DRIVE RESILIENT EXECUTION IN INDUSTRIAL EQUIPMENT MANUFACTURING

Modernize the shop floor with Manufacturing Operations Management for efficient and resilient manufacturing execution

RESILIENCY RELIES ON RADICAL TRANSFORMATION

With the rapidly increasing pace of innovation and change, Industrial Equipment manufacturing companies need to be more resilient than ever in their operations. Digital innovation is essential as global disruptions and instabilities impose the need and opportunity for growth amid shifts in supply, demand and customer expectations for digital-first experiences[1].

> **"Disruption isn't about what happens to you, it's about how you respond to what happens to you."**
>
> Jay Samit, Serial Disruptor, Bestselling Author and Keynote Speaker

The goal of manufacturing resiliency, driven through digital transformation, is based on agility, flexibility and sustainability. Agility in responsiveness to the unexpected and the flexibility to pivot are essential to enable growth and innovation when opportunities are presented by disruptions. These require a forward-looking mindset and scalable digital infrastructure that supports business goals. Lastly, sustainability refers to resource preservation throughout operations and decreasing global carbon footprint. These elements are the foundation for new innovation and operational improvements to create sustainable, profitable growth.

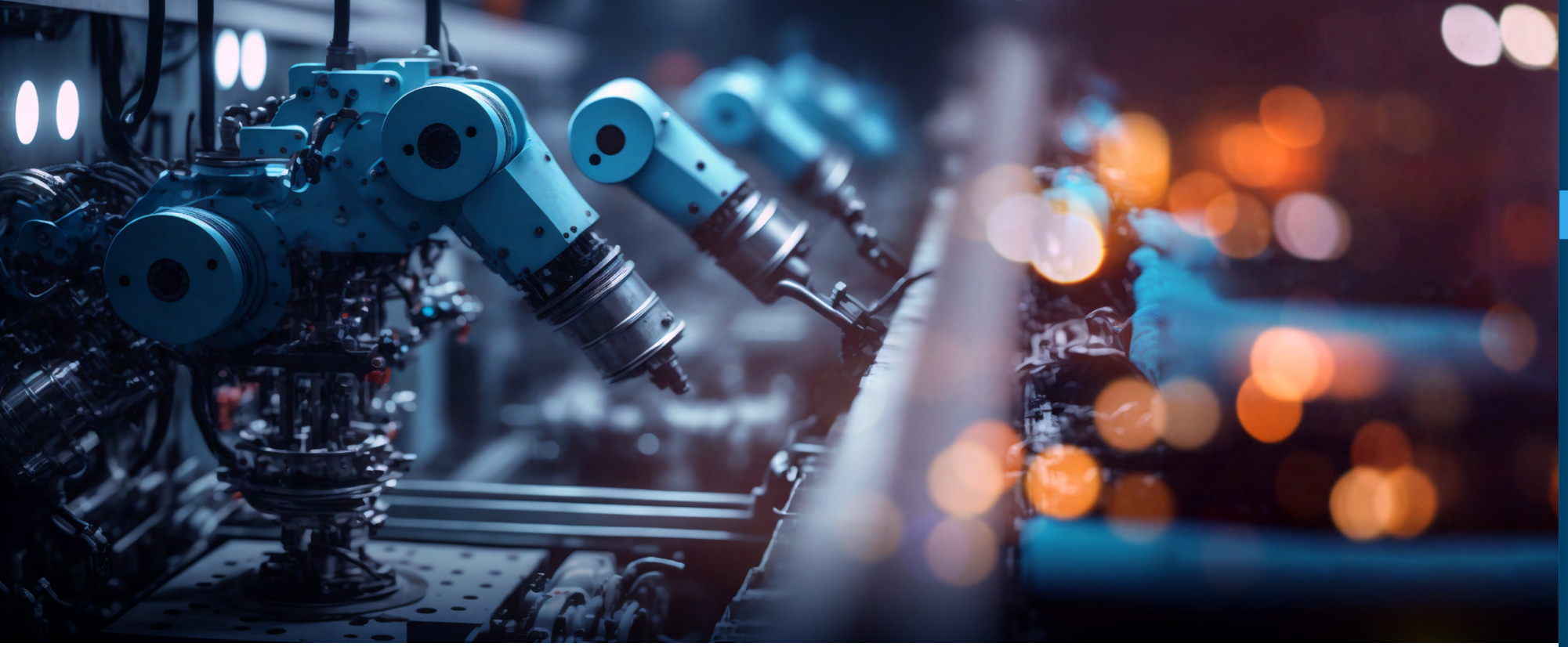
[1] Betti, Francisco; de Boer, Enno and Giraud, Yves. McKinsey & Company. "Operations Practice: The manufacturers lighting a path to sustainable growth" (March 2021)

This can be achieved through digital transformation. Many manufacturers are starting transformation initiatives in different areas of industrial engineering or the supply chain domain. However, few have addressed the transformation of their shop floors with a modern manufacturing operations management (MOM) solution for their factory of the future. MOM goes beyond traditional manufacturing execution systems (MES) as it involves automating, executing and managing the performance of all business processes relevant to manufacturing execution, which includes manufacturing production (MES), quality, warehousing, the workforce and maintenance.

