Global Manufacturing Solutions | Volume I Issue II

Expert advice for optimizing your manufacturing operations with research from Gartner.

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Gartner

Optimizing the Value Chain in a New World: It All Begins with Manufacturing

By Ron Wichter, Senior Vice President, Rockwell Automation
Global Manufacturing Solutions

Welcome to the second issue of *Global Manufacturing Solutions*, a publication with expert advice for optimizing your manufacturing operations. As with our first issue, we're bringing you leading research from Gartner to help you maximize success at the factory floor layer of your operation.

Recently, Rockwell Automation hosted the annual Rockwell Global Media Summit at the Renaissance Atlanta Hotel in Atlanta, Georgia, USA. The purpose of the Global Media Summit is to invite trade press from around the world to gain a better understanding of Rockwell Automation and the solutions we provide.

At the summit, a distinguished guest shared the podium with Rockwell Automation Chairman and CEO Don Davis: Gail Fosler, senior vice president and chief economist for The Conference Board, the world's leading research and business membership organization. Ms. Fosler has received prestigious forecasting awards and twice been named "most accurate forecaster" by *The Wall Street Journal*. She is a member of several corporate boards, and a regular contributor on ABC, CNN, the BBC, and other major television networks.

Ms. Fosler gave us an eye-opening view of the state of the global manufacturing sector and the new world in which it now operates. She began by talking about the value that manufacturing adds to the total value chain.

Value and the Manufacturing Sector

In the United States, value added in the manufacturing sector has remained constant at 18 to 20 percent — down from 26

percent in the 1970s, despite growth in the tech sector due to innovation. The growth of the U.S. service sector, the move by global companies of manufacturing to other parts of the world, and emerging markets where foreign investment has been high, are causing all countries to fight to maintain position in their respective manufacturing sectors.

Today, "there are no innate advantages in the manufacturing world," states Fosler, "but there are no innate disadvantages either."

Within the manufacturing sector, however, the value-added for goods is rising. Because of this, says Fosler, the manufacturing sector has more opportunity to capture value than the services sector — and the opportunity to maximize its value by reducing its cost lies at the factory gate. The best way to do this? By using information and communications technology.

According to Fosler, currently, there are lows in manufacturing that resemble those of the 1981-82 recession. There is also an investment decline. Despite this, there is ability and willingness on the part of manufacturers to use these technologies and push forward their value in the chain, says Fosler.

"There are things being written about the manufacturing sector going the way of agriculture," she says. "But structurally, the manufacturing sector is alive, vibrant, and at work."

Committed to Understanding Manufacturers' Needs

According to Don Davis, who also spoke at the Global Media Summit, "Manufacturers have to cope with several things that affect their manufacturing strategies: industry consolidation, value chain reconstruction or management, and the convergence of technology." By understanding manufacturing and manufacturers' needs, Rockwell Automation is positioned to provide solutions in the new world of the manufacturing sector.

If, as Gail Fosler states, manufacturing has the greatest opportunity to push value through the chain, manufacturing must take advantage of these opportunities. Optimizing manufacturing is now seen as the key to optimizing the value chain. While there have been software and services that address these concerns, manufacturers have been hard-pressed to find people who really understand their problems to implement these solutions. As such, manufacturing has become a missing link in the value chain.

That is, until now. As ERP products, solutions, and providers have thrived, so has the enterprise's role in the value chain. As ways to further optimize the value chain are being considered, attention is now being turned to manufacturing, the link that stands to improve the most by virtue of the solutions — and the providers — now available to optimize it. We at Rockwell Automation are supporting this through our strategic initiatives, services, products, and consultants.

Adding Value Through Partnerships

We understand the link between manufacturing success and the overall performance of your operation, and how that extends to the value chain. Through our expertise, we are positioned to help implement solutions that can help you achieve manufacturing success.

Another way we optimize the value chain is through our partnerships. Strategic partnerships allow Rockwell Automation to provide more offerings that solve value chain issues. They also allow us to move into solving a bigger suite of problems, providing more value to our customers.

We enhance collaboration through partnerships resulting from IT consulting and acquisitions. With our partners, our goal is to:

- optimize manufacturing,
- improve plant uptime,
- reduce time to market, and
- drive regulatory compliance.

Through improved handling, digitalization, optimization, and simulation of information, we can help you to analyze, therefore improve, your performance.

It's a New World

Gail Fosler states that the long-term changes taking effect in the current economic environment will change the way business is done around the world. The articles you'll find in this issue of *Global Manufacturing Solutions* address these changes and propose solutions for surviving in a new world.

"Today is not like yesterday," says Fosler. "Because of this, I encourage the manufacturing sector to think in innovative ways. It is very easy to be overcome by risk, but the opportunities are even greater."

