

# Connect the Dots

Today's factories generate vast quantities of raw data, capturing information about everything from output to downtime to worker productivity. That data, when put in the proper format and the appropriate hands, can become useful information to improve business processes both within manufacturing and in other departments, such as accounting and human resources. But to truly leverage the data needed to improve performance, engineers on the plant floor and experts in the IT department need to work in tandem, breaking down the barriers that have traditionally divided the two groups.

The benefits of convergence can be enormous and exist at enterprise, plant, department and individual levels. Companies that have moved toward converging IT and controls engineering report lower costs and higher efficiency of these departments. They enjoy better business continuity, reliability and disaster recovery. Project timelines are shorter and response to issues is better. In general, these companies have a competitive advantage that will work for them shift after shift and year after year. Convergence - or at the very least collaboration - between plant controls and IT also can be a logical means to succeed with goals such as globalization, product proliferation, outsourcing and broadening value to customers.

The key to unlocking the benefits of plant-to-enterprise integration is not the technology; if it were, manufacturers would have already made great leaps forward. The major obstacles lie in mind-sets and communication. IT professionals and manufacturing engineers emerge from different educational backgrounds, possess contrasting skill sets and speak different languages in the workplace.

Yet each has important knowledge and invaluable experience to help energize the enterprise. Business works best when team members understand and value each other's attitudes, perspectives and cultural differences. Mutual respect for one another's roles and better understanding of each group's business pressures, work styles and unique contributions are required.

I set out to explore the challenges and benefits of IT/manufacturing convergence by interviewing more than 20 managers from both sides of the business. I found a common set of issues that should be considered when embarking on any level of cooperation or convergence.

Increasingly, those who run manufacturing companies - CEOs, CFOs, CIOs, COOs and their teams - want instant access to information. Having IT and

controls engineering work together more closely enables greater transparency and consistency in how plants report their data. While visibility into operational data may be used to pressure those in the plants, it also fosters sound decision-making and greater predictability of financial results. For example, one company reports that cycle time and gross profit improvements resulted from a manufacturing enterprise solutions (MES) effort that brought together IT and controls data. Consequently, some managers now better realize the potential for reducing waste and making better use of both human and technology resources.

Clearly, effective leadership is crucial to creating convergence. First, a good leader will recognize whether the classic divide between IT and control engineers exists in the organization. If so, then it is time for action. Bring top members from the two teams together for frank discussions and brainstorming. Help create partnerships and relationships among the two teams by including them in planning and strategy meetings, training, staff development and team-building events.

At every stage of the convergence process, leaders need both organizational skills and personal characteristics such as communicating and listening well. Those traits are key to creating trust among team members and critical to ensuring that everyone's expertise is leveraged.

Another way to integrate the two groups is to create formal reporting structures. One person alone could focus on facilitating and taking advantage of convergence. In other cases, a group could be dedicated to this liaison role. Some companies will create a converged organizational structure in which one department reports to the other or one technology group includes both IT and controls engineering.

One supervisor who became the sole liaison for an integration process reports, "In the past, our working relationship was dependent on the personnel rather than procedures or standards, which is what we are trying to fix. All of those groups report dotted-line to me now. It's not total control, but I'm in a position to influence."

Top leadership must remember that convergence of IT with process control is not an event that can be mandated by management, but rather a process by which an organization evolves. So, as the process moves forward, executives must continuously foster the strategic alliances between manufacturing and corporate IT to ensure that each group's viewpoints are addressed.

Sometimes, the people in the trenches - the midlevel managers - recognize the need for greater collaboration and communication. But while IT and controls engineering are highly trained individuals, many practitioners on each side of the fence have preconceived notions about what the other group does and how effectively it works.

Many controls engineers view IT as an organization that is so tied up in documentation and standards it cannot take effective action. Also, project-oriented engineers who often are called in when a problem is hurting production sometimes view IT as impossibly plodding and overly complex. What they may not recognize is that IT projects are often rolled out or standardized globally, so the impact of issues ripples.

Conversely, many IT employees view control engineers as somewhat undisciplined cowboys who go out and fix problems or conduct projects without regard for future consequences. IT shudders at the high ongoing maintenance costs as well as the risk of not replacing obsolete equipment just because it is running a production process. One IT manager says, "Engineering drives out a problem, then moves to the next one. They do not necessarily have a vision of what they need and how to attain it over time. They are very reaction-oriented." What IT may not realize is how essential control engineers are to keeping the plant running and how expensive even short periods of downtime can be for the company in profits and customer good will.

While the people may be different, technology is often a unifying force. Today's control systems are grounded in the same operating systems and networking technologies common in IT. The practice of controls engineering departments "hiding" their computers from IT is thus becoming not only more difficult, but also less productive. On the other hand, IT needs to gain a better understanding of and appreciation for the unique demands of manufacturing-centric information systems. Most production employees have a disaster story relating to IT standards and maintenance practices wreaking havoc in a manufacturing environment.

An example of skillful teamwork was aptly summarized by an engineer working at a leading ladder manufacturer, "I showed a team of IT people, internal auditors, production people and accounting staff that most of the information they needed already resided in the control system on the plant floor. We discussed how I could take that information and transfer it into existing databases where people were currently hand keying information. From that point forward, the changes were driven by all involved parties. That was the key to making the whole project successful."

Such collaboration can help speed common goals, such as assessing the current manufacturing and IT systems environment and setting standards for integration, data management and future technology investments. These projects often carry the added benefit of creating a more nimble organization. Most companies find that each team member should retain specific roles so that everyone knows who to call for various issues. However, they should be cross-trained for flexibility so that any team member can take on any issue that arises.

Some of the keys to success for implementation projects by cross-functional teams are common to nearly any project and team. These include good specifications and clear project plans, sound project management, leveraging best practices and management buy-in on the value proposition and total cost of ownership.

Sometimes building unity inside an organization requires recruiting outside help. Consider the value of involving experienced automation and IT partners in your convergence project. Working in concert with your internal team, these partners can bring insight and perspective to the process, along with integrated automation solutions. An impartial third party who understands IT and automation terminology also can play a key role in helping to mediate and translate between the two groups. Here are some tips for successful collaboration:

- **Ensure top executive support.** Senior managers such as engineering VPs, operations VPs and CIOs must endorse convergence to create a clear vision of the expected results.
- **Form cross-functional teams.** Creating core teams ensures a full understanding of all goals and issues relating to integration.
- **Allow ownership.** Standards can take hold more effectively if all stakeholders are part of the process.
- **Develop guiding principles of design.** Ground standards and technology blueprints or roadmaps. For example, in manufacturing, good design must allow for maintenance without shutting down the system.
- **Standardize architectures.** Cross-functional virtual center of excellence teams can create corporate blueprints or roadmaps for architectures, so people in each plant have a framework within which to act quickly when they need to address an issue. Review these blueprints annually. Conduct peer reviews of designs.
- **Create merged reporting.** Form manufacturing-focused IT groups that report to both operations and/or plants as well as IT and controls engineering with common accountability or at least dotted-line responsibility to the same executive(s).

- **Formalize control-system change processes** for all plant floor modifications.
- **Best practice feedback.** Conduct a postmortem at the end of each project to see if standards, policies or procedures need to be revised.
- **Audit results.** Have project teams check in at major milestones to show an investment review board or accounting team what they have done and ensure projects deliver the value they promise.
- **Hire for mind-set.** A prospective employee's way of thinking, attitude, communication skills and interest in learning new domains