While it is well recognized that investment in these systems is necessary to stay competitive, the challenge is to determine the right fit that can help you simultaneously maintain high levels of throughput, quality and customer service—while creating opportunities for sustainable innovation.

This eBook illustrates:

- **Key trends and challenges in Industrial Equipment manufacturing and operations today**
- **The value of manufacturing operations management (MOM) in addressing these challenges and trends, and in building operational resiliency**
- **The advantages of a well-formed MOM strategy and critical considerations on the path to transformation**



TRANSFORMATION DRIVERS IN INDUSTRIAL EQUIPMENT MANUFACTURING

Key trends in manufacturing and operations

The scale of disruption that hindered many industries in the last two years has led many companies to realize that the legacy systems and processes they rely on in manufacturing and operations were inadequate. The world faces a New Normal that presents new market opportunities but also increasing complexity and constraints, which require companies to rapidly modernize, innovate and adopt new technologies in order to build a competitive advantage. This directly translates to increasing market opportunities for Industrial Equipment manufacturers as other industries seek to expand their own production capabilities, modernize processes or expand operations.

However, in order to seize the opportunities created by the forecasted market growth, Industrial Equipment manufacturers also need to modernize in order to overcome new industry challenges as well as long-standing ones that have been amplified by recent global disruptions. This raises the urgency for companies to pay close attention to and act on the growing trends to ensure resiliency and business continuity:

Industrial Equipment Business Trends

Production of One

Rising customer demand for customized products require manufacturers to be more flexible and agile.

Self-aware Software Driven Systems

Having a smarter, more connected system supports autonomous equipment to improve production performance.

Enterprise Agility

Agile enterprises can respond quickly and effectively to changes in market demand and increase the speed of delivery.

Product as a Service

Product as a Service offers more effective business operations and a simpler financial model based on pay-per-use or pay-per-outcome.

Enterprise Risk Planning

In a highly disruptive business environment, more effective risk management has become a necessity for companies.

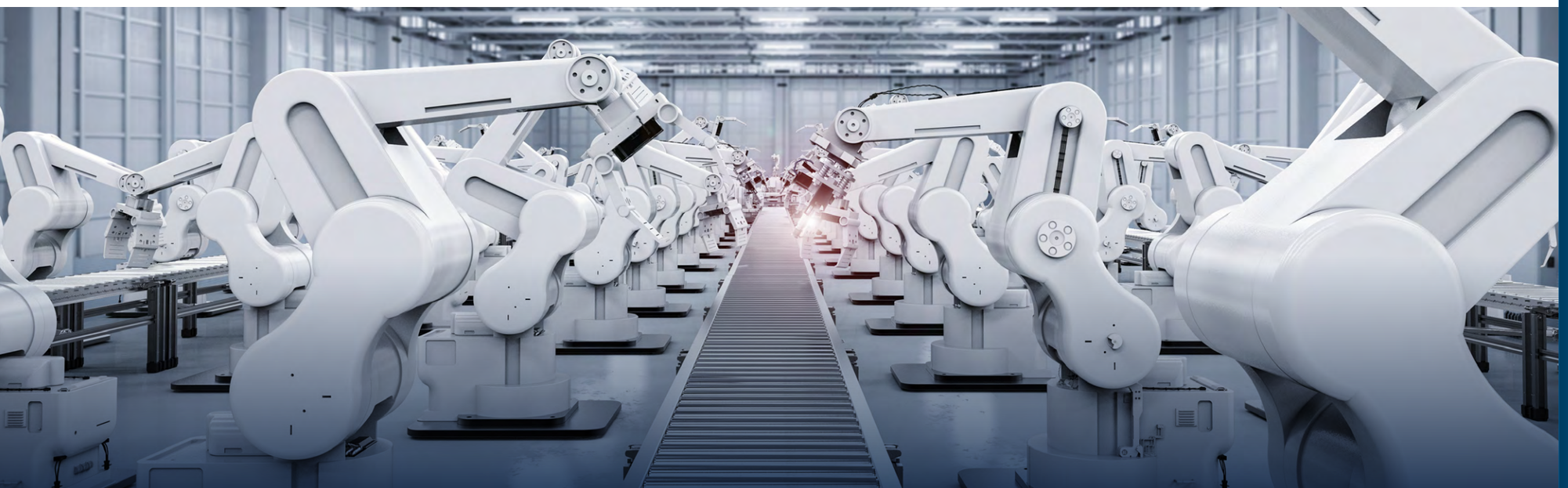
Circular Innovation

With the world shifting towards sustainability, companies need to meet the increased demand for sustainable equipment and products.