Source: Rockwell Automation

The Rockwell Automation Network: Working for You

The Rockwell Automation value-added network now includes:

Propack Data GmbH
Acquired: March, 2002
Base: Karlsruhe, Germany
Business: Manufacturing information systems for pharmaceutical and other regulated industries
Benefit: Makes Rockwell Automation a preferred partner in pharmaceutical industry; expands reach into food and beverage, life sciences, and cosmetics industries

Sequencia Corporation
Acquired select assets: October, 2000
Base: Phoenix, Arizona, USA
Business: Batch software and services
Products/services: rpmSeries™
Benefit: Strengthens Rockwell Automation's leadership in batch automation; expands Manufacturing BizWare™ capabilities

Systems Modeling Corporation
Acquired: April, 2000
Base: Pittsburgh, Pennsylvania, USA
Business: Shop floor scheduling, supply chain simulation and modeling software
Products/services: Tempo, Arena™
Benefit: Expands Rockwell Automation's Manufacturing BizWare™ capabilities

Entek® IRD™ International Corporation
Acquired: March, 2000
Base: Milford, Ohio, USA
Business: Condition-based monitoring equipment, analysis software, professional and Internet services for MRO marketplace
Products/services: Integrated Condition Monitoring Solutions, including: hardware; software; balancing systems; protective monitoring systems and surveillance capability; predictive maintenance solutions, and; platform and gateway for integrated CMMS/EAM solutions
Benefit: Expands Rockwell Automation's asset management offerings

Enterprise Technology Group
Acquired: April, 1999
Base: Pittsburgh, Pennsylvania, USA
Business: Automating information flow through application-specific software
Benefit: Continues Rockwell Automation's growth in automation software

Source: Rockwell Automation

Manufacturing Planning: Fundamentals and Indicators of Collaboration

By B. Zrimsek

Collaboration in manufacturing planning requires enterprises to extend bedrock capabilities to the supply chain. Gartner presents performance indicators to help enterprises rate performance and discover opportunities.

Manufacturing enterprises can measure the impact of collaboration by starting with the best practices of traditional manufacturing planning, then extending them to all members of the supply chain. A major benefit of collaborative commerce (c-commerce) is reaped when enterprises become capable of applying their own winning measurements of manufacturing proficiency to their key suppliers. That requires manufacturers to open up their best practices to suppliers and treat them as an essential part of the enterprise, demanding no more or less from them than they would ask of their own employees. Developing this inclusive mind-set will enable the timely sharing of critical information, so that production decisions can be made with the best interests of the whole supply chain in mind, not just the needs of the enterprise or channel master.

Enterprise performance within the context of the supply chain remains important to collaboration as fundamental business practices are extended from the enterprise to customers and suppliers. For many manufacturers, however, the least visible link in their supply chain is their own facilities. Turning to c-commerce may seem like an easy way around the problem, but if internal performance can't be measured, moving measures outside the enterprise will only further muddy the waters.

Figure 1
Measurements of Collaboration

Traditional Indicator	Enterprise Measure	Collaborative Impact	Collaborative Indicator
Forecast Accuracy	The percentage difference of predicted vs. actual demand	Increased external visibility to forecasts creates larger imperative for accuracy	Increased accuracy indicates c-commerce readiness
Inventory Accuracy	The percentage of items for which system inventory and physical inventory differ	Collaborative planning will be based on collective inventory information; failure to provide accurate data will erode relationships and drive up supply chain inventories	Increased accuracy indicates c-commerce readiness
Time Fence Adherence	The percentage of orders completed that were inserted into the schedule after the schedule was frozen	As supply chains become more synchronized, short-term changes will ripple throughout participants and lead to inventory buffers and poor customer service	Short-term demand stability indicates c-commerce readiness
Lead Time	The average time from customer request and authorization to customer order receipt and installation completion	Lead time will be measured for the organization and the supply chain, measuring total time from sourcing through production and distribution	Reduction in lead time across the supply chain indicates a more collaborative community
Work-in-Process Inventory	The ratio of in-process inventory dollars to average daily sales dollars	WIP will be measured in terms of the supply chain in addition to the organization; enterprise initiatives that push inventory on suppliers can no longer be judged as successful if they create problems elsewhere	Reduction in WIP across the supply chain indicates a more collaborative community
Inventory Turns	The ratio of annual sales dollars to inventory dollars on hand	Collaboration will reduce the need for inventory buffers between enterprises	Reduction in inventory across the supply chain indicates a more collaborative community
Constraint Utilization	The ratio of time that critical work centers/machines are in use to the total time available for use	Available capacity data on key constraints, will be used in nontraditional e-markets and exchanges to drive up utilization and gain business from noncore customers	Knowledge and management of constraints indicates c-commerce readiness

Source: Gartner Research

The indicators depicted in Figure 1 are keys to overall enterprise and collaborative success.

Necessities: Accuracy and Trust

Any supply chain, collaborative or not, is only as strong as its weakest link. Driving performance improvement via these metrics will improve the capability of the enterprise within the supply chain. In addition, quantifying these metrics before implementing collaboration initiatives will create a baseline from which subsequent business improvement can be identified and measured.

