

Myths and Realities of “Top to Shop” in Manufacturing

Why you need to connect shop floor
to top floor to enhance the extended
supply chain

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Any disconnect in the enterprise means that people don't understand the true impact of actions. That lack of insight typically costs a lot of money.

Introduction

For nearly two decades analysts, journalists, and industry experts have warned manufacturers about the consequences of a disconnect between the shop floor (the production line) and the top floor (senior management up to C-suite). With all that has been written on the subject, it's surprising that few manufacturers have even tried to connect the shop floor to the top floor to enhance the extended supply chain.

Those that have taken action without success failed to address the fundamental requirements of connecting the top floor with the shop floor in a manufacturing business:

- Use one set of data—a single, real-time version of the truth;
- Make the corporate strategic plan actionable for everyone in the organization;
- Deliver production and operations insight into the hands of the people who define the strategy;
- Close the loop on the extended supply chain; and,
- Use enterprise resource planning (ERP) software, a manufacturing execution system (MES) and enterprise manufacturing intelligence (EMI) software in harmony to facilitate a flow of accurate information throughout the organization.

Making the connection from top floor to shop floor, and back again, can seem overwhelming. Like any strategic goal, it requires senior management commitment, together with motivating and mobilizing everyone and everything throughout the organization in the same direction. Without this level of commitment, information silos flourish and the disconnect becomes a chasm, placing business goals in jeopardy.

Myth: “My company is too small/big for effective top-to-shop”

Establishing a connection between line workers and decision makers to improve the supply chain (outbound as well as inbound) is important whether you're a small produce business, a medium-sized specialty coatings company, or a multi-billion-dollar cosmetics empire.

Manufacturing giants require and can afford top-tier ERP and MES systems, but small and mid-size businesses derive greater value from ERP that is designed specifically for the kinds of goods they produce. For example, food and beverage companies have concerns around traceability and compliance, while packaging businesses often struggle with quality and scrap. To avoid the high cost of customization, services, and bolt-on applications, high achievers use systems that align with their specific production and business concerns. The systems that best meet their needs are industry-specific yet flexible and provide a user-friendly configuration interface to adapt to business needs today and tomorrow.

IT system agnostic ERP, MES, and EMI solutions deliver the greatest value all around—for small producers to manufacturing giants. After making the decision to purchase a system, this is typically a topic of much debate. If a company already

has one of these systems, that doesn't mean it will survive indefinitely. Acquiring a system-agnostic EMI or MES solution ensures continuity of performance gains and protects the investment, regardless of business changes into the future.

Myth: “We don't have disconnects, the problem is worker commitment”

While C-level executives typically focus on financial considerations, plant management and line supervisors worry about throughput and quality. Everyone is pushing a vision and agenda, and as a result line workers receive conflicting messages. Few have any idea how to translate the financial and operational directives into specific, meaningful action. Those on the front lines often pick and choose which priorities will receive their attention, and resist or ignore the rest.

While management understands that enterprise strategies must evolve with market and economic conditions, production teams persistently strive toward one goal: produce quality goods on time. These perspectives often collide and create a disconnect. However, for businesses that recognize the opportunity, it's where production tactics align with corporate strategies to drive success.

Manufacturers who take steps to overcome the communication disconnect find common ground by connecting the shop floor to the top floor with ERP, MES and manufacturing intelligence.

Reality: The plant is disconnected from the extended supply chain

The more a company can simplify the business processes needed to support their complex supply chain and complex manufacturing, the more time and money they will have to focus on what they're good at—making things. Unfortunately, a lot of companies have inadvertently built in complexity by creating processes or acquiring systems to tackle very specific problems. Most of the time, these processes and systems don't work together.

Let's examine a common scenario. The typical production facility feels like an island, where no one knows how to get where senior leadership wants to be, and is disconnected from the extended supply chain of suppliers and customers. How can that be? Consider what ERP is designed to do—look ahead weeks and months to come up with a plan. But, what the factory really cares about is the here and now—what am I supposed to be making, and do I have what I need to make it? Line workers don't have time to wait for a plan from the back office. They need the plan for this moment in order to react in real-time.

To make things a little easier for the production team, companies have put processes in place for planning, scheduling, design, execution, manufacturing and reporting. The number of hands and systems that touch the plan from order to ship continues to grow. Instead of making things easier or more efficient, the result is more lag time to communicate production plans and changes, and a much higher risk of error. The complexity grows exponentially with each new system or process. It's a rare occasion when inbound supply, production, and outbound goods all align with demand and plan.

Without accurate information, the disconnect grows, and it becomes impossible to accurately analyze and explain the discrepancy between plan and reality.