Industrial equipment manufacturing challenges

The general sentiment across businesses of all disciplines is that disruption will be part of the "next" normal. In response, manufacturing leaders must consider concerns from an enterprise perspective, the challenges of which revolve around the lessons learned in 2020. As many manufacturers discovered, the disparate, siloed manufacturing systems that permeate their shop floors lack the digital agility to meet today's business needs, which result in these challenges:

- Lack of synchronization between planning and manufacturing across the organization
- Increasingly complex manufacturing processes and ecosystem that complicate both operations and decision making
- Organizational silos that hinder visibility and effective collaboration between stakeholders
- Difficult to manage resources (people/materials) to the project tacks and deal with changes (escalations, interruptions, absences)
- The lack of an integrated platform hinders the sharing of best practices for efficient execution
- Inability to plan across longer planning horizons to ensure resiliency to disruptive events
- Lack of agility and real-time visibility hinders organizations from responding quickly to mitigate disruption
- The retirement of deeply experienced senior workers leaving a significant workforce gap
- Increased employee turnover with high job demands and reduced available workforce
- Negative public perception of manufacturing as an antiquated and unattractive line of work



At the plant level, the tactical challenges are no less important but are equally frustrating, with several conflicting goals to balance for a smooth and efficient production process. Figure 1 highlights some of the questions asked daily on the shop floor of a manufacturer that has not transformed its business in terms of digitalization of manufacturing processes.

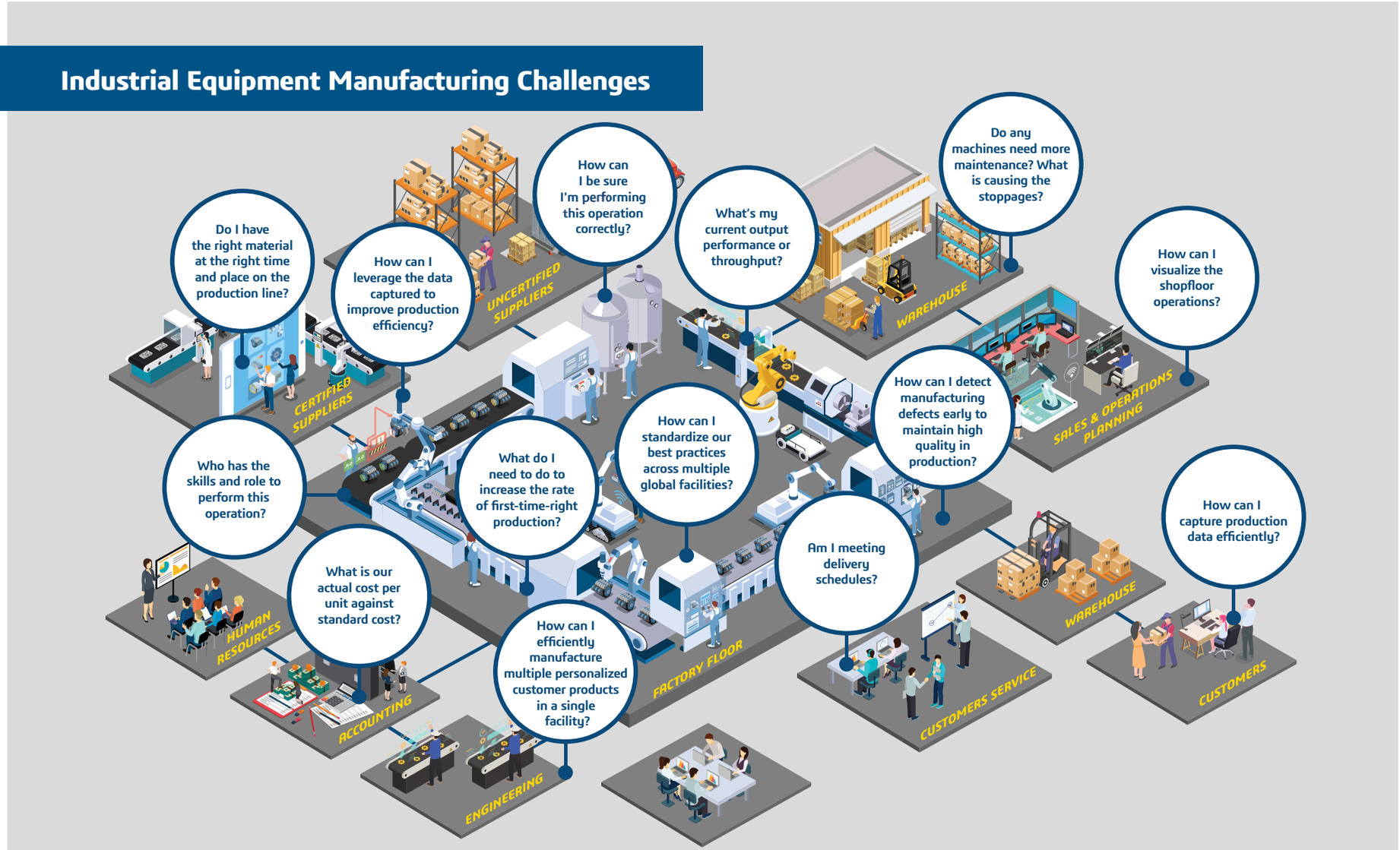


Figure 2: Plant-level manufacturing challenges

Increasingly, companies are looking for and realizing the value of more dynamic environments that can change quickly and enable agile operations. In manufacturing, products must now be developed and delivered faster than ever with **greater personalization** and **complex specifications**. To remain competitive and to stay in business, design, execution and planning systems must be seamless to compress time to market and be 'change-ready'.