Enterprises that roll out collaborative processes and applications face issues as simple as data accuracy and as complex as interenterprise trust. Information must be accurate as it passes through the supply chain. If it is not, the faulty data will undermine all transactions and erode the trust of supply chain partners. Trust is the greatest inhibitor to (and enabler of) collaboration — it is essential for overall success. Trust and collaborative capability become directly proportional. Enterprises must trust suppliers with potentially sensitive data to facilitate collaborative planning. Enterprises must trust suppliers to act in the best interests of the supply chain and not just themselves. Because of the importance of these relationship issues, enterprises should choose only a few key suppliers for inclusion in full collaborative initiatives. Such a manageable "short list" of suppliers will enable enterprises to hedge their bets against collaboration failures with other suppliers.

Bottom Line: Enterprises must provide information and expectations to suppliers and treat them as an essential part of the enterprise. The failure to treat key suppliers with trust and commitment will erode relationships and make collaboration impossible. Enterprises should analyze their planning environments and, by using Gartner's offered indicators of collaboration, determine their potential for planning successful collaboration.

This research is part of a broader article consisting of a number of contemporaneously produced pieces.

Gartner's Manufacturing Applications Strategies Commentary COM-13-3853, 29 May 2001.

Optimizing Factory Floor Key to Successful Collaboration

According to Gartner's Research Note entitled *Manufacturing Planning: Fundamentals and Indicators of Collaboration*, published 29 May 2001, "Enterprise performance within the context of the supply chain remains important to collaboration as fundamental business practices are extended from the enterprise to customers and suppliers. For many manufacturers, however, the least visible link in their supply chain is their own facilities."

Gartner's "supply chain" represents activities, such as purchasing and production, that take place in an even larger arena, where factory floor operations are linked to the supply chain, called the "value chain." At every link in the value chain, the value of products and services is increased until they are ultimately passed on to customers in the marketplace.

"If the manufacturing operation is disconnected, if it's not optimized to perform well within the rest of the supply chain, then you've failed."
Wes Wernette, Rockwell Automation Global Manufacturing Solutions

Since there is room for improvement in a supply chain, a similar opportunity also exists in the value chain. Since supply and value chains are thus inexorably linked, manufacturing processes are key to the success of both. If manufacturing is the weakest link in the supply chain — therefore the overall value chain — improvements in the former result in improvements in the latter. The first step in doing this is by better connecting, or "optimizing," the factory floor to the rest of the value chain.

Optimizing the factory floor — and its interaction with the value chain — is now viewed as key to successful collaboration. Overall, collaboration at the enterprise layer has provided opportunities for stronger relationships, greater communication, and increased efficiencies with suppliers and customers. When extended to the factory floor layer, collaboration results in an even keener competitive edge.

Steps to becoming a stronger collaborative partner:

- Identify how manufacturing operations fit into the value chain
- Optimize, or connect, those operations to the value chain
- Measure and analyze overall performance

Whether manufacturers are operating in manual environments or with IT and ERP systems in place, Rockwell Automation Global Manufacturing Solutions Consulting Services can help them achieve these goals.

Source: Rockwell Automation

Economic experts have recognized that the opportunities for improving collaboration at the manufacturing layer are great. In a recent address to the Rockwell Automation Global Media Summit, Gail Fosler, senior vice president and chief economist of The Conference Board, the world's leading research and business membership organization, stated: "Manufacturing has more opportunity, through information communications technology, to push its value forward in the chain."

This is precisely the focus of Rockwell Automation's Global Manufacturing Solutions Consulting Services: Through their technologies and services, to optimize the value chain by optimizing manufacturing. Their approach to successful collaboration is making plant facilities an essential link in the value chain.

Wes Wernette, practice leader for operational consulting, Rockwell Automation Global Manufacturing Solutions, says that optimizing manufacturing is an idea whose time has come. "If you've already invested in IT infrastructure, an ERP system, or a supply chain software package," says Wernette, "you are in a good position to benefit from collaboration at the factory floor level. Optimizing manufacturing, and its interaction in the supply chain, provides the opportunity to increase the responsiveness and effectiveness of the entire value chain."

One critical activity that spans the entire value chain is order flow management. The lower the degree of collaboration in the

Two KPIs: An Example

Two Key Performance Indicators (KPIs) that particularly impact the customer are:

1) lead/cycle time, and
2) work-in-process inventory.

Manufacturers want to shorten the time it takes between the customer's request for a product order and the customer's receipt of that order. They also want to reduce their ratio of inventory dollars to sales dollars. Collaboration allows lead/cycle time to be measured all the way from sourcing to distribution, allowing manufacturers to reduce lead time across the entire value chain. It also allows work-in-process inventory to be measured, enabling the manufacturer to identify points where excessive inventory exists and reduce it, versus pushing excess inventory to suppliers.