Reality: Businesses are data rich and information poor

How many pieces of paper does it take to run a manufacturing plant? For some, it's not a number they'd be glad to share. Typically, once the plan is set by the ERP, plants print out work orders, which are attached to work centers and given to each person running the equipment. Line workers see it and know, “these are the orders I need to fill today.” Production begins, and workers manually record what's happening on the line. Often factories use preprinted forms or pads:

- How many parts did we make?
- How much did we scrap?
- Was the machine on or off?
- If it was off, why was it off?

Even if plant managers are highly successful in gaining support from all the line workers throughout the facility, at the end of each run, shift or day, someone has to collect all that paper, and enter it in the ERP or planning system.

Because recording and data entry are manual processes, many workers feel a sense of optimism. In other words, people record their perceptions, rather than what actually happened. The result is perhaps overestimating the number of good items made, or underestimating the amount of scrap. Workers may record that a machine was down for 45 minutes for setup, when in reality setup took 55 or 60 minutes. It's not a question of honest reporting. Instead, workers focus on their job—making product—rather than on reporting.

Many times there's a long reconciliation exercise at the end of each shift and an attempt to make reality fit the plan—adjusting the numbers and reporting. Without accurate information, the disconnect grows, and it becomes impossible to accurately analyze and explain the discrepancy between plan and reality. Ultimately, there is no valid insight to make either strategic or tactical decisions, and decision making is based on faulty data and anecdotal incidents. Even then, there is significant lag time from what happens on the production line to reacting and decision making.

Reality: Manufacturers throw away money and much more

Any disconnect in the enterprise means that people don't understand the true impact of actions—either within the plant, or of strategic decisions. That lack of insight typically costs a lot of money.

Excess stock on raw materials. High finished goods inventory. Inbound and outbound express shipments. These are just a few of the “hidden” penalties of not having enough or the right information. Some companies miss order deadlines or end up spending the profit on overtime to get orders out the door. Reputation often suffers, and as quality and customer service decline, so does customer retention and new business.

Manufacturing businesses that close the loop on the extended supply chain—everything from planning, raw materials, production, delivery, and customer satisfaction, and everything in between—uncover a wealth of opportunity to drive down costs and boost revenue.

Myth: “Top to shop is just a lot of fancy charts and graphs”

Meaningful connections and a single set of facts isn’t something we “see”. Instead it’s the heartbeat of a business organized with ERP, MES and EMI working in harmony to provide a flow of accurate information throughout the organization. The result is a unified ecosystem that eliminates complexity in business processes, despite complexity of manufacturing.

The focal point of “top-to-shop” is ERP. It connects everything, vertically within the business (from shop to top), and horizontally so that there are seamless connections from supplier to production, to the customer. Manufacturing execution (also called production management) and manufacturing intelligence complete the connections, so that data and insight flows to and from ERP. These are the connections that provide entirely new insights on how to react, how to improve the business, and how to make timely proactive decisions based on fact.

In practice, it’s a closed-loop control system. The ERP still creates a plan—but then that plan moves electronically to the shop floor via the MES. The system creates work orders, and as production happens, it monitors exactly what takes place and what is produced. Information flows back into the system directly from assets on the line, via PLCs, purpose-specific devices, or an OPC standard. The MES feeds data to the EMI system as well as back to the ERP, and everyone throughout the business knows what’s really going on at all times. It’s a single, real-time version of the truth—and there’s no margin for interpretation or misunderstanding.

Reality: Entirely new insights emerge for the connected business

Manufacturers that combine ERP, MES and EMI make quantum leaps in building and sustaining improvement programs. The closed-loop control system creates trust, because the entire team (from top to shop) knows in real-time what is happening. More importantly, everyone throughout the system—on the line, plant operations, plant management, and corporate management—has an unfiltered view of reality without rekeying, and with no time delays.

With a clear view, it’s easy to decide which actions come first, second, and so on, to fix problems and improve performance, regardless of where any individual “resides” in the organization. For example, when the production worker sees data that indicates temperature or speed problems on the line, he can take action immediately to avoid bad parts. Using the same data, plant operations and management can make tactical decisions about combining orders, startup/shutdown to save energy, or others that could reduce costs. Finally, this data might be used by executives to justify or avoid capital investments, or even help other lines or facilities improve.

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Real-time performance data becomes historical insight—to make sure fixes “stick”, and as a benchmark to understand the reasons for performance gain or loss. After capturing low-hanging fruit, the historical data and analytics inside MES and EMI help uncover ways to build on gains or avoid loss, to leverage tactics and strategies for even greater improvements.

Conclusion

Manufacturers that address the fundamental requirements—single version of the truth, an actionable strategic plan, insight for those who need it, closed-loop supply chain, and connected flow of information—know that “Top-to-Shop” isn’t an urban legend any more. Those that have eliminated the disconnect between the shop floor and the top floor by connecting ERP, MES and EMI have succeeded in enhancing the extended supply chain. More importantly, their executive leadership consistently achieves business goals—with the help of those on the line and in plant, operations and management.

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