According to IDC, the growing trends and challenges are driving significant opportunities in the digital operations space and require new approaches and capabilities:

TEN SIGNIFICANT DIGITAL OPERATIONS OPPORTUNITIES

OPPORTUNITY DRIVERS

- DASAMASA (Design Anywhere, Sales Anywhere, Manufacture Anywhere, Support Anywhere)
- Develop innovative autonomous equipment
- Deliver mass customization
- Define new business models
- Increased focus on sustainability
- Build more resilient operations

OPPORTUNITIES

- Sales & Operations Planning
- Master Production Planning
- Equipment Virtual Build
- Part Fabrication Process Engineering
- Additive Manufacturing
- NC Programming & Simulation
- Robot Programming & Simulation
- Manufacturing Control Tower
- Production Scheduling
- Material Synchronization
- Production & Maintenance Execution
- Quality Execution
- Lean Operations Management

While Industry 4.0 brought automation and incremental change, the vision of a smart, connected factory or Factory of the Future extends previous concepts and creates an opportunity for step change. According to Deloitte Insights, a true smart factory can integrate data from system-wide physical, operational and human assets to drive manufacturing, maintenance, inventory tracking, digitization of operations through the digital twin and other types of activities across the entire manufacturing network[5].

The Factory of the Future works to enhance the virtual world with operational experience, capturing all data in operations management to be fed into a digital twin. At DELMIA, we go beyond the digital twin with the Virtual Twin Experience—it captures implicit knowledge, know-how and best practices in the plant and shop floor for the current as well as future workforce. This accumulation of information allows the Factory of the Future to be optimized over time as workers grow, change, move into new positions and learn new capabilities.

WHY INDUSTRY 4.0 OR FACTORY OF THE FUTURE?

More efficient and agile system with less production downtime. Greater ability to predict changes in the facility or broader network, leading to better positioning in the competitive marketplace.

PAST

- 22% of companies embracing digital transformation
- 3 out 4 leaders are willing to adopt emerging tech
- Digital transformation perceived "difficult"

PRESENT

- Inflation and volatile energy prices
- Geopolitical instability
- Supply chain diruptions

FUTURE

- Flexible & robust resource planning
- Increased use of IIoT and robotics
- Heightened emphasis on compliance

Industrial Equipment

45% On-time performance increase

Digitalizing your operations not only enables more agile and efficient production, but can also lead to major cost savings. IDC highlights an example of **expected savings** from operational technology investment over a period of three years for a large manufacturing company.

$750 million in operational analytics

$890 million in operational optimization

$2.7 billion in asset reliability and resiliency

[5] Burke, Rick; Laaper, Stephen; Mussomeli, Adam; Hartigan, Martin and Sinderman, Brenna. Deloit Insights. "The Smart Factory: Responsive, adaptive, connected manufacturing" (31 August 2017)

Why Manufacturing Operations Management (MOM) matters

The hunger for transformation among industry players is at an all-time high. But at the same time, organizations want options that include a lower risk approach to digitalizing the shop floor. Currently, manufacturing leaders are seeking new operational directions as they evaluate their organizational crisis performance, planning a strategic course to support re-shoring activities and acquisitions.

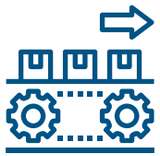
The use of isolated, inflexible solutions tied to physical assets and siloed applications that are local and transactional will diminish. Manufacturers who want to seize opportunities created by disruptions should seek a **connected, scalable** and **sustainable platform** approach—one that is collaborative on a global scale, model based and bound only by the imagination and creativity of their employees. That is the definition of the **3D**EXPERIENCE platform and the DELMIA Manufacturing Operations Management (MOM) solution.

Powered by the 3DEXPERIENCE platform, DELMIA MOM creates a foundation for digital transformation that is unified, flexible, scalable, secure and provides real-time availability to critical manufacturing data for responsive decision-making. A strong MOM environment on the shop floor is at the heart of digital transformation as this is where the product, business and operational functions of the enterprise intersect and is, arguably, where a solid digital platform is needed most.

THE BASICS OF MOM

Though MES and MOM have been used synonymously, the ISA-95 standard has long dropped the MES term, favoring the broader scope of MOM, which, as described earlier, goes beyond traditional MES to include capabilities in Quality, Warehousing and Logistics, Time & Labor and equipment maintenance.

