



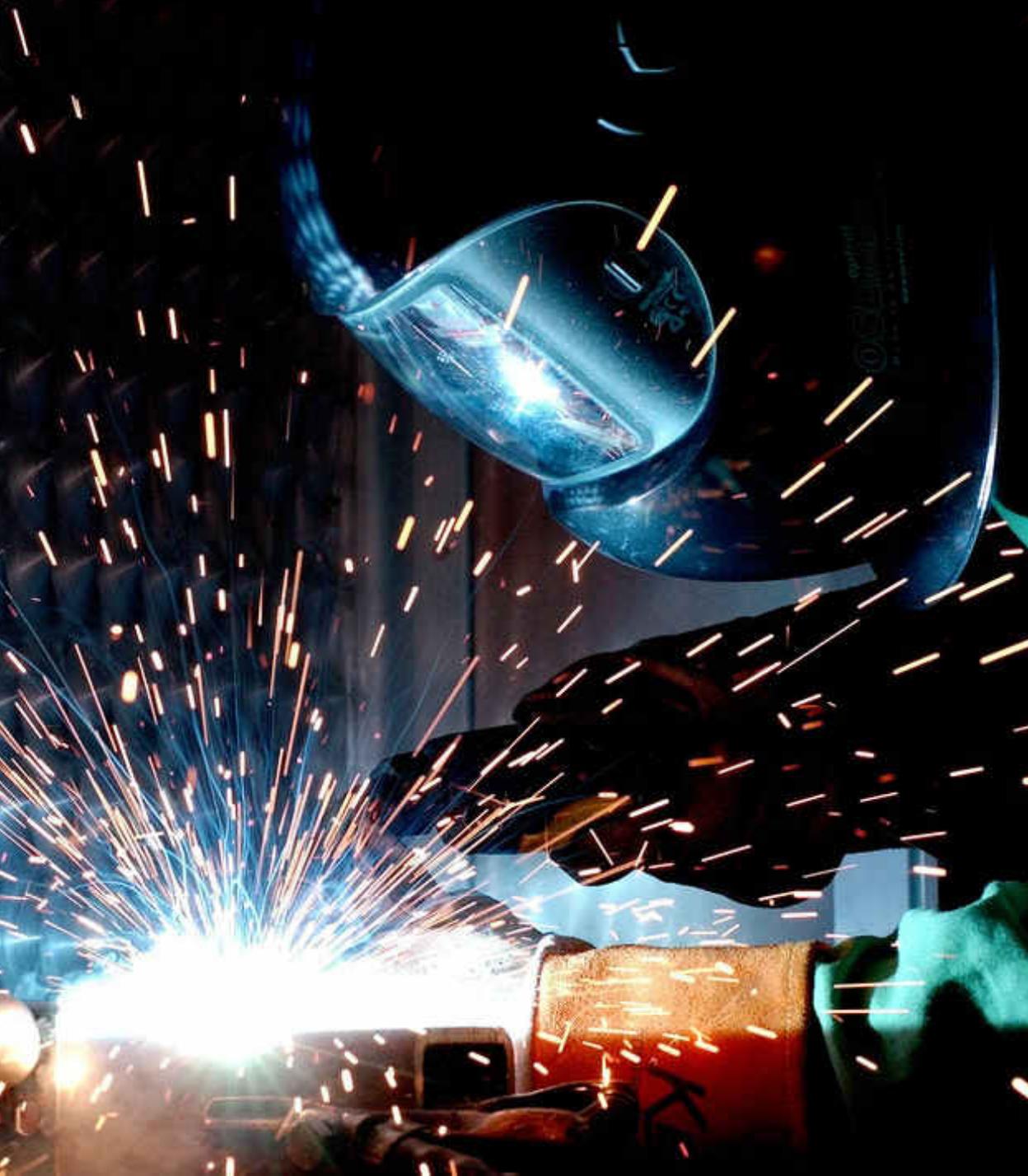
Industry 4.0

Integrating with PLM & MOM/MES

 +1-855 XDI-TEAM

 contact@xdinnovation.com

 www.xdinnovation.com



Smarter Manufacturing was already transforming manufacturers' operations before the pandemic. Now transformation is spread between those who have and those who haven't.

Even in those countries where COVID-19's effects have arguably turned the corner, significant disruption looks to remain in place for months to come:

- sudden materials shortages are common
- steep drops in demand
worker unavailability

However, even before the pandemic inconsistencies were becoming more common. The long-term question, has to be:

How will manufacturing and supply chains look after COVID-19?