Source: Rockwell Automation

Optimize Manufacturing, Optimize the Flow

"Order flow management" is a critical activity that spans the entire value chain. Manufacturers have four needs that stem from order flow management:

- To send suppliers information in order to get supplies and materials for production
- To get those supplies and materials out on the production floor
- To make the right goods on the production floor
- To get those goods out to customers on time

Source: Rockwell Automation

value chain, the more likely the failure of one or more of the four objectives of order flow management (see above). The key to reducing failure is a higher degree of integration and accurate information shared among manufacturers, customers, and suppliers — therefore a higher degree of collaboration.

"The greater the number of linkages you have between the business system and customers, suppliers, and the factory," states Wernette, "the greater your collaborative ability. In turn, the entire value chain becomes more responsive, efficient, and agile."

Rockwell Automation offers several solutions that enable manufacturers to identify opportunities for collaboration. Global Manufacturing Solutions™ offerings help to optimize manufacturing through order flow management, which tracks orders as they come from the customer, through a company's business systems and manufacturing floor — and throughout the entire value chain.

According to Wernette, "connectivity" is at the heart of collaboration. "Information systems are important," he states, "but the way in which they're deployed to improve collaboration is what provides competitive advantage and true value."

Through its consulting services, Rockwell Automation Global Manufacturing Solutions provides several ways for achieving that connectivity. Once solutions are in place, not only is the factory floor now a strong link in the chain, but it can also afford manufacturers the ability to improve. By making its factory floor collaborative, an enterprise can also learn a great deal about its own manufacturing performance through significantly improved operational information. But only when a company measures, analyzes, and optimizes its performance can it improve its performance.

Rockwell Automation Global Manufacturing Solutions Consulting Services provides connectivity solutions:

- **FactoryTalk™:** Providing the backbone for communications between factory floor operations and the supply chain
- **RSScheduler™:** Optimizing scheduling on the factory floor
- **RSSql™:** Connecting the shop floor and top floor, enabling communication between the factory and ERP and supply chain integration software programs
- **RSBizWare™:** Visualizing, data forming repository, and data analysis
- **Others:** Simulating capabilities, training

Source: Rockwell Automation

Improving Connectivity, Building Relationships

Rockwell Automation Global Manufacturing Solutions recently provided a collaboration solution for Ferro Corporation. Ferro, the world's largest manufacturer of ceramic glaze and porcelain enamel coatings based in Cleveland, Ohio, has manufacturing facilities in France. While the company was using an SAP-based enterprise system, it had no automated way of collecting data about what was happening on its factory floor and reporting it to that system. As a result, Ferro eventually developed problems related to inventory accuracy.

Specifically, Ferro asked for help with its inventory problem and its impact on the value chain. Consultants determined what key data was needed, how often Ferro needed it, and what format it was needed in. The solution? RSSql Gateway, which now links Ferro's SAP-based ERP software to its factory floor, enabling improvements in inventory accuracy. As a result, Ferro is better able to collaborate and communicate with suppliers on inventory issues.

Source: Rockwell Automation

"Manufacturing has more opportunity, through information communications technology, to push its value forward in the chain."
Gail Fosler,
The Conference Board

According to the above mentioned Gartner note, "Manufacturing enterprises can measure the impact of collaboration by starting with the best practices of traditional manufacturing planning, then extending them to all members of the supply chain." Using the enterprise's key performance indicators, or KPIs — what Gartner refers to as "Measurements of Collaboration" in Figure 1 (see page 4) — manufacturers can determine what they are most

proficient at, and then extend those proficiencies, or best practices, throughout the value chain. Once identified and then measured, KPIs help to set clear expectations for everyone in the chain, and enable the enterprise to treat everyone in the chain as an important part of their extended operations. KPIs also drive improvement at the manufacturing level, serving to improve the overall performance of the entire chain.

The Conference Board's Fosler states that: "Manufacturing must see itself as part of the value chain. Manufacturing must not look from the inside out, but the outside in. In doing so, it effectively becomes part of the chain." Optimizing the value chain — achieving that connectivity between the factory floor and the supply chain — enables an enterprise to look from the outside in. In this way, it extends even greater value throughout the entire value chain, not just to the enterprise itself.

Optimizing the value chain creates a competitive edge by also providing accurate information throughout the chain. As a result, everyone in the chain is an informed part of the chain. Because of this inclusion, trust, the foundation of good relationships, is built. Solutions recently provided by Rockwell Automation Global Manufacturing Solutions for Ferro Corporation demonstrate these benefits (see *Improving Connectivity, Building Relationships*, page 6).

Ferro's collaboration success is indicative of the essential nature of factory floor interaction to the rest of the supply chain — and therefore, to successful collaboration. "If the manufacturing operation is disconnected, if it's not optimized to perform well within the rest of the supply chain," says Wernette, "then you've failed."

Collaboration at the manufacturing layer protects against this failure, providing valuable information to everyone in the value chain. "Successful collaboration enables suppliers to know what's happening, customers to know where their orders are, and management to understand exactly what's happening on the factory floor at any given time," says Wernette. "Further optimizing the value chain by way of optimizing manufacturing is the new key to collaborative success."

