Microsoft Dynamics AX

Inextricably Linked

How Information Technology Helps
Drive and Support Lean Manufacturing

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Introduction

Competition among manufacturers is tougher than ever. By deploying a lean manufacturing approach, companies can stay ahead by dramatically reducing waste, streamlining processes, and accelerating demand-pull operations. Practiced by companies like Toyota for decades, lean initiatives have been adopted by many manufacturing organizations with highly successful results.

As lean manufacturing methods and tools evolve to accommodate the business landscape of the twenty-first century, information technology (IT) is taking on a broader, more strategic role. The ability to capture and manage information, once marginalized by some lean practitioners, has taken on growing significance as a critical component of successful lean implementations and as an indispensable tool for sustaining and enhancing lean operations over time.

Microsoft recognizes the strategic importance of lean initiatives for manufacturers competing in global markets. Furthermore, Microsoft's commitment to enabling organizations to empower their people and drive business success through integrated, end-to-end business management solutions can help manufacturers address the IT requirements of lean manufacturing.

This white paper discusses the changing role of IT in lean implementations, and describes how Lean Manufacturing in Microsoft Dynamics® AX 2009 addresses IT challenges to help manufacturers accelerate and sustain lean manufacturing initiatives for a competitive advantage.

The challenge of customer expectations, global competition

The role of IT in lean manufacturing has evolved rapidly. A close look at the development of lean practices shows not only that IT can support those practices in powerful ways, but also that IT has become a driving force in the lean revolution.

For example, the advent of the Internet and broad implementations of Web-based technologies have transformed the landscape of commercial enterprises. The "digital marketplace" has changed business requirements for virtually everyone involved. Businesses must respond at light speed while providing 24x7x365 access to product information and order placement and tracking. Increasingly, customers expect products to be available on demand and to meet a variety of very specific requirements, leading to the rise of mass customization.

Tolerance for lead times or partial answers has eroded, and available-to-promise is an increasingly critical element in customer satisfaction. Further, the ability to compare information over the Web—from pricing and product specifications to delivery options—has created educated, pitch-savvy customers who drive the need for differentiation.

This shift in customer expectations, combined with global competition and increasing price sensitivity, has helped to fuel the momentum and necessity of IT in lean manufacturing today.

The transition to lean

While the demands of a market with an "Internet mentality" are severe for manufacturers, technology has opened new channels for enhanced service and rapid, cost-effective entry into new, geographically dispersed markets. However, these opportunities extend the typical challenges of shipping, logistics, warehousing, international regulation, and documentation, making it difficult for manufacturers to keep up.

Traditional manufacturing methods provide restricted visibility into demand, using sales forecasts over a planning period as the basis for demand estimates. Because these methods lack the flexibility for rapid response and short lead times, it results in excessive inventory. This leads to significant holding costs, and, in an age of increasingly narrow windows-to-market timeframes, the risk of inventory loss through product obsolescence.

In today's manufacturing channels, the visibility into demand is much more precise—the sales pulse is monitored in real time, with new orders coming into the channel without anticipation. At the same time, an expanding field of competitors is placing crushing pressure on prices and margins, making cost reduction imperative. Manufacturers must be more agile than ever and achieve optimum efficiency across the organization—all while tailoring products to an extent that challenges the very definition of mass production.

To meet these challenges, manufacturers are moving away from traditional manufacturing paradigms to lean manufacturing methods.

Lean: An overview
At the core of lean manufacturing is the idea of removing waste from—and adding value to—all processes involved in product creation and delivery. Lean environments share certain critical characteristics, including:

- Production is paced to customer demand and synchronized throughout the organization.

- Material replenishment and work control is driven by signaling devices, such as kanbans.

- Continuous improvement (kaizen) procedures are in place.

- People are empowered to control and improve the manufacturing process for which they are responsible, and they're able to shift operations to respond to current demand.

The critical role of information technology

In lean manufacturing, success depends on timely, accurate information about demand, material status, product and process quality, and performance results. Manufacturing organizations are dealing with massive amounts of information dispersed across systems, departments, and people—making it difficult to manage data as effectively as possible.

