Manufacturing in the Intelligent Enterprise
Meeting Market Demand in a Demanding Market

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SAP® ERP, SAP Manufacturing Execution, and SAP Manufacturing Integration and Intelligence applications provide a fully integrated, comprehensive solution from order placement through to execution and delivery, which clearly differentiates the overall SAP solution from that of the competition.”

—Olivier Bühler, Global CIO, Landis+Gyr

Executive Summary

Today’s connected, informed, and always-on marketplace is full of customers that demand high-quality, individualized products delivered within shorter timeframes. To meet these requirements, companies must synchronize their demand chain with their supply chain, even though traditional boundaries between their R&D, manufacturing, logistics, and operations dissolve.

In response to these challenges, companies are looking to provide more meaningful customer experiences that hinge on positive product experiences. They are breaking down silos in their processes, increasing visibility across operations, and driving customer-centric strategies. More importantly, these intelligent businesses are achieving much higher levels of efficiency and optimization while delivering new business and service models.

These changes, when combined together, are shaping the journey to digitally transformed manufacturing processes. For example, smart, connected factories with advanced automation and integration of the shop floor are optimizing performance and ensuring compliance. Connecting business and process information is enabling operational excellence across manufacturing and the supply chain, creating integrated processes is even becoming a significant differentiator as companies address the complexity, risk, and cost of the extended supply chain.

SAP is uniquely positioned to provide this level of differentiated innovation by eliminating the black-box, siloed-nature of shop-floor solutions. The manufacturing function is now an integral part of the extended supply chain, running with real-time insight into the status of work in process, financials, supply chain, logistics, and the impact of change.

Higher new product revenue
(as % of total revenue) for organizations that drive growth with continuous innovation

Lower manufacturing cost
(% of total revenue) for organizations where execution systems and the shop floor are integrated with enterprise applications

Lower days in inventory
for organizations where all of the metrics and KPIs needed to monitor, measure, analyze, and control performance are captured easily and automatically
SAP® Digital Supply Chain solutions are empowering our customers to deliver on their unique aspirations for Industry 4.0. Spanning design, manufacturing, logistics, and asset management, the solutions play a critical role in helping to ensure positive customer experiences. But to get to this point in their transformation, leading organizations are integrating across traditionally siloed business areas that include R&D, manufacturing, supply chain planning, logistics, and aftersales service and maintenance.

By connecting every aspect of the supply chain digitally, your business can perfect its operational reality as much possible with efforts such as:

1. **Capture customer requirements early**
   In the product requirements phase, you can achieve early visibility to monitor trends and innovate in the direction customers want. For example, organizations want to build smarter, Industry 4.0 enabled products and assets that use embedded sensors to capture real-time data once they are running in a live environment. And when manufacturing processes are integrated with the supply chain from the beginning, product lifecycle management becomes compliant.

2. **Plan with visibility across silos**
   Business scenarios of increasing responsiveness and accelerating planning cycles call for connected departmental silos to provide a unified view of real-time supply and demand and balanced inventory and service levels. For planners, this means synchronizing planning processes and tools to break down data silos quickly, while running simulations for better decision-making, faster planning cycles, and real-time response to change.

3. **Manufacture with flexibility, speed, and efficiency**
   Sophisticated digital supply chain capabilities and greater connectedness can help your organization increase shop-floor visibility, identify process bottlenecks, and manage operations with greater agility. This approach then facilitates smart factory capabilities that connects business data to manufacturing process to transform rigid production lines into flexible manufacturing cells – making the shift from mass production to mass individualization possible.

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4. Deliver on time
The delivery phase is a critical aspect of the supply chain that can make or break the customer experience. As business models change to a services orientation, the manufacturer takes ownership of the product throughout its entire lifecycle, this represents a higher level of investment in the customers business. To support this, products must be smarter, they need sophisticated monitoring capabilities and must be designed to anticipate potential failures. Only then will customers be satisfied with the services and the manufacturers performance in meeting demanding Service Level Agreements (SLA’s).

5. Operate with new business models
Many organizations are transforming the operating phase with IoT-connected assets that plug directly into the digital supply chain. This tactic helps drive new business models, where the manufacturer owns the asset and charges the customer for usage, uptime, or another metric. In this case, manufacturers are responsible for facilitating the most-cost efficient maintenance program, which is now possible with advanced analytics that help monitor asset health, predict issues, and respond proactively.

A digital supply chain that is integrated from design to operate acts more like a network. Visibility, communication, planning, analysis, and execution are all orchestrated across critical operational phases, based on real-time inputs and requirements. Work and data flows span functional silos to provide greater flexibility and consistency – leading to benefits such as reduced financial and operational risk and higher rates of customer satisfaction.
Manufacturing in the Intelligent Enterprise

The demand for individualized products is becoming a more common requirement across more and more industries and putting tremendous pressure on manufacturing processes – from supply chain to design, manufacturing, and logistics. To meet this demand companies first need to understand market trends and variant configurations for their products.