The DELMIA MOM suite offers a solution for global manufacturing operations management. By digitalizing the entire manufacturing process—from design to build to support—our comprehensive MOM solutions enable manufacturers to control and synchronize their operations as a global, best-in-class enterprise. With an emphasis on business process management, unique global management capabilities and robust data collection from any IIoT device, our solution supports multiple manufacturing models from discrete to process and is scalable from the largest of factories to small, niche manufacturers.

DELMIA functional coverage	Capabilities	Advantages
 **Production**	DELMIA Production offers the functionality needed to support today's extended manufacturing environments. As an enterprise solution, it easily adapts to simple or complex manufacturing environments. It allows manufacturers to define, control and optimize operations across multiple sites and functions, while still accommodating site-specific requirements. When combined with DELMIA Manufacturing Process Intelligence, DELMIA Production offers unprecedented levels of visibility and control, including Machine Time Analysis, OEE and many other role-based KPI, report and analytics views.	• Provides global manufacturing visibility • Boosts operational efficiency • Accelerates New Product Introduction (NPI) • Ability to adapt and shift production to demand across geos, while ensuring process standardization
 **Quality**	DELMIA Quality brings a unified approach to managing quality assurance and control across all phases of manufacturing operations—and your entire enterprise. It provides powerful tools for managing quality processes and product characteristics against specifications. Standardizing quality processes across your organization and into your product supply network with DELMIA Quality provides enterprise-wide visibility and control over your entire quality management program.	• Provides global visibility and control • Enhances genealogy, traceability and containment • Facilitates continuous improvement management • Reduce in-house scrap and costs associated with quality issues

 **Warehouse management**	DELMIA Warehouse tightly unifies manufacturing operations with warehouse processes. This unique material synchronization between the warehouse and shop floor enables unprecedented coordination. It directs people and equipment to perform warehouse processes, such as put-aways and cross-docking materials directly to and from production based on real-time status, alerts and replenishment policies. Efficiency and operations performance can be improved while removing idle inventory. Monitoring and reporting is provided on activities ranging from the receipt of raw materials to the shipment of finished goods.	• Synchronizes material flows to production in real time • Improves operations performance and reduces inventory • Enables a demand-driven enterprise
 **Maintenance**	DELMIA Maintenance provides essential capabilities for maintenance management, including the ability to schedule preventive maintenance, manage maintenance calendars, respond quickly to unplanned downtime and manage parts and spares. It directs maintenance tasks while tracking actual time and labor per maintenance work order and enables supervisors to track workloads while monitoring KPIs such as MTBF and MTTR.	• Synchronizes maintenance across all operations • Increases equipment uptime • Improves manufacturing productivity and quality • Reduces maintenance costs • Expands maintenance productivity and effectiveness to offline locations
 **Time & Labor**	DELMIA Time & Labor gathers, manages and validates real-time employee time and labor data as collected and processed during the course of daily activities in all operational areas running DELMIA. It makes this data available to easily review, approve and export into enterprise ERP or Payroll systems.	• Optimizes time and attendance tracking • Enables lean analysis to improve operations by capturing value add and non-value add times • Eliminates paper tracking and manual data entry

BEYOND MOM BASICS: THE CHANGE MAKERS

> **DELMIA is a highly configurable MES/MOM solution that is well suited to discrete manufacturers with multiple factories and manufacturing models distributed around the world."**
>
> Gartner, Magic Quadrant for Manufacturing Execution Systems 2019

On a broader scale, the DELMIA MOM solution is very mature. It goes beyond traditional business process accelerators and functions as a comprehensive and core platform for manufacturing excellence, offering these competitive advantages:

Build on a business process foundation

A key approach to heightening responsiveness while maintaining process consistency and quality standards is establishing a Center of Excellence (CoE) team to configure and distribute process improvements. Together with a global platform for MOM that embeds Business Process Management (BPM), manufacturing leaders can simplify process distribution, governance and monitoring, resulting in greater standardization with less effort.

DELMIA MOM includes Process Builder, an embedded low-code BPM application that enables you to establish and maintain your unique business processes, ensuring the greatest operational flexibility for global change and establishing a strong basis for your CoE. Used in conjunction with Global Process Manager, DELMIA's Process Governance application, it enables you to effectively manage the complete life-cycle of a process. With real-time visibility and control, you can monitor process governance at every facility—for all manufacturing operations. Beyond improving agility, it enables you to reduce IT costs, ensure brand integrity, ease process governance and accelerate time to value to support shifts in production in response to demand changes.

Augmented reality for an ACTIONABLE Virtual Twin Experience

Manufacturing entities are facing unprecedented workforce challenges. Because over a quarter of current manufacturing workers are over 50 years old, some analysts predict there will be over 2 million unfilled manufacturing positions by 2025 due to senior-level workers leaving the workforce. At the same time, increasing product variability and complexity are making new employee onboarding more difficult and time-consuming.

