



THE ROI OF MRP: *HOW ERP TECHNOLOGY CAN HELP MANUFACTURERS SAVE MILLIONS*

US Manufacturers Face 21st Century Challenges
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The ROI of MRP: How Technology Can Help Manufacturers Save Millions

US Manufacturers Face 21st Century Challenges

Dynamic changes in the supply chain and the ease with which we can communicate across the globe have dramatically expanded opportunities for even moderately sized U.S. manufacturers. However, many manufacturers still struggle with the decades-old challenge of matching supply with demand. When the balance is off, the business suffers in a number of ways.

Increased costs - As a "rule of thumb" carrying costs run between 15 and 20% of inventory value but can go as high as 75% in some industries.

Increased waste - For perishable products or those that include a technology component, too much inventory can drive costs up further as idle inventory becomes obsolete.

Production delays - Not having enough of the right components throws off production schedules and raises costs as lines are retooled to work around the shortage.

Lower customer satisfaction - When production stalls, customer orders are delayed, lowering satisfaction, and damaging the company's reputation in the global marketplace.

Missed opportunities - Not having enough raw components when needed, or worse, not knowing what finished goods can be produced by when can cause sales to plummet as orders are lost.

Proper inventory and resource management can address every one of these challenges, and the principles are not new. However, before the current generation of modern ERP systems, many of the most effective techniques had to be implemented manually. That was a challenge for the manufacturer looking to improve their ability to respond to dynamic changes in the marketplace.

In this white paper, we will explore some of these techniques as well as how a modern ERP system like Microsoft Dynamics can make implementing them easier and more effective.

ERP BENEFITS

- Users moving from disparate systems or paper-based processes can expect Microsoft Dynamics user productivity to increase by up to 30 percent.
- Average inventory reductions range from 10 to 15%.
- Manufacturers moving from other disparate applications can often redeploy hardware, cut maintenance contracts, and re-devote IT resources to other projects.
- Reduced freight and shipping costs. Better visibility into shipping operations across the supply chain can enable manufacturers to consolidate and streamline ordering and reduce shipping costs.

From [2010 Nucleus Research, Inc.](#)

The Sensitive Balance Between Supply and Demand

Clearly, not having enough inventories on hand can be bad for business, but so can having too much. If the recurring recessions of the past few decades have taught US manufacturers anything, it's that they need to stay nimble. That means optimizing inventory levels to minimize costs while maximizing opportunities. Of course, the key to having just the right amount of inventory is to predict what you are going to need when you are going to need it—and that's not easy to do.

Push Systems: Garbage In, Garbage Out

Push based inventory management seeks to predict the amount of inventory needed during a given period based on demand. From this, the organization derives a production schedule that allocates resources such as staff, component parts, and raw materials. Unfortunately, the production plan is only as good as the inputs that go into it, and for most businesses, demand can be very hard to predict.

Demand forecasts generally come from two different areas: sales and production. Both of these sources present challenges for the organization seeking to optimize inventory levels.

The Sales Driven Forecast:

A sales-driven forecast looks at what the sales team expects to close within a given time period. This should be derived from the current pipeline of opportunities and an assessment of their likelihood of closing within the period. As many manufacturers know first-hand, the problem with calculating demand based on the sales forecast is that these forecasts are often wrong—sometimes wildly so.

"In many organizations, forecasting is a largely political endeavor."

- Tamara Schenck, CSO Insights

"In many organizations, forecasting is largely a political endeavor," says Tamara Schenk, Research Analyst at CSO Insights, an MHI Global Company. "Salespeople create the forecast based on what is in their pipeline but are heavily influenced by what they know their managers want to see. Their managers then massage the data before passing it on to the next level. At each level, the data gets pushed and pulled until the forecast bears little resemblance to the actual sales funnel."

When the production planner derives the master plan from these forecasts, they're really basing their plans off of what sales management hopes will happen. And, as any planning specialist will tell you, "hope" doesn't lead to a sound inventory management strategy.

Production Driven Forecasts:

The alternative approach is to discount sales entirely and rely on production's assessment of what will be needed. This approach is history-centric, looking at year-over-year production requirements and then applying some educated guesses at what will be required. The challenge is that production often lacks visibility into the sales funnel and dynamic changes in market conditions.

Some organizations try to address this problem by holding joint production planning meetings with sales. This approach can work well in a very disciplined organization, but too often it simply reintroduces the political stresses as sales managers eager to make quota overestimate requirements to ensure they will have enough on hand to promise a competitive delivery date. When those sales don't materialize, inventory levels rise.

