities. Collaborative platforms and shared data repositories drive supply chain visibility improvements as well as demand forecasting and product development. By adopting these strategies, manufacturers can connect the dots between data-driven innovation and collaboration, enabling them to drive efficiency, quality, and competitiveness in their operations. ■

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