The Augmented Reality (A/R) capabilities provided by DELMIA address the current workforce challenges and provide other significant capabilities and benefits. DELMIA A/R extends the 3D model into operations for visual execution, guiding the operator through complex tasks using various technologies, including mixed reality devices such as Hololens, projection of work instructions onto assembly surfaces, A/R overlays on tablets or computer screens, and other methods. This helps capture "tribal knowledge," improves new employee skill ramp-up, and provides contextualized digital guidance for better operator decision making, increased worker productivity, and satisfaction. In addition, DELMIA A/R provides model-based quality and traceability throughout manufacturing and maintenance operations, automating quality inspections and significantly improving product quality.

Democratize your data

Many industry-leaders use operational intelligence to identify opportunities for improvement and cost reduction. Enterprise Manufacturing Intelligence (EMI) helps improve visibility across global operations, making the right information available quickly, with sufficient granularity and context to empower managers to make better decisions, faster.

DELMIA Manufacturing Process Intelligence (MPI) delivers broad visibility and decision support to achieve and sustain manufacturing excellence. MPI offers consistent, unified views into specific areas of manufacturing operations to facilitate performance comparisons across locations, eliminating data silos for faster insight into problem resolution and performance improvement. Gathering and aggregating clean data quickly is simplified, resulting in valuable analytics and reporting delivered in near real-time. Additionally, MPI lets you modify existing KPIs, measures and analytics and complements your existing enterprise IT landscape, enabling efficient and accurate data collection from almost any third-party solution.

Scalability and flexibility: Manage globally, execute locally

Organizations may have sufficient needs and skills at individual plants to enable innovation at the local level, but also need a strategy that works on a global scale. Most manufacturing IT architectures are too inflexible as a multi-site platform, and too expensive to reconfigure.

With a common platform approach to all operations, you can scale resources, enable centralized management of the system and standardize processes and best practices across sites. This eliminates custom systems and enables scalable continuous improvement initiatives on a global scale. DELMIA MOM helps manufacturers extend their best practices and application footprint without upgrades or integration—increasing flexibility to meet unique process or plant requirements, lowering IT costs and providing a "future proof" model. DELMIA MOM's winning architecture supports multiple manufacturing models and enterprise manufacturing, from large to small manufacturers.

Deployments that make sense

The complexities and costs of maintaining a distributed IT system traditionally increase with more locations, process changes and affected IT systems.

DELMIA supports manufacturers in this process by offering the ability to centrally manage business processes and deploy them to the field—without coding or taking down the system to install new software at each site. This critical capability, combined with the BPM-based global manufacturing platform, facilitates continuous improvement initiatives while enforcing process standardization across sites and supporting site-specific extensions.

CRITICAL CONSIDERATIONS

MOM will continue to drive operations for several years, but will have to evolve and adapt as edge technology and IIoT continue to advance. For a more comprehensive and forward-thinking approach to transformation, you may want to consider these aspects, which are fully supported by DELMIA via the **3D**EXPERIENCE platform.

Cloud and On-Premise

There is a growing movement to put applications in a cloud environment instead of on-premise, and for good reason: lower hardware and architecture costs, less need for on-site technical staff and reduced large capital expenditures for new systems. However, most companies are still hesitant to consider cloud solutions for MOM for a number of, again, very good reasons:

Internet latency:
There is still a degree of inherent latency when working over the Web, which is manageable in many (near) real-time applications like ERP and PLM. However, on shop floors where communication with multiple types of equipment is critical, and the speed of which may need to be measured in micro-seconds, internet latency can be prohibitive to successful shop floor operations. The advent and expanded availability of 5G communications may change this, but in today's environment, internet latency is a significant hurdle.

Communication risks:
Loss of communications with host systems is common. However, shop floor solutions like MOM are mission critical, and losing these systems can be catastrophic to a manufacturing entity. For example, if a Tier 1 automotive supplier providing major sub-assemblies to an OEM on a Just-In-Sequence basis has a system failure that causes the OEM to have to shut down an assembly line, the supplier can be charged tens of thousands of dollars per minute for every minute the assembly line is down. This risk can be reduced by running mission-critical applications on-premise.

DELMIA provides high-availability on-premise applications to alleviate this risk. Some of our customers, namely automotive suppliers, have run on a JIS environment for over 10 years and have not experienced any unplanned losses of their DELMIA applications.

Collaborative Operations

Every manufacturing organization runs on teams and every leader, whether a CEO or department head, wants to be able to make full use of their teams in order to drive improved outcomes for the business. However, traditional team interactions are not truly collaborative, resulting in missed opportunities for problem-solving and follow-up, and could lead to the creation of more operational problems.

DELMIA 3DLean helps manufacturing and operations teams solve those problems by facilitating structured and effective teamwork. A modern, customizable and interactive solution powered by the **3D**EXPERIENCE platform, 3DLean gives managers the ability to capture, monitor and track operational meetings on the shop floor by providing visibility across operations, accountability from all team members as well as improved collaboration. The solution brings Lean practices to the shop floor as an integral part of operations by providing a digitalized solution that empowers managers and teams to communicate, organize and solve problems more effectively. 3DLean breaks down organizational barriers as well as geographic barriers in today's distributed manufacturers, and allows each team to take the right actions, cascade decisions to stakeholders and collaborate seamlessly regardless of their role or location.