"These production meetings can be a step in the right direction, if only to get everybody looking at the business in the same way," says Catherine Dean, Managing Director of Microsoft Dynamics 365 Finance and Supply Chain Management at Boyer & Associates. "But it takes strong leaders to resist the kinds of political forces present when sales and production management get together."

Pull Systems: A Lean Thinker's Dream

Pull-based manufacturing systems take the opposite approach, focusing inventory requirements and production only on what has actually been sold. Properly implemented, pull-based systems have a number of benefits including:

- Lowering inventory
- Improving cash flow
- Increasing customer-centricity

As simple as pull-based inventory management sounds, there is no doubt that it can be more difficult to get right. When an organization tries to implement a pull-based approach without the proper discipline, planning, and system support, the effects can be devastating.

"While Kanban and other lean techniques can help keep inventory levels low, MRP allows for flexibility and is helpful when demand is unpredictable."

- Catherine Dean, Boyer

"Pull-based systems are such a delicate balance," says Dean. "If even one thing goes wrong, your entire production schedule can be thrown off balance. Since everything you're manufacturing has already been sold, this can have a very destructive impact on customer satisfaction and company reputation."

Luckily, push and pull aren't mutually exclusive. Many manufacturing organizations employ both strategies. The key is to make sure that you focus on the right strategy for the right components.

Tools of the Trade: The Spreadsheet vs. MRP and Kanban

About a decade ago, The Aberdeen Group studied the percentage of manufacturers using spreadsheets for demand planning vs. MRP or other automated tools. The overwhelming majority (71%) used spreadsheets because they found it easier than using the tools in their ERP system.

"Unfortunately, not much has changed since then," says Mark Skinner, Director of Services at Clients First. "When we talk with new clients, we almost always hear something about how frustrations with their ERP systems have driven them back to the spreadsheets they were using before the system was implemented."

In addition, resource planning is a collaborative effort, or at the very least, one which requires data aggregation from a number of sources. When everyone involved is working from their own version of the master plan, the data is often inaccurate or out of date. "Spreadsheets can facilitate decision making, and that includes poor decision-making," adds Skinner.

Automating Resource Management

Automating resource and demand management processes can go a long way toward helping the manufacturer become lean and nimble. In addition, because the automation makes the process more efficient, planners have the ability to use more sophisticated techniques.

For example, two of the most popular inventory management techniques today are MRP (Material Requirements Planning) and Kanban. Let's start with a simplified definition of each technique:

MRP (Material Requirement Planning) - *A production planning and inventory control system that uses bills of material, inventory data, and the master production schedule to calculate requirements for materials.*

Kanban - *A visual replenishment system that uses manual inventory signals to trigger replenishment.*

MRP is often categorized as a push-based system because it is historically created from a production plan that is created from a forecast. Conversely, Kanban is typically classified as a pull-based system because it is a key component of lean manufacturing, which heavily emphasizes pull techniques. In reality, MRP and Kanban can be either push or pull, especially when implemented within a modern ERP system like Microsoft Dynamics.

IMPLEMENTATION MATTERS

Mossberg, a world renowned firearms designer and manufacturer, learned this the hard way. Inventory levels in their ERP system were off, and bills of material were inaccurate or incomplete. To try to fix the problem, they migrated from their old system to Dynamics, but without taking the time to clean up their data and their inventory management practices first.

According to their production manager, "this caused all kinds of issues. We used to joke that our requirements were 'gross requirements' because the inaccuracy of the data was really 'gross'. Eventually, everyone quit using the system and started using their own spreadsheets for planning. Of course, that only made the problem worse."

This manufacturer called on Boyer to help. Instead of changing their ERP system and running into the same issues anew, Boyer helped them clean up their inventory data then adjusted the way Dynamics ERP was implemented to account for their unique business requirements. Lastly, by helping the manufacturer follow a few best practices, they were able to cut their inventory levels in half, saving the company millions.

Take Kanban for example. One of the simplest implementation of Kanban is the bin system where materials are stored in two bins. When one is emptied, a replenishment order is triggered. This approach works particularly well for high-volume, low-cost items like bolts or nails. However, the finished goods orders consuming these raw materials could be made-to-order, made-to-stock or based off of sales' wishful thinking. Likewise, MRP as implemented in Dynamics can be a pull system if it is set to pull inventory based on production orders created from sales orders. So which is better? MRP or Kanban? As in most areas, the answer is "it depends."

Many customers manage their operations using a combination of MRP and lean principles like Kanban. According to Dean, "While Kanban and other lean techniques can help keep inventory levels low, MRP allows for flexibility and is helpful when demand is unpredictable. Manufacturers should not be forced into one or the other by their ERP system."