Information technology—software and the infrastructure upon which it functions—plays a critical role in managing this information in the way that works best for your business. In fact, lean manufacturing practices are more likely to succeed if the appropriate software and software support systems are in place. By automating processes, presenting complex data in easy-to-access views and forms, and improving communication across functional and organizational boundaries, your organization can reduce complexity and costs, minimize waste, and ultimately drive profitability.

Newly introduced lean practices require a commitment from your organization, such as training from the plant floor to the boardroom; expanding the strategy beyond manufacturing to purchasing and accounting; and devising new measures of assessing performance that incorporate value-added parameters. You can minimize training time by deploying an intuitive, integrated technology solution.

IT drives lean initiatives
IT can support your organization's lean initiatives by delivering the following benefits:

- Sequence control, such as providing logic to calculate and recalculate the size and number of kanban bins required on an ongoing basis. Other examples include providing alerts to changes in existing physical kanbans or automatically changing electronic kanbans.

- The creation of direct process links between sales, production, and fulfillment.

- Support for just-in-time procurement, including the provision of parts from suppliers in sequence according to the needs of the production line.

- Product configuration, such as providing applications to determine specific customer configurations and addressing component needs for real-time capable-to-promise, demand loading, and line sequencing requirements.

- Implementation of schedules or cell working lists wherever possible.

- Demand and production flow leveling tools, alternatives, and recommendations.

- The presentation of clear, easy-to-understand, relevant information that supports and improves decision-making by all who need it.

- Information delivery to process and production points at the right time.

In addition, a technology platform that can be modified quickly is fundamental to deploying effective lean solutions. The platform must be flexible, support constant change, and allow for rapid introduction of new processes.

Industry example: IT supports lean in automotive implementations

The automotive industry has long been at the leading edge of lean manufacturing. As consumers seek increasingly higher degrees of customization in their vehicles, the ramifications for automotive OEMs and suppliers are extreme. Fueled by the proliferation of features and options, the number of vehicle configurations has grown dramatically. This makes it more difficult for automotive manufacturers and suppliers to maintain low levels of inventory. Complicating the situation is the ongoing issue of balancing supply and demand.

To meet these challenges, automotive manufacturers have moved universally toward lean production practices. However, as this movement has gained traction across the sector, so has the realization that older IT investments may be insufficient to support current lean objectives.

For example, the concepts behind MRP, MRPII, and ERP are based on the traditional push model, from which forecasts are made, a plan is produced, and operations are executed. In a real-time environment, this approach is often inflexible and inaccurate. Forecasts are incorrect, plans are too rigid, and often, an emphasis on manufacturing capacity leads to large batch sizes that result in excess inventory, unnecessary production, and waste throughout the supply chain. Organizations expend time and money in devising new plans and debating proposed changes, and they lose focus on the single most important factor—the customer order requirement.

OEM requirements and process flow
Such experience has shown that the only way automotive manufacturers can work effectively is by pull and flow techniques, two of the main components of the lean execution foundation. This structure can be illuminative for other manufacturers who are driving forward lean implementations or considering the role of IT in their efforts.

Automotive OEMs communicate across the supply chain by means of sales schedules tied to firm, tentative, and forecast planning horizons. Cumulative figures that control the schedule position change on a minute-by-minute basis using call-off requests as vehicles move down the production line. The use of Electronic Data Interchange (EDI) and standards (for example, ODETTE or X12) are employed differently by each OEM, creating a challenge for supply chain partners.

To successfully meet OEM requirements, supply chain partners cannot "guess the market," which would require costly and inefficient buffers, but instead must also employ pull and flow techniques. Thus, OEMs have been the driving force for lean initiatives, imposing pull and flow requirements on their downstream suppliers, with In-Line Vehicle Sequencing (ILVS) as an example. With ILVS, OEMs pull the exact

components needed at the assembly line at specific points and times—a practice designed to optimize production efficiency. All of these tactics fall under the concept of Release Management, an area IT can readily support.