Immediate Responses

Keep it fast, agile, digital & people orientated

Industry leaders are leveraging Industry 4.0 technologies: visibility and automation are central to supply chain and people disruption care of the crisis.

Fast & Agile is the name of the game - Manufacturing Intelligence & efficient operations, care of quickly implemented systems/applications and Industry 4.0 Technologies.

- connectivity, data, computer power (IoT, sensors, Cloud)
- advanced analytics & intelligence (ML, AI)
- human-machine interaction (VR/AR, Robotics & Automation)
- advanced-manufacturing technologies (3D Additive Manufacturing, Nanoparticles)

They're all helping companies move their operations ahead of the rest in everything from production efficiency to product customization, with improvements in speed to market, service effectiveness, and new-business model creation.



The 'Haves' Have It All

The 'Haves' have succeeded by innovating around a new operating system, including how they manage and optimize businesses and processes, transform the way people work, and use technology.

These new operating systems can become the blueprint for modernizing the entire company operating system (People, Process & Technology).

The 'Haves' show amazing diversity. They arise across industries, sectors and geographies. Leadership in smarter manufacturing is open to anyone willing to commit to it.

Several factors differentiate these organizations. Most importantly, they're leading the way through their adoption of critical 4IR technologies, including digitization, automation, advanced and predictive analytics, virtual and augmented reality, and the Industrial Internet of Things (IIoT).



Manufacturing @ Scale

These new fast & agile manufacturers work across four dimensions at once:

- business processes,
- management systems,
- people systems,
- IIoT and data systems.

New Product Opportunities Unleashed

The opportunities unleashed by smarter & more personalized products are seemingly endless for any company seeking game-changing innovation or new levels of efficiency.

However, product companies need to climb aboard fast, to ensure they are not left behind in the quickly intensifying and accelerating product market.

Smart products emerging across industries are already having a unprecedented impacts on product development, manufacturing, marketing, sales and the customer experience. When properly implemented and personalized, smart products not only bring great insight

in product usage across the value chain, but they also advise continuous product improvements and influence strategic moves into connected and/or radically adjacent markets.

The development of these smart products requires the intelligent connecting of engineering processes across the ecosystem.

That's what I call PLM & MOM 4.0.

Overhauling your existing PLM/MOM architectures and end-to-end digitalization of the entire product lifecycle is what it takes.

Let's get on top of those challenges!



PLM & MOM 4.0 Macro Challenges

The 4IR brings new ideas built on new technologies, a new speed dynamic and agility to the industry marketplaces and as a result enterprise needs to master the strategic challenges associated with new product lines:

- Each sector is evolving and seeing the arrival of new products, services and business models that leads to ever increasing competition. Enterprise must continue to innovate and push the boundaries of its product lines. New PLM product innovation platforms that stretch across the entire ecosystem demanding a new level of collaboration.
- The 4IR demands traditional products are generally disappearing, being replaced by cyber-physical products and systems that integrate software and electronics. This new machine-to-machine communication demands new interdisciplinary skills, not only when developing the products but also when designing the processes.

Both B2C and B2B demand frequently mass-customization resulting in volumes of product variations and complexity. Generally, this gives rise to more complex development, production and servicing.

- The growing availability of digital information across all phases of the product lifecycle offers an opportunity to increase efficiency potential through the horizontal and vertical integration of data and to further boost the value add / customer experience and the ultimate benefit to customers.
- The use of collaborative methods, systems and processes will increase the range of engineering services available, thus reducing costs, speeding up design and development. As a result, enterprise needs to be thinking of more value chain collaboration opportunities to compete with competitor agility



PLM & MOM 4.0 Tactically Speaking

The blending of Product Lifecycle Management and Industry 4.0 is not for the faint of heart.

Not only does it require the proper use of PLM & MOM processes and incorporates many of the Industry 4.0 technologies but also demands a shift to the Digital Culture of today's most successful organizations.

The intertwining of design, development, production, sales and service using modern digital infrastructures and communications, places the enterprise at the forefront of the 4th Industrial Revolution.

PLM & MOM 4.0's objective is an end-to-end digital value chain, built upon an Industry 4.0 foundation of more powerful and cheaper sensors, embedded systems, AI, vertically and horizontally integrated networking and 3D printing combined with the increases in computing power.