Sometimes it can seem like the ultimate goal of lean practitioners and purists is to get rid of "outdated" notions such as MRP. However, other manufacturing experts don't see MRP as the problem so much as the way it is implemented within the organization.

Orlicky's Material Requirements Planning Third Edition, Carol Ptak and Chad Smith, 2011

Advanced applications like Microsoft Dynamics ERP have sophisticated functionality that allow for both options as well as flexibility in the way the concepts are applied. "Dynamics AX has supported make-to-order production planning and MRP for decades. In addition, Dynamics AX has the electronic Kanban functionality required to make visual replenishment feasible in a number of different scenarios. With Dynamic AX, we can help our clients implement the right techniques for their business," says Dean.

Making the Case for MRP

At the end of the day, a properly implemented ERP system with a robust MRP engine and Kanban capabilities can make any approach easier to implement and more effective, and that translates into bottom line benefits for the manufacturer.

"Manufacturers looking to make a business case for ERP often have to look no further than the financial benefits of better inventory management," says Skinner. "Most of our customers come to us looking to solve an immediate problem like bottlenecks in production. However, when it comes time to create a financial justification for the system, we immediately look at their inventory issues. Many manufacturers carry far more inventory than they need."

Inventory benefits only the start. Automated resource management can help organizations make other improvements that impact the bottom line such as:

- ▶ faster throughput
- ▶ ability to promise deliver dates
- ▶ ability to take advantage of supplier discounts
- ▶ improved cash flow management

Research supports Skinners' assessment of the value of automated MRP. [In a comprehensive study of the benefits of MRP](#), researchers surveyed 1700 companies to determine estimated performance against several key metrics in the company's pre-MRP state, current state given the progress if their MRP deployment and their future anticipated state. Their findings are shown in the table.

MRP Key Metrics	Pre-MRP	Current	Anticipated
Inventory turnover	3.2	4.3	5.3
Delivery lead time (days)	71	59	44
Percent of time delivery promises met	0.61	0.76	0.88
Percent of orders requiring "splits"	0.32	0.19	0.09

"Every small and precise adjustments done with the right knowledge and experience can have a significant impact on operational efficiency," says Skinner. "That translates into lower costs and higher margins."

But, while immediate cost savings may be what drives the organization to invest in ERP, it's the ability to stay competitive in the long run that is the greatest benefit of a modern ERP system. In general, people are getting used to having instantaneous access to information and faster access to goods and services. Organizations up and down the supply chain are pushing each other to be faster and more responsive to consumer demand.

The Manufacturer's Need for Speed

This quest for speed has been one of the primary drivers of the evolution of manufacturing systems from the early days of MRP, through MRP II, ERP and ERP II. It's complementary technologies like EDI and mobility that allow the supply chain to process information faster. It's changed the way manufacturers engage with customers and supply chain partners through portals and other self-service applications and websites. And, it's behind the technology waves of the future such as the Industrial Internet of Things.

All of these advancements have a common goal: more accurate and better information faster. Organizations that can accomplish this have a competitive edge. However, success in all things is based on getting the fundamentals right. And that means making sure your organization has an ERP system that is accurate and reliable.

Manufacturer Realizes 3-Month ROI from Dynamics ERP

A mid-sized manufacturer of lighting systems, Orion Energy Systems, understands not only the importance of Master Planning, but also just how time consuming it can be. Orion manages nearly 30,000 active bills of materials, many with multiple subassemblies. Master Planning took several hours a day and was so complex that it could really only be handled by one person with the background and skills to do it well.

"As we shifted to an even more technically complex product with a more volatile component market, it became difficult to quickly and accurately extrapolate component needs," said Ben Green, IT Solutions Manager.

Orion turned to Boyer for expertise in production planning as well as material requirements planning. After implementing new procedures in Dynamics ERP, the process takes less than an hour and has been simplified to the point where Orion has three or four people who can manage it should the need arise. Green estimates that these and other financial benefits of Dynamics paid for their project in about three months.

Subject Matter Experts and Contributors

Catherine Dean: CPA, Managing Director of Microsoft Dynamics 365 Finance & Supply Chain Management at Boyer & Associates

- BS, Accounting Saint Cloud State University
- 10+ years of experience in Microsoft Dynamics AX and now FSCM
- Over 20 years of experience in the industries of manufacturing, wholesale distribution, food processing and service
- Deep IT and ERP experience in areas of food processing, cost and general accounting, manufacturing, cash management, financial analysis and forecasting
- Managed and worked on over 20 Microsoft Dynamics AX implementations*



*Dynamics AX now has a cloud counterpart, Dynamics 365 Finance & Supply Chain Management.