

## **Collaborative Manufacturing Management for profitability and competitive advantage**

*Like the members of virtually every other industry, pharmaceutical manufacturers are looking for new ways to leverage partnerships and technologies to gain competitive advantage. Optimizing processes and sharing information across the enterprise are critical to success in every facet of the business. (1/24/2002)*

A recent report from ARC Advisory Group highlights a new strategy – Collaborative Manufacturing Management (CMM) – designed to maximize the responsiveness, flexibility and profitability of the manufacturing enterprise. According to ARC, CMM can “improve response to changing market conditions, streamline product introductions, improve asset utilization, increase or maintain market share, reduce inventory and reduce cycle times.”

ARC defines CMM as “the practice of managing by controlling the key business and manufacturing processes of a manufacturing enterprise in the context of its value networks. CMM is a new strategy that focuses on facilitating and managing business processes first, and the supporting systems second.”

In response to today’s business environment, manufacturing companies, according to ARC, are optimizing processes for “overall enterprise-wide effectiveness rather than individual plant efficiency; and many are moving from isolated business processes to distributed, synchronized business process management.”

According to the report, most manufacturers are utilizing Customer Relationship Management (CRM), Advanced Planning and Scheduling (APS), Supply Chain Management (SCM), e-procurement and logistics systems. Some have begun to replace aging automation systems with Collaborative Automation System (CAS) components, and many have experimented with portals and exchanges. ARC believes those enterprises incorporating real-time business intelligence, analysis and decision-support tools for top management have the competitive advantage.

In order to understand the context for planning and implementing collaborative manufacturing systems, ARC contends manufacturers must visualize the relationships among plant and enterprise applications, markets, value chains and manufacturing nodes. According to the report, a collaborative manufacturing network “consists of spheres or manufacturing nodes connected by material, information and process flows.”

In the CMM model, business and production functions, currently supported by manual processes and legacy applications, are performed by “collaborative components capable of orchestrating the designated functions in concert with the business goals of the node and the competitive dynamics of the value chains in which the node or enterprise participates.”

There are, according to ARC, seven functions of collaborative manufacturing:

- *Synchronization of business processes with manufacturing processes* – To be competitive, manufacturers must raise the visibility of manufacturing information in order to optimize performance, enhance responsiveness and manage costs. Those who leverage manufacturing data not only to continuously improve their own operations, but also to enhance their information sharing with customers and suppliers will gain advantage.
- *Optimization of the supply-side value chain* – To improve their upstream supply chain performance, plants can utilize Supply Chain Management (SCM) and procurement systems or they can participate in buy-side exchanges or portals. Collaborative manufacturers can leverage this information in real-time to distribute work throughout the production network in response to actual demand, rather than forecasts.
- *Automation of business processes across departmental and business boundaries* – As powerful, connected computing devices become pervasive and exchanges change the dynamics of buying and selling, the foundation is being laid to change the fundamental paradigm from one of providing data or information visibility to human decision makers, to one of providing the benefits of real automation an business process control.
- *Generation of value by empowering people and measuring results* – Web-based tools allow manufacturing managers to visualize information from a variety of systems throughout the enterprise and interpret the results in conjunction with established performance metrics.

- *Implementation of collaborative design and engineering* – Collaboration systems must support assembly sequence planning, constraint-based design, distributed process planning and layout, work instructions development, routing and operations times, performance analysis and optimization. In addition, they must be integrated with plant business systems. Collaborative solutions for chemical, food and pharmaceutical plants should support recipe-related business processes in R&D, manufacturing and marketing. They should also ensure consistent recipe maintenance across enterprise boundaries.
- *Linking of operations with customers* – Production information on quality, materials availability and production status must flow downstream to customers, while information on orders inventory levels, specifications and change orders flows upstream.
- *Enabling collaborative maintenance and manufacturing support* – Implement an Enterprise Asset Management system that is closely integrated with production management and Plant Asset Management systems. Another important collaboration area is with plant equipment suppliers for remote monitoring and maintenance of plant equipment via the Internet.

CMM, according to ARC, “builds upon a collaborative infrastructure, business process management services, and real-time strategic business management tools, together with critical applications, production systems, and enterprise information to maximize the responsiveness, flexibility and profitability of the manufacturing enterprise.

ARC predicts the benefits of collaboration will demand rapid enablement of seamless integration with new partners and will become a major challenge for system architects. To avoid the frustrations that can come with addressing each new integration as another point-to-point connection, ARC recommends an infrastructure approach to integration as a basic element of any CMM system.

The report outlines four main areas to consider in an infrastructure to support CMM:

- Connectivity within the enterprise and among various sites;
- External connectivity to partners and customers;
- Equipment connectivity; and
- Visibility of necessary information to users throughout all levels of the enterprise.

Internal connectivity, ARC advises, can be implemented with application servers, messaging, host integration and Web services, while external connectivity can be achieved through private and/or public exchanges and portals. Information visibility, ARC believes, can best be achieved through the use of portals.

ARC believes implementing collaborative manufacturing also requires “building and implementing business processes both internally (from deep within manufacturing systems to deep within business systems and externally, connecting partners along a number of dimensions.” Business Process Management (BPM), the group contends, is the driver for integration, both among applications and between companies.

According to the report, “introducing portals and exchanges begins to make advanced collaboration possible by leveraging the Internet to simplify the interconnection between systems and users and between business entities. But manufacturers need to add the infrastructure to support the complexities of implementing business processes across organizational, geographical and functional boundaries. This requires the addition of workflow management, messaging, data translation and connectors to new and legacy applications.”

Such BPM systems overcome hurdles such as asynchronous connections between customer or supplier-facing portals and the manufacturers’ internal systems and applications.

ARC advises that “recognizing manufacturing as a system of interrelated processes is vital to managing and improving performance.” And integration of those processes is vital to ensuring consistent and reliable performance, but “overlaying collaborative processes on top of an integrated system enables even higher levels of performance.”

To learn more about collaborative manufacturing or to obtain a copy of the ARC report, visit the group’s Web site at [ARCweb.com](http://ARCweb.com).