Source: Rockwell Automation

New Zealand Dairy Plant Optimizes to Meet Export Regulations

After a plant-wide installation of Rockwell Automation's RSSql™ data transaction software, a wealth of available plant-floor data enables New Zealand dairy manufacturer NZMP to provide the crucial documentation required to meet new export regulations.

'Bits' of butter and 'bytes' of cheese — it's all part of the advanced data-grabbing technology at the world's largest dairy manufacturing site, New Zealand's NZMP Whareroa facility. Building upon an extensive automation network linking ten separate factories, NZMP has taken the next major step in plant optimization: collecting myriad data from PLC® controllers on its factory floor into a single central database.

What pushed NZMP in this new direction? Compliance with new export regulations instituted by the New Zealand Ministry of Agriculture and Fisheries (MAF) that requires all of the country's dairy producers to produce accurate weight documentation. For NZMP, failure to comply meant that the company would not be permitted to export its 600-item product line.

As a result, NZMP began to better integrate their ten plants — which, together, process 14 million liters of milk a day — so that they could better control carton filling and produce the documentation needed for compliance. Controlling their operations is one of the largest automation systems in the southern hemisphere. Divided among nine operation "zones," the system consists of more than 230 Allen-Bradley controllers (a mixture of ControlLogix™, PLC-2®, PLC-3®, PLC-5®, PLC-5/250™ and SLC-500™) and more than 110,000 I/O points. Each zone is also equipped with a ControlLogix Gateway — supporting Data Highway Plus™ (DH+™), Ethernet® and ControlNet™ networks. Rockwell Software's RSSql™ collects and monitors the real-time data generated on each of NZMP's plant floors, and reports it to the company's enterprise layer.

The data transactions handled by RSSql, courtesy of its seamless connection with the plant-wide Allen-Bradley PLC network, have become an integral component of NZMP's operations. Not only do they provide the export documentation so crucial for regulatory compliance, but they also form a critical link in the whole chain of milk deployment, processing, and quality control in the company's facilities.

In RSSql, along with other Rockwell Automation products, NZMP received a solution that allows refined control of carton filling processes, as well as accurate documentation of the exact weights it exports. "This documentation is so important," says NZMP Whareroa Automation Engineer Geoff Roberts, "we can't export any product without it."

Source: Rockwell Automation

Business Activity Monitoring: The Promise and Reality

By D. McCoy, R. Schulte, F. Buytendijk, N. Rayner, A. Tiedrich

Business activity monitoring stands to penetrate the market psyche to the same extent as customer relationship management, wireless and other world-moving concepts.

Business activity monitoring (BAM) is a Gartner term that defines the concept of providing real-time access to critical business performance indicators to improve the speed and effectiveness of business operations. At its broadest level, BAM is the convergence of operational business intelligence (BI) and real-time application integration aimed at business goals but enabled through advances in IT.

BAM, a target of the zero-latency enterprise (ZLE), will likely make heavy use of business process management (BPM) and network and systems management (NSM) investments, among other technologies. Unlike traditional real-time monitoring, BAM draws its information from multiple application systems and other internal and external (interenterprise) sources, enabling a broader and richer view of business activities. Although BAM depends heavily on advanced infrastructures, technology is just the required pipeline to move business-level information to the decision-makers.

The real potential for BAM is at the business level: enablement of new business strategies, reduced operating costs, improved process performance and other tangible areas of management attention. Early BAM ventures in transportation (e.g., airlines operations) and logistics (e.g., package shipment) are showing the benefits of reduced latency on decision-making.

BAM has the potential to provide businesses with new power to improve many (but not all) business decisions through real-time information. BAM is not a panacea. The term "business decisions" is too vague by itself. Deciding to ship extra product because inventory levels are getting dangerously low is a business decision, but deciding to acquire your major competitor is also a business decision. BAM can help with the former as it involves business operations; it will have little relevance to the latter. However, there is no shortage of appropriate business decisions that can benefit from BAM and, for many, the promise of BAM will become reality.

By 2004, BAM will be pushed to center-stage in many industries as a consequence of industry efforts to build the ZLE (0.8 probability); however, BAM is not easy to implement, is not a product and requires significant organizational and architectural planning.

Enterprises must realize that BAM is early on the market maturity curve; market hype, vendor overselling, management over-expectation and all the other classic issues associated with a hot new topic must be expected.

The Business End of BAM

BAM may have its strongest initial support from senior management tired of making decisions with poor information sources, but BAM is not just for executives or management. BAM analysis will often be delivered via graphical displays ("dashboards") customized for use in different parts of the enterprise and optimized for different audiences (e.g., pie charts for some needs, complex visualization for others). BAM will be an important part of the end result of better analysis, but it cannot deliver everything on its own.

