

AUTOMATING INDUSTRIAL SUPPLY CHAINS

Automating Industrial Supply Chains

Technology has driven fundamental changes in the way industrial and manufacturing companies manage their businesses. With the addition of sophisticated solutions, like warehouse management and ERP systems, as well as advanced data capture and wireless networking tools, companies are squeezing more efficiency out of their operations every day.

In most cases though, companies have built silos of applications defined by departments or processes (e.g. WMS to manage the warehouse). These solutions deliver significant improvements for the specific areas they're designed to manage, but do nothing to unite the entire supply chain. It's rare for companies to have reached that level of automation or, in some cases, even understand the value of doing so. But the rapidly changing marketplace is creating a greater demand for manufacturers to be more agile and flexible in order to meet their needs, and that, in turn, is placing more pressure on managing supply chains.

It's not uncommon for companies to gain 20 percent more productivity in areas they've automated. Now imagine those same gains across every function. Or the dramatic increase in manufacturing flexibility gained by having total visibility into your upstream supply chain as well as changes in demand downstream.

That's what total automation can do for an industrial/manufacturing enterprise. It can dramatically improve operations by providing real-time data to all the interdependent parts of the supply chain.

Agile Manufacturing

Manufacturers face an increasingly fast-paced, sometime fickle, marketplace where product demand changes almost daily. Companies have adopted agile manufacturing processes to keep up with the market dynamics, allowing them to change product direction at a moment's notice.

As diverse as manufacturing companies are, there are common issues faced by all, including:

Rapid Product Development

Product development cycles are faster than ever, requiring manufacturers to often outsource parts of their manufacturing and sometimes design. This agile manufacturing demands a more collaborative approach between manufacturers and suppliers, requiring better supply chain management. By automating the real-time information exchanges between manufacturer and suppliers via data collected by wireless handheld scanners and computers over industrial wireless networks, companies can make quick, informed product decisions.

Reducing Costs in the Supply Chain

Errors in orders and shipments cost billions of dollars annually. By automating ordering and

tracking shipments in real-time along the supply chain, companies can reduce costly and time-consuming mistakes.

Leveraging Infrastructure Investments

According to the Gartner Group, manufacturing businesses that make investments in ERP-directed manufacturing applications, but fail to provide for accurate real-time information from the process, achieve at least 50 percent lower return on those investments. Additional automation via standards-based technology maximizes the value of existing IT investments as companies add new functionality.

In addition, bridging technologies, like Intermec's dcBrowser, which enables "green screen" terminals to access Web-based data, extend the useful life of older devices by giving them the ability to tap new, more universal data sources.

Complete automation of the supply chain helps companies to adopt agile manufacturing processes to meet these challenges. The "extended enterprise" requires real-time data flowing from suppliers to manufacturers to distributors to customers—and the only effective way to achieve that is through automation.

Industrial Supply Chain Technologies

Supply chain automation requires a suite of technologies that work seamlessly together to gather data even in the most severe industrial settings. Which set of technology depends on the specific needs of a company's operations, the environmental conditions, and complexity of its supply chain.

Asset Tracking

Tracking production assets is the foundation of a manufacturing business. The basic tool for asset tracking has been the linear bar code printed on a label, which for many applications is still the most cost efficient method.

The addition of new symbologies (e.g. reduced space symbology, 2D matrix and PDF codes) and special label media that can withstand specialized industrial environments allows bar codes to fulfill a large portion of asset tracking needs. Sophisticated printing software can also combine asset tracking with compliance labeling requirements.

Direct Part Marking

It's harder to track assets when they're high-performance metal parts. Direct part marking extends bar coding to areas where applying a label is impractical or impossible. Direct part marking etches a bar code symbol, in many cases using matrix symbology, directly onto the metal part. Because of their low contrast, etched codes require special bar code readers.

The Air Transport Association (ATA) SPEC 2000 standard calls for all line-replaceable units (LRU) installed in commercial and military airplanes to be marked with their own individual number. While as many as 80% of the parts on a typical aircraft can be identified with a simple, pressure-sensitive bar code label, high performance parts including turbine blades and wing surfaces require direct marking through technologies such as laser engraving or chemical

etching. Direct part marking is a key element in the aerospace industry automating its supply chain and tracking every part.