Release Management practices integrate EDI releases and just-in-time (JIT) delivery instructions, reconciling cumulative shipments against requirements while maintaining a full history of OEM change requirements. The objective is to eliminate manual intervention for routing processing—and highlight exceptions for review and action. Release Management also includes automated scheduling of order picking and shipping, and a requirement that manufacturing account for shipping lead times and customer ship-to calendars. Automatic generation of outbound Advanced Shipping Notes (ASNs) is included when needed.

OEMs also require specific documentation processes that facilitate the flow of information throughout all operations. Supply chain participants are required to automatically calculate packaging materials based on fully configurable, multi-level packaging—which can be labeled as a consumable or inventory item. The objective of this practice, commonly called Automatic Packing Creation, is to ensure that precise quantities of packaging are issued from stock when goods are shipped, and that returnable packaging is tracked.

To buffer the spikes in market demand that inevitably occur, automotive OEMs use consignment stock, smoothing the flow transaction by self-billing. This approach provides visibility of consigned and self-billed goods, eliminates manual invoicing, and supports expected service levels.

While supply chain integration has been a key part of the automotive implementation of lean manufacturing, it is essential for OEMs to flow demand to downstream suppliers. Doing so requires the IT-empowered ability to digitally send vendor schedules and call-offs while managing inbound ASNs and payments by electronic invoicing or self-billing. The objective is synchronization of material delivery with actual need, thus streamlining the receiving process.

Lean Manufacturing for Microsoft Dynamics AX

To support lean initiatives effectively, IT systems must integrate information and streamline processes while providing the specific tools needed to accommodate various production methods. With the flow of real-time information throughout the supply chain, you can increase organizational efficiencies and free your people to spend time on more valuable activities.

Lean Manufacturing for Microsoft Dynamics AX is designed to deliver the functionality and flexibility manufacturers need to meet the challenges of lean implementation. As an integral part of a familiar and adaptable end-to-end business management solution, Lean Manufacturing for Microsoft Dynamics AX can help you achieve the insight, agility, efficiency, and customer-orientation that enhance profitability and business success. You can integrate information and processes across the organization while offering specific tools and functionality to empower your people to achieve and maintain leveled, demand-driven production over time.
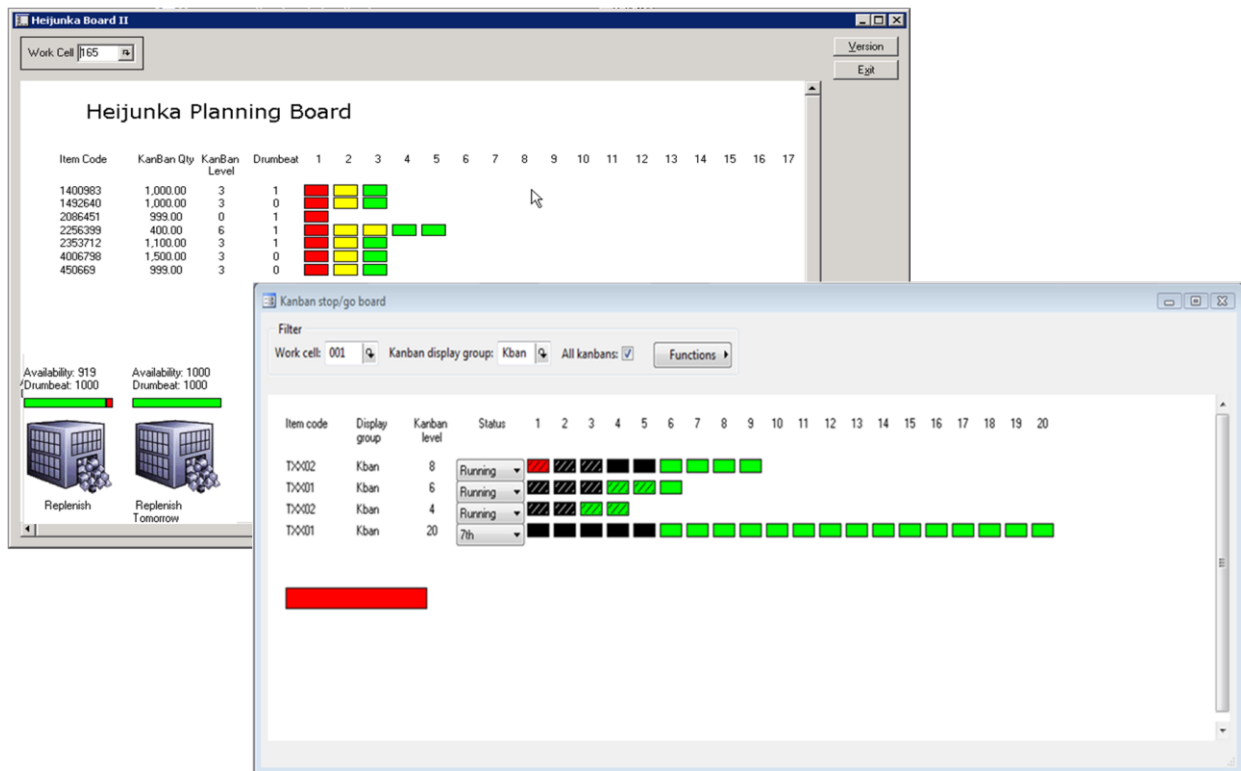
Lean Manufacturing for Microsoft Dynamics AX provides easy-to-us, graphical tools such as the heijunka board and kanban stop/go board that help level production and improve replenishment efficiency.