BAM's potential users include:

- Call center staff who need a real-time view of customer and supply chain metrics (beyond limited content provided by the automatic call distributor)
- Vice presidents of sales who want a real-time view of sales orders, providing better visibility into the order pipeline to complement historical order data and as a cross-check on sales forecasts
- Corporate treasury and pension departments, which want to monitor real-time global financial positions, foreign currency and economic information in an integrated way that the real-time data providers cannot provide
- Factory-floor managers who require real-time material requirements planning (MRP), inventory and sales metrics

BAM spans the gamut of business needs. An enterprise that needs faster reaction time on a business issue can use BAM, but must realize it is but one of the "moving parts" in a complex business system. Since BAM leverages the application integration world (BAM may require data from many systems in the process chain) and the BI world, some BAM efforts will stress one side more than the other. For instance, for the controller who wants to view real-time cash flow and working capital metrics, the BI side may be heavily stressed. Enterprises can only calculate cash flow by taking a sales order and applying the customer's payment history to forecast the expected cash flow (the same is true on the payment side, except the payment terms from the accounts payable system are used). This requires a powerful BI model, and much data for the calculation will likely not be in BAM's control — e.g., in the operational data store (ODS) — because it is not transactional data being pumped into the ODS by the

integration infrastructure. The watchword for enterprises is that the real-time data must be blended with models, data and processes that may exist outside of BAM and are all part of a holistic view of the business mandate. BAM is the real-time element of model-based decisions.

BAM — A Realistic Goal?

While the benefits of real-time reaction through faster decisions will be available to many for the first time via BAM, the concept of BAM is not new. The industry has been driving toward real-time decision support for 30 years. The historical precedents for real-time monitoring of large-scale, complex systems include:

- Financial trading (i.e., real-time analysis and program trading)
- Military and business "war rooms"
- An airport control tower
- The string of National Aeronautics and Space Administration (NASA) flight centers
- Cheyenne mountain Strategic Air Command headquarters
- Process control monitors (e.g., supervisory control and data acquisition, remote telemetry)

The majority of these real-time decision environments are hardly the business applications found in the typical enterprise. BAM is timely because it is becoming possible to envision BAM architectures for a wide variety of mainstream commercial activities. To many, BAM is now a realistic goal to consider.

The link from goal to reality remains a challenge. Enterprises should begin assessments to determine potential benefits of BAM. Before any money is spent on BAM, a reality check is needed. Just a few of the issues facing a BAM-related project include:

- Enterprises will, for the most part, be pioneers in a new field. Not everyone can survive the pioneer lifestyle.
- Enterprises will have little or no best practices about how to proceed with implementation.
- BAM will have a cascade effect in that it requires significant investments in the underlying infrastructure (e.g., integration technology).
- BAM will have a cultural impact as new decision policies clash with the policies of suppliers, customers and others who are not running at the same speed.
- Vendors' offerings will be diverse. They will not be comprehensive solutions that can easily be compared to one another.

The complexity of BAM will mean that the majority of upcoming BAM implementations will be outside of the mainstream (Type B) market, until return on investment, vendor stability and architectural ease become manageable.

Technology Underpinnings

BAM aims to reduce information float (the time between when new information is captured in one place and when it becomes available and usable elsewhere). In a prototypical BAM scenario, software agents evaluate events as they occur in the context of a set of rules to determine what actions to invoke. BPM tools can assist here as part of the BAM architecture for making interactions "process sensitive" (e.g., marrying process "state" data with other real-time data). If BAM's recipient (listener) is a person, these agents convey the information through a graphical display, an e-mail message, a page, a fax, an icon or panel change on a browser or other screen, or through some other application program. Through adaptive profiling, BAM can try to understand how the user typically responds to types of messages, so it can be more precise. Adaptive profiling is potentially risky (a profile might not recognize something really important), but is a real consideration for the future. Some listeners may be devices or applications that take actions without human intervention based on notifications from the BAM infrastructure. BAM usually leverages an ODS or a message warehouse to maintain state data and a record of events, respectively.

BAM will draw on many technology families to deliver its benefits, each offering unique aspects of the BAM puzzle: BI, BPM, application integration, NSM and data warehouses. Application integration vendors are helping enable BAM by making it easier to build real-time application integration links among heterogeneous application systems. BAM, the analysis aspect of a ZLE, is attracting BI providers that offer the analytical engines, BPM vendors who are marrying process status with real-time analysis and NSM vendors who are turning their real-time, data-probing approach toward a BAM vision. Data warehouses are extending the power of the ZLE. BAM will enable sweeping changes in enterprise business strategy. BAM-related software vendors will begin a merger and acquisition phase as the market matures; however, through 2004, a successful BAM approach must blend best-of-breed methodology and products on an as-needed basis.