IIoT

The Industrial Internet of Things (IIoT) is maturing and brings with it a major realignment of how and where IT is used throughout manufacturing operations and decision-making. As devices become more intelligent, a new data and system architecture will emerge that will flatten existing hierarchies, provide the capabilities to send data from anywhere to automation to anywhere and enable next-generation business applications. The advent of digital transformation has boosted interest in MOM as a starting point for integrating factories into IIoT platforms. IIoT initiatives encourage manufacturing leaders to examine their current state of automation and MOM deployment to plan for digital transformation[6].

However, implementing IIoT comes with its own shortcomings, with 75% of IIoT projects facing challenges in terms of digital acceleration[7], due to these obstacles:

- The use of older equipment with little to no connectivity
- Big data challenges around capturing, storing, analyzing and contextualizing data
- IT and OT, developed separately, need to securely integrate without data loss
- Constant need for uninterrupted connectivity
- Challenges in identifying achievable KPIs
- Retirement of experienced workers, which is expected to create a skills gap

[6] LNS Research. "Jumpstart Digital Transformation with MES: The Road to Manufacturing Operations Maturity in the IIoT Age" (15 March 2019)
[7] Klubnikin, Andrei. SoftEQ. "75% of IoT Projects Fail. Here's What You Could Do to Avoid This Scenario" (11 March 2020)

A key issue contributing to these shortcomings is that IIoT and MES/MOM projects are often siloed, run by separate teams with little or no interaction. IIoT achieves maximum benefit when the data collected is contextualized in a business process and actionable. DELMIA's MOM both contextualizes collected or traced data and initiates actions in response to issues identified by IIoT and other data sources. In essence, **MOM delivers the promise that IIoT promotes**. To run the projects separately at best sub-optimizes the results, and at worst leads to project failure.

Additionally, a key consideration is determining the long-term vision for IIoT in manufacturing. LNS Research breaks this down as the **"seven lives of MOM"**, which are:

Life 1 **No MOM**

Life 2 **Traditional monolithic MOM**

Life 3 **Cloud-based MOM**

Life 4 **Distributed modular MOM**

Life 5 **The "transitionary life of MOM" – IIoT platform with some MOM applications**

Life 6 **MOM applications on IIoT**

Life 7 **No MOM, but efficient, flexible factories run by people and systems that are continually learning and improving**[8]

[8] Hughes, Andrew. LNS Research. "The Seven Lives of Manufacturing Operations Management (MOM)" 16 March 2017

[9] Hughes, Andrew. LNS Research. "Can MES Jumpstart Transformation for Industrial Organizations? Seventh Life of MOM – Refined" 30 March 2021

The long-term future calls for a scenario where "the functionality previously implemented in MOM systems would be distributed as apps across an IIoT platform.[9]" This would seem to discount the importance of MOM, however, it has been acknowledged as an unrealistic near-term goal for most organizations. In fact, approximately 80% of organizations are still at Life 1, while the rest are mostly at Life 2.

A more viable path suggested by LNS Research is to select an MES system that can be installed with a few functions but solid data connectivity, which is a good strategy for smaller companies. For larger organizations, the most optimal solution is to **invest in a MOM platform that is flexible, modular, scalable and provides strong data connectivity**. This enables companies of any size to start small with a few modular functions, integrated with IIoT from the start. They can expand modularly to grow capabilities that meet near-term needs and transition to the subsequent "lives of MOM" while receiving value at every step without discarding the modular solutions that have developed over time. This approach provides both short-term benefits and a "future proof" long-term solution—which is precisely what DELMIA MOM and the **3D**EXPERIENCE platform from Dassault Systèmes provide.

REAL-LIFE IMPROVEMENTS IN MANUFACTURING EXECUTION THROUGH MOM IMPLEMENTATION

CenterLine, a producer of robotic weld guns, index tables, fixtures, turn-key automation products and cold spray systems, sought to correct its lack of data cohesiveness.

CHALLENGE

- Factory setups can be very expensive, especially when a manufacturer needs to fix design errors after built-out systems have already been physically installed.
- Careful planning is required to avoid operational errors or accidents between machines and human workers.

STRATEGY

- CenterLine sought to optimize their robotic work cell designs through digital simulation before the actual deployment of physical equipment on factory floors.
- They implemented DELMIA on Dassault Systèmes' **3D**EXPERIENCE platform to virtually simulate products, processes and factory operations for optimized robot movements, plant layout, material flow and ergonomics.

RESULTS

- Since implementing DELMIA for every robotic work cell, CenterLine has **reduced tooling-related issues and rework** by up to **90%** and **programming time on the floor** by up to **75%**.
- Time saved through simulating robot arc welding tool paths has **improved productivity by 15%** and **shortened the time to market** for simulation and design by **15-20%**.
- As a single source of truth for different CAD data, **3D**EXPERIENCE allows leaders at CenterLine to **focus on day-to-day operations** instead of managing data and products.