With Lean Manufacturing for Microsoft Dynamics AX, you can:
- Determine the pace of demand, and then level and schedule production to that drumbeat or "takt" time.
- Manage replenishment with support for a variety of physical or electronic kanban systems.
- Enhance supply chain collaboration with real-time information about demand, materials inventories, and order status using business portal integration.
- Streamline transactions, increase accuracy, and speed order cycles with the ability to exchange common electronic documents using accepted standards.
- Boost the productivity of people with role-based access to the information and tasks they need most.
- Improve processes with tailored performance and process information and a variety of collaboration and communication tools.

Regardless of your current position on the continuum of lean implementation, Lean Manufacturing for Microsoft Dynamics AX can help. The solution supports mixed-mode operations, so it can help you manage a phased lean implementation, and it can readily adapt as your business changes and your lean initiatives expand over time.

The end-to-end solution is built on the Microsoft technology stack and integrates smoothly with other Microsoft technologies, including Microsoft® BizTalk® Server, Microsoft SQL Server®, and Microsoft Office SharePoint® Server to support collaboration, trade partner interaction, and sophisticated business intelligence. Role-based access to reports combined with the ability to analyze and share information using familiar tools such as Microsoft Office Excel® helps you gain deep insight into your business data. With a familiar, intuitive interface, your people can get up and running quickly and you can realize a fast

return on investment while achieving the insight, efficiency, and customer-orientation that characterizes lean thinking and business success.

Taking action

A transition to lean practices is a significant undertaking. Fortunately, there are multiple techniques, methodologies, and guidance available to any organization considering the task. Regardless of which path and tools are employed, manufacturers must consider the IT requirements and whether their organization's existing IT infrastructure and applications either support or hinder lean initiatives.

Ultimately, lean imperatives are about taking action, and IT is a critical component of empowering the organization to implement an integrated solution. With Lean Manufacturing for Microsoft Dynamics AX, manufacturers can deploy and speed effective lean initiatives by supporting and facilitating change as a fundamental operating principle.

"Change alone is unchanging," said the Greek philosopher Heraclitus. Who knew the roots of lean practice extended so far back? The challenge for manufacturers today, however, is to combine the proven philosophy and understanding of lean practices with contemporary IT tools—including an integrated business management solution—to accelerate lean initiatives and help take the organization into a successful and profitable future.

About Microsoft Dynamics

Microsoft Dynamics is a line of integrated, adaptable business management solutions that enable you and your people to make business decisions with confidence. Microsoft Dynamics works like and with familiar Microsoft software, automating and streamlining financial, customer relationship, and supply chain processes in a way that helps you drive business success.

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