This digitalization of business processes requires a complete digital product model that not only maps the development process but also the entire product lifecycle (digital master and digital twin).



A Little Wake-up Call

Despite, the progress made in the fields of these Industry 4.0 Technologies, the adoption rate by manufacturers is staggeringly low.

With only 3% of manufacturers making the transition to Industry 4.0, we wonder what's stopping the rest from implementing these technologies on the factory floor.

And with 87% of manufacturers reporting that Industry 4.0 is part of their plans, we know the slow adoption of this model isn't due to a lack of desire.

Let's start to look at the challenges manufacturers face on the path towards Industry 4.0, and how PLM helps overcome these barriers

The Tactical Challenges

In many cases, data is only as valuable as the ways in which it is used to drive effective and necessary change. But

taking the first step toward using data in the right way requires having access to it in the first place.

For many manufacturers, variable device data is often confined within separate ALM, PLM and ERP systems that are only partially integrated, at best. The longer data is stuck within this infrastructure, the longer it will take to find increased value from the information collected about products and services.

It's only when this data is unlocked that manufacturers will be able to experience its true potential. With the power of more data-driven decisions, manufacturers can take preventative measures when it comes to the maintenance and improvement of their assets.

What is needed is secure and efficient access to consistent and up-to-date customer, product & supply chain data over the entire product lifecycle.

It's the ability to share it downstream and across the value chain. The enterprise application infrastructure has, however, made this next to impossible for many manufacturers. While enterprises often turn to the use of a single spreadsheet to distribute data when needed, the solution is both temporary and unreliable. Plus, the growth and evolution of IIoT will soon advance beyond the ability for giant spreadsheets of data to effectively store and share product information.

Without a holistic view of their own data, enterprises may be unaware of the value in sharing portions of information collected with vendors or suppliers.

Furthermore, we the end customer also possess data that can help to improve product lifecycle and manufacturing operations planning and therefore drive operational efficiencies, never mind, of course innovative new products.

Enterprises must consider how to effectively solve for the issues of data

ownership and security. Addressing the challenges of data sharing starts with ensuring the interoperability of different systems and improving the communication channels between all machines and sensors.

The IIoT is quickly opening up a whole new world to manufacturers. However, making the most of this opportunity requires taking a proactive approach to solving for product lifecycle challenges. Supporting increased connectivity across all touchpoints within an IIoT ecosystem and collaborative enterprise data platform will help manufacturers gain increased transparency, efficiency and optimization throughout the entire product lifecycle.

Industry 4.0 technologies include the inexpensive, high quality additive manufacturing processes (3D printing) that allow for technically complex products that meet the exact design requirements and are no longer constrained by restrictive production processes. In addition, the use of



embedded software, sensors and actuators makes product customization easier rather than relying on physical variants.

The Internet of Things (IoT) and Big Data allow data from the entire product lifecycle to be analyzed and utilized. Access to data relating to wear and tear, operating parameters, usage statistics and to service data not only enables predictive maintenance but also ensures fast feedback regarding customer benefits and expectations from the after-sales phase of the development process. This facilitates and accelerates product optimization in terms of functionality, cost and quality.





PLM 4.0 The Enabler

Product Lifecycle Management has expanded over recent years including the wider integration of the supply chain, the integration of customer data and frequently now not only the visualization of manufacturing but the manufacturing operational management aspects. PLM has a vital role to play in the digitalisation of value chains and the implementation of smarter engineering processes .

It's very normal to see the various product aspects across mechanical, electrical, structural and software departmentalized.

This means as design goes through the phases, a cumbersome approach to change and modeling, under -pinned by disparate systems. It can be assumed that process innovations will result in a significant increase in efficiency when developing, manufacturing and servicing smart products.

PLM 4.0 can quickly identify 6 main areas for improvement that optimise the use of i4.0 technologies :

1. Agile processes and modular PLM solutions
 2. Integration of Application Lifecycle Management, MES, SCM, CRM and ERP systems
 3. Model -based Systems Engineering
 4. Interdisciplinary variant, configuration and change management Collaborative PLM processes
 5. Implementation of the digital twin
- Most of us agree that enterprise needs a modularized series of systems within an open architecture that allows data to be linked across different systems.

The creation of a digital innovation and enterprise data platform that provides users with the single -source of information and functionality they need to perform their respective task in an easy to use interface, is a key prerequisite for making the growing complexity of the systems and processes involved vertically and horizontally.