Radio Frequency Identification (RFID)

What if the information a bar code can carry isn't enough or if the labor involved in reading bar codes is slowing productivity?

RFID technology is the obvious answer. RFID technology is based on embedding a small chip with an antenna into a tag. The RFID tag holds much more data than any bar code symbology and can be read and written to thousands of times, acting as a portable database. Unlike bar codes, RFID tags do not require line-of-sight to be read, so they can very quickly and easily be read without the extra time and labor to reorient the item the code is on.

For example, in a typical warehouse operation, one worker may be responsible for pulling product off a trailer and placing it in a staging area, while a second worker will move the product to an inventory location, and a third will move it to an outbound trailer. With RFID tags on the cartons and/or pallets, an RFID reader with an antenna array around the dock door can read every tag automatically as it passes through, saving time and reducing errors. In a cross dock application, the RFID tags would be read and the host system would immediately direct the forklift operator, via a vehicle mount terminal, to the dock the goods are being transferred to, eliminating the extra handling.

RFID technology is being used successfully today at the pallet and case level.

CHEP, the international pallet and container pooling company, uses Intellitag® RFID technology to enable real-time tracking of its wooden pallets, so it knows where its pallets are, providing asset visibility as the pallets and their cargo move through the customer's supply chain. Pallet tracking allows CHEP to identify damaged pallets by location, to track pallet loss and to accurately measure cycle-time for optimization of asset utilization, reducing discrepancies between audit information and actual stock holdings, thus reducing trade disputes.

Scanning Technology

Scanning technology has been changing dramatically. Laser scan engines, once considered the workhorses for most scanning applications, have been surpassed by new imaging scan engines—linear imagers, Active pixel CMOS sensors (APS), 2D imagers—that are more powerful and reliable. It has also enabled the convergence of scan engines into a wider variety of devices. The new solid-state imagers cost less than comparable laser scanners and are more reliable because they lack the moving parts of a laser.

Scanning technology continues to improve on performance with a wide variety of form factors—from handheld and fixed scanners to scan engine embedded into handheld wireless computers.

Werner Company, a state-of-the-art fully integrated manufacturer and distributor of fiberglass, aluminum and wood climbing products, implemented a new ERP/WMS system with Intermec wireless devices and printers to improve productivity, fill rates and credits. In its first full year online, its Carrollton plant saw productivity—measured in pounds per work hour—increase

21%. Credits for over-shipments, under-shipments and wrong goods shipped have decreased an average of 72%.

SteriPack, UK specializes in the design and manufacture of high quality packaging for the medical industry. The manual recording system they used could no longer handle the hundreds of thousands of items needing to be recorded accurately while still meeting production deadlines. They implemented a wireless system from Intermec using their 2425 wireless handheld computers. Automating has reduced errors, improved traceability, enhanced its stock control function, and they've seen substantial customer relationship advantages. They've also been able to increase production without increasing staff and consequent overhead costs. The investment in the new system will be repaid purely by the increase in productivity.

Wireless Handhelds/Networks

More and more, industrial workers are mobile workers and tethering them to wired devices reduces productivity and slows data. Wireless technology is not only the heart of every real-time system, it adds flexibility in manufacturing lines by eliminating wired limitations.

Wireless handheld terminals and computers send a regular flow of data to hosts systems that can be shared with suppliers and customers immediately, speeding the flow of goods and reducing errors. They can also direct workers while they're on the floor, reducing handling errors.

Haliburton Energy Services, which manufactures equipment for oil and gas exploration, sought to improve its manufacturing processes using wireless technology. The company needed a mobile interface to SAP for its warehouse workers so they no longer had to walk back to a desktop PC to perform warehouse transactions in SAP. Using a MobileLAN™ wireless network, they now perform standard SAP warehouse transactions from anywhere on the shop floor. By integrating manufacturing data into its enterprise resource planning system Halliburton has experienced approximately 8% to 12% increase in productivity. And the system has eliminated paperwork and made warehouse data collection faster, eliminating clerical positions.

Aerospace giant Honeywell installed a wireless network at its largest aerospace repair and overhaul facility. They estimate it paid for itself in less than 90 days with additional cost savings estimated to be in the millions of dollars. By using the wireless network in combination with handheld scanners and Web-based data collection screens, Honeywell reduced labor collection issues by 99.6% in the very first week.