Click here to read the full customer story.

The **Yamazaki Mazak Corporation (Mazak)**, a leading producer of machine tools to support manufacturers worldwide, needed a solution to help them reduce the need for physical prove-outs, which were costly and time consuming.

CHALLENGE

- Physical prove-outs of final machine assembly and machine behavior in the casting process definition were very expensive and time consuming.
- The company wanted a digital solution that would reduce their need for physical prove-outs.

STRATEGY

- Mazak implemented DELMIA solutions to aid them in Assembly & Manufacturing Planning as well as Machining.
- The newly implemented solutions enabled them to enhance 3D pocketing operation definition, minimize 2D pocket side finishing motion and carry out process simulation and validation of machine final assembly.

RESULTS

- With digital validation of machine final assembly, Mazak effectively **reduced the need for costly reworks**.
- The company saw a **30% reduction in 3D pocketing** operation definition and optimization, saving them precious time.
- Engineering and manufacturing integration unlocked **instant access to design changes**; the sum of all implemented process changes resulted in **improved production throughput**.

Click here to read the full customer story.

CONCLUSION

By now, it is clear that MOM is key to manufacturing excellence. Starting with a MOM implementation can prove to be a low-risk, high-value entry point for digital transformation and to modernize the shop floor environment for improved performance, a competitive edge and to better manage disruptions. Leveraging DELMIA MOM on the **3D**EXPERIENCE platform, you can unlock the potential for greater levels of manufacturing efficiency, productivity and profitability. Implementing MOM with DELMIA and the **3D**EXPERIENCE platform allows manufacturers to:

- **Build on a business process foundation to increase responsiveness to change to support new manufacturing strategies such as on-shoring**
- **Maintain process consistency and quality standards**
- **Enforce standard processes while improving employee efficiency and product quality using Augmented Reality**
- **Democratize data to improve visibility and enhance performance**
- **Centrally manage business processes and flexibly deploy them on a global scale**
- **Incorporate critical complementary technologies to further enhance manufacturing execution**

The result is improved agility and expanded continuous improvement across the enterprise and extended global supply chain, bringing your organization closer to manufacturing and operational resilience.

Business Value Created with DELMIA MOM

- **50%** Production Lead Time
- **40%** Stock Level
- **50%** Customer Service Level
- **60%** Time Spent Planning
- **100%** Plan Execution Progress Tracking
- **10%** Productivity

Operational Benefits	IT Benefits	Business Benefits
• Fast reaction times • Synchronized data across systems	• Seamless integration (native) • Clean high-quality data	• Lower planning effort, lower costs • Agility for Industry 4.0

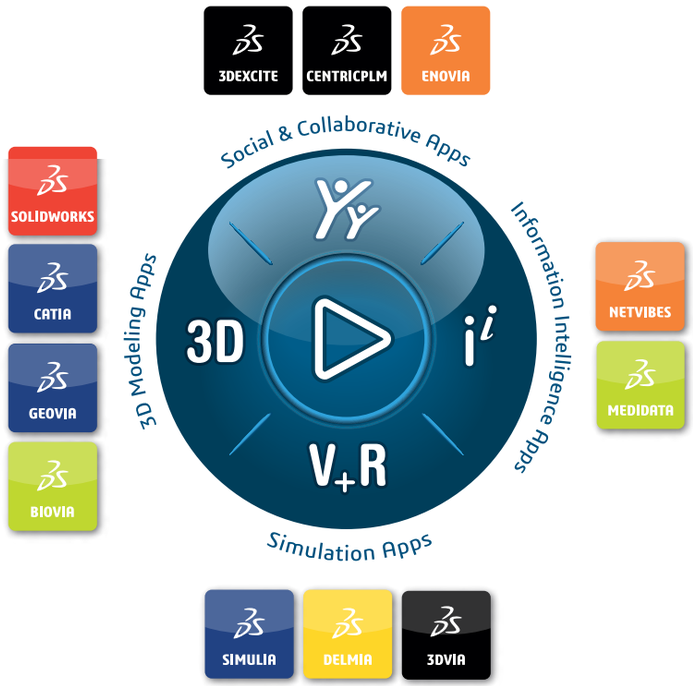
Learn more about our solutions for manufacturing at:
https://www.3ds.com/manufacturing

Continue the conversation with your peers in our **Global Operations community**.

Our **3D**EXPERIENCE® platform powers our brand applications, serving 11 industries, and provides a rich portfolio of industry solution experiences.

Dassault Systèmes, the **3DEXPERIENCE** Company, is a catalyst for human progress. We provide business and people with collaborative virtual environments to imagine sustainable innovations. By creating 'virtual experience twins' of the real world with our **3DEXPERIENCE** platform and applications, our customers push the boundaries of innovation, learning and production.

Dassault Systèmes' 20,000 employees are bringing value to more than 270,000 customers of all sizes, in all industries, in more than 140 countries. For more information, visit **www.3ds.com**.



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