Bottom Line: BAM is enabled by the concerted efforts of many technologies, but BAM's real impact will be at the managerial and operational levels. IS departments that have successfully implemented application integration and BAM's other underlying technologies will have an advantage in deployment. BAM will have the most impact where real-time analysis and immediate feedback give new power to the "management-by-exception" models of the past. BAM is a

leading-edge architectural and cultural change, and enterprises should target specific applications of BAM as opposed to blanket approaches. In 2001, BAM remains an investment for Type A enterprises (i.e., enterprises that thrive on high risk/high return). By 2004, in enterprises where faster reaction is key to operational effectiveness, BAM will be one of the top four initiatives driving IT investment and strategy (0.8 probability).

Gartner's Marketing Knowledge and Technology Commentary COM-13-9992, 11 July 2001.

Business Activity Monitoring Brings Collaboration to Life

According to Gartner's Research Note entitled *Business Activity Monitoring: The Promise and Reality,* published 11 July 2001, "By 2004, in enterprises where faster reaction is key to operational effectiveness, business activity monitoring will be one of the top four initiatives driving IT investment and strategy (0.8 probability)."

At the automation layer, companies want to achieve manufacturing effectiveness, improve time to market, and lower their total cost of ownership. Business activity monitoring (BAM), which allows collaboration between the shop floor and top floor by the simultaneous viewing of product, processes, and facilities, is key to achieving these goals.

FactoryTalk™ delivers the right information to the right place at the right time in the right form.

But wanting and doing are two different things. Because of the lack of capital funding, and collaborative hardware and software products that make it worth the investment, for most manufacturers, business activity monitoring has remained a wish, not a reality.

"Collaborative commerce is a reality," says Don Lazzari, marketing director, Rockwell Software. "While some companies recognize this and are moving in that direction, it's also a reality that most are not in a position to collaborate internally, much less externally."

FactoryTalk™ achieves the benefits of an open e-manufacturing software platform through key components:

FactoryTalk™ Directory
FactoryTalk™ Data Model
FactoryTalk™ Live Data
FactoryTalk™ Audit
FactoryTalk™ Portal

Source: Rockwell Automation

Nonetheless, companies see the value in collaborative commerce and, despite its initial costs, are moving toward it because the payoffs are great. The key to successful collaborative commerce is BAM, and the place to start is from the inside out.

As stated in the above note, according to Gartner, "Although BAM depends heavily on advanced infrastructures, technology is just the required pipeline to move business-level information to the decision-makers." The practice of BAM is not expected to be widespread until 2004, but for businesses that recognize the cost efficiencies of collaborative commerce now, Rockwell Automation is offering FactoryTalk™, a strategic initiative of Rockwell Software that enables companies to collaborate internally using a common framework and data flow.

Says Lazzari, "FactoryTalk acknowledges that now and in the next few years, businesses will have to pursue collaborative production management strategies in order to be more effective and profitable. By making them better

Together, FactoryTalk™ and Rockwell Software's entire portfolio of software provide a system that delivers a wide variety of solutions, resulting in increased productivity, savings, and RONA:

- Collaborative e-manufacturing data sharing
- Information transparency
- Consistent data
- Seamless interoperability among Rockwell Automation products such as ControlLogix™ and Allen-Bradley PLC™ controllers
- Connectivity to entire enterprise and beyond, to suppliers and customers

Source: Rockwell Automation

internal collaborators, FactoryTalk will enable greater effectiveness and profitability."

Through its FactoryTalk initiative, Rockwell Software brings several technologies together to provide the common framework and data flow needed for BAM, delivering the right information to the right place at the right time in the right form throughout a customer's manufacturing system — anywhere, anytime. Using a combination of widely accepted international standards and next-generation vision to classify process data, FactoryTalk effectively enables the sharing of shop floor data with ERP and SCM enterprise systems.

To understand initiatives like FactoryTalk, it is also necessary to

FactoryTalk™ Benefits:

- Increased manufacturing efficiencies and optimization
- Enhanced production scheduling capabilities, performance analysis tools, and data historian and data collection functions

Source: Rockwell Automation

understand the value of an open e-manufacturing software platform — the common language that enables manufacturing applications to integrate seamlessly across the enterprise and allows access to information from third-party OPC servers. In an open e-manufacturing software platform, "directory" and "data model" technologies enable programs and applications to interoperate and share data effectively, regardless of where they're from.

The ultimate benefit that both the directory and data model, as well as other components of an open e-manufacturing software platform provide is access to relevant information needed to make informed decisions at the enterprise level. The end result is providing the enterprise with the right information at the right time to make better decisions, resulting in greater productivity and increased RONA.

Compare this to companies that write different programs designed to share information — information that has to be re-entered into different applications, usually resulting in large, hard-to-handle spreadsheets. With FactoryTalk, regardless of which products in the Rockwell Automation software portfolio are applied, they all share a common language, which is used to describe processes and store data. This results in the free sharing of information, openness, and greater and faster access to knowledge about what's happening on the plant floor.