Logistics

Moving goods can often be the black hole of supply chain data. Wireless devices that can operate on wireless wide-area-networks along with powerful logistics applications keep the flow of information alive. It also gives companies the flexibility to make changes mid-course, redirecting goods as needs change.

Syncrude Canada Ltd., produces 230,000 barrels of crude oil a day from the sand at its massive operation in Fort McMurray, Alberta. The challenging weather, production demands and remote locale require self-sufficiency, which placed strong demands on Syncrude's materials management system. Putaway, storage, picking and delivery operations have all been automated

over the years, with Intermec equipment processing thousands of transactions each day. Syncrude recently automated its internal delivery process, using Model 720 mobile computers, which improved its return on capital to 25.7 percent last year, the fourth time in five years the company has topped 20 percent.

Wireless and Smart Printing

Printing of bar code and compliance labels is an area often overlooked when planning automation, but the right printers can save time and money as well as increase efficiencies.

Wireless printing is the next logical step in extending the benefits of wireless networks. Not only does it support the mobility of workers and improve their productivity, but it also enhances the flexibility of facilities so they can adapt quickly to new requirements or opportunities in a highly competitive business landscape. Companies save considerable time and money by placing printers where they are needed—not where the wires are—to complete work efficiently without having to pay the cost of running network cables.

Smart printers are capable of operating without a computer, transforming the printer into a “smart client” capable of executing user-defined programs. The printers can replace computing devices and middleware with their ability to communicate with and even control other industrial/computer devices such as scanners and other printers. They can also act as a programmable logic controller (PLC) running and controlling production line devices and processes.

Automating the Entire Supply Chain

In most industrial companies, agile processes are enabling manufacturers to meet fast-changing market demands. The extended enterprise that agile manufacturing requires is placing more demands for real-time data across the entire supply chain so that everyone—suppliers, manufacturers, distributors and customers—have visibility to accurate, appropriate data at a moment’s notice. And this is driving the move from automation silos to comprehensive supply chain automation.

With over 35 years experience and the broadest product line in the industry, Intermec helps companies automate their data collection and data handling from one end of the supply chain to the other, beginning with suppliers who must accurately and quickly deliver the correct parts or products to their customers.

Supply Chain Automation Checklist

Just as implementing other solutions takes planning, so does automating a company’s entire supply chain. The checklist below is a simple reminder of things to consider as you automate.

Conduct a supply chain audit

Before you get started, document where you are currently. What processes are now automated? Can they be improved? Where are manual processes still being used? Are there obvious slow areas in your supply chain? Look for interdependencies between processes across the supply chain.

Develop a plan

Developing a written plan helps avoid the pitfalls of implementing new technologies and business processes.

- Prioritize the areas to implement. Where can you gain the most value the fastest? Which areas will demonstrate success faster?
- Define your processes, changes and improvements. Automating your supply chain is as much about changing business processes as it is implementing technology.
- Look for interdependencies—internally and externally— that might affect the project. Missing a link in the chain will not only set back the project, but could severely affect your ability to do business now.
- Investigate the best options for hardware and software solutions and vendors. Make sure vendors and their partners have a proven track record in your industry. Check their support track record. Be sure any solutions you choose are based on open standards, not proprietary systems.
- Involve everyone impacted by the automation—employees, suppliers, and vendors. Make sure they understand what the changes will be, what the results should be and why it's so important. Training must be part of the plan—internally and externally. Don't assume someone else will do it.
- Build in contingencies. It's rare for implementations to go 100% to plan. Build in time and budget to deal with the unforeseen.
- Plan for growth. Implement a system that will fulfill your needs now and can easily grow as your business changes and grows.
- Define the ROI. Go into the project knowing how its success will be measured as well as how and who will collect and report the data.

Rollout automation methodically It's easy to get sidetracked when implementing large, complex systems. Once you've established the plan and timeline, stick to it. Train all who will be affected by the rollout.

Measure the results With each rollout, measure, measure, measure. It's easy to let metrics slide as other priorities arise, but measuring the success of the project will help streamline future implementations as well as justify the project to upper management. ROI measurement is a critical part of any implementation.