Digital manufacturing solutions from SAP are a critical part of becoming such an intelligent enterprise. Manufacturers can connect processes that are the lifeblood of their business. More importantly, organizations can tightly integrate their digital supply chain directives of the business. Effectively connecting the enterprise to a complete end-to-end portfolio of manufacturing solutions and leveraging technologies like Machine Learning, IoT and Artificial Intelligence provides the underpinnings to Industry 4.0 transformation.

By integrating business planning and customer experience management, manufacturers gain the visibility to stay ahead of market demand and meet customer expectations. Production and procurement processes across the supplier network can be enhanced with access to the Ariba® Network. Doing so accelerates the delivery of component and supplier information to maintain shop-floor assets and produce short-run component production through a network of additive manufacturing 3D printing companies.

An additional challenge placed on manufacturing with the variable demand of today’s market is a fluctuating need for production resources. SAP Fieldglass solutions enable flexibility in resource management by allowing organizations to find, engage, and manage an external workforce including temporary staff to contracted consultants, freelance workers, and gig workers. These solutions enable organizations to optimize their use of their talented resources and increase operational agility.

“For years, we’ve relied on an in-house solution for our production control system, which had its limitations. With the SAP Manufacturing Execution application, we now have a system in place that helps us connect production structures in different regions digitally and harmonize processes across our corporation.”

—Torsten Melchert, Business Systems Manager, Connected Car Division, HARMAN International Industries, Inc.
The rise of Industrial Internet of Things (IIoT) technology from SAP is building the promise of advanced computing and processing power to set the stage for the rise Industry 4.0.

Groundbreaking digital capabilities enabled by IIoT solutions include:

- Intelligent technologies such as analytics, artificial intelligence, Big Data, blockchain, the Internet of Things (IoT), machine learning enabled by SAP Leonardo technologies
- Previously unimaginable levels of supply chain Big Data – structured and unstructured – generated through the IoT and sentiment analysis
- Smart assets and products enabled by AI and machine learning to improve the user experience and enhance predictive analytics
- Stronger data security and user trust by applying blockchain technology to increase transparency, auditability, and regulatory compliance
- Rapid prototyping of designs through additive manufacturing processes supported by 3D printing
- Redesign of after-sales services and spare parts management to increase flexibility and responsiveness, lower inventory costs, and support on-demand 3D printing services
Manufacturing in the Experience Economy

The “experience economy” is a main driver behind the development of a variety of offerings, especially as manufacturing operating models continue to shift from mass production to mass individualization. But delivering the goods that customers want and love requires not only an initial positive customer experience, but also continuous monitoring of that product experience.

With experience management solutions from SAP, manufacturing companies can better understand how well products perform in a live environment. For example, customer feedback is an invaluable resource when determining opportunities for continuous product improvement, higher quality, and better design. Plus, manufacturing visibility into the customer experience plays a critical part in ensuring ongoing customer satisfaction by bringing the customer closer to the manufacturing shop floor.
Get on the Road to Success by Meeting Customer Requirements

Manufacturing organizations, like yours, is more critical to your business than ever before. Your team is pressed to perform from both sides of market demand – the variability in design and the systems and processes to quickly adapt to them.

This new reality is putting tremendous pressure on your manufacturing, especially as the variety of product configurations continue to proliferate. But with a desire to accelerate the delivery of high-quality products, leading manufacturers are finding new ways to decrease production cycle time while staying within cost constraints.

The secret to achieving this level of manufacturing excellence requires companies to improve collaboration across functional areas, connect processes more seamlessly, and eliminate inefficiencies in the product lifecycle. For manufacturing organizations, such innovative thinking provides better insight into the supply chain through the use of advanced Industry 4.0 technologies such as machine learning and the IoT. Additionally, business processes can be automated wherever possible and coordinated precisely across logistics channels.

Once manufacturing operations are on their way to becoming digitally transformed, the rest of the business will soon follow. Achieving this level of transformation may seem daunting to the enterprise, until they begin to their unique digital blueprint. Integrating processes from the design phase to manufacturing, logistics, and service brings the process efficiency you need to meet demanding customer expectations.

So here’s the bottom line: support manufacturing functions with better visibility into the supply chain and business information to help plan more effectively and make better business decisions. Monitor Overall Equipment Effectiveness (OEE) to increase efficiency and directly tie this to every product order. Then once your business listens intently to its customers and staff, you can deliver on market expectations and take every opportunity to improve business outcomes.

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SAP® Digital Supply Chain

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