Although FactoryTalk's focus is on internal collaboration, it paves the way for greater collaboration with the value chain too. Says Lazzari: "It allows you to take information from the automation layer, pull it up to manufacturing, gather key manufacturing information, and then push it up to the enterprise system. After that, the information can be supplied in a format that supply chain systems can also take advantage of."

"Collaborative commerce is a reality."
Don Lazzari, Rockwell Software

For many companies, one hindrance in considering collaborative commerce options has been cost. Tim Scanlon, director, product strategy, Rockwell Software, says: "Today, the cost to integrate a system is great. Through FactoryTalk, however, productivity and time to market are improved because the system is up and running faster. Because of the high degree of data integration, fewer resources are needed to get the production line up and running. Because of these factors, ultimately, collaboration is going to be less expensive because return on net assets will be higher."

FactoryTalk provides a common namespace for factory automation products, whether they're Rockwell Automation products — such as RSLinx™, RSLogix™ and RSView™ — or other applications. FactoryTalk can also be specified by the user to represent any topology in a manufacturing facility, allowing users to browse tags, and plug and play new automation hardware. Further, it allows the efficient transfer of high-speed manufacturing data between processes in the system, promoting reliability and scalability. Its audit feature also allows users to track all changes to a system.

FactoryTalk's common namespace allows data to be entered only once, and used over and over by several different people. "Because we use a common data model and a common directory," says Scanlon, "we're actually able to reuse that data, as opposed to re-entering it every time." Cost savings are realized by virtually eliminating manual data entry, and the potential for human error that comes with it.

In the future, FactoryTalk will make information available in XML format so it can be shared with XML-based supply chain management programs. Through SAP-certified gateways, the system will also

To provide interoperability, an open e-manufacturing software platform needs certain technologies in place:

- "Directory," which allows organization and browsing of application data and services for any manufacturing operation. Tags between applications do not have to be reproduced, saving time and money during development and start-up phases.
- "Data model," which commonly defines data so that it can be re-used among all applications across the enterprise. As a result, collaboration is easier and fewer resources are needed to manage data among those applications.

Source: Rockwell Automation

FactoryTalk™ provides the common framework and data flow needed for BAM through products that:

- Design integrated plant floor architecture
- Operate and integrate manufacturing data with enterprise-level systems
- Maintain systems through asset management, i.e., predictive maintenance and change management

Source: Rockwell Automation

FactoryTalk™ Features:

- Information transparency, connectivity to supply chain and customers
- Enhanced reporting: XML language allows easy data integration and sharing
- Easy navigation thanks to access via common browser and Web server

Source: Rockwell Automation

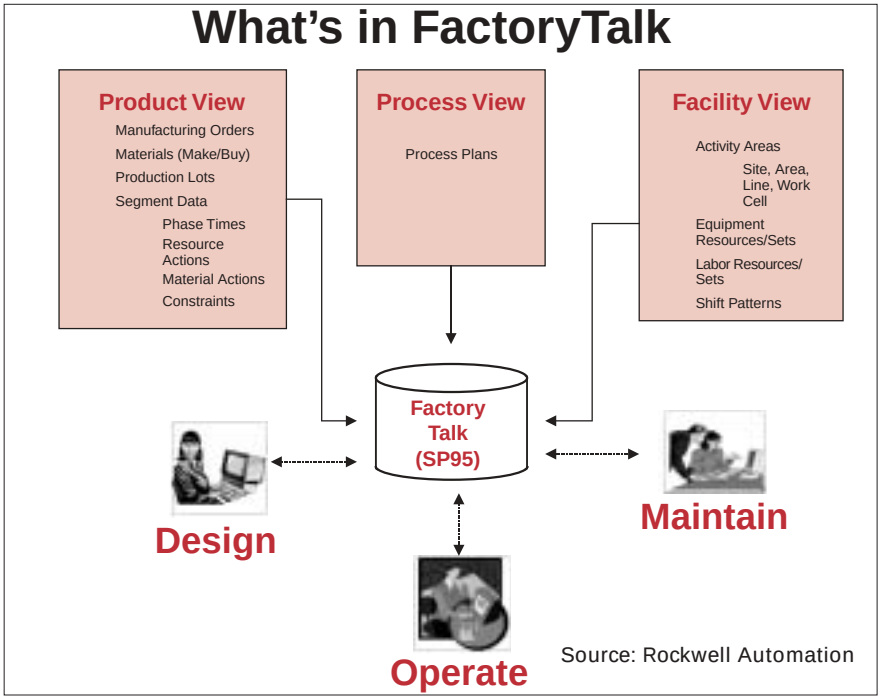
have direct connections to popular ERP packages.

Says Scanlon: "Throughout the design operation and maintenance of a manufacturing process, there are many user profiles involved with getting a product on line and producing it. Traditionally it was difficult for these different user profiles to collaborate, because they're using software and other tools that are unique to their domain. FactoryTalk changes all that, to the benefit of efficiency and optimization."

The availability of real time information is beginning to provide a tremendous advantage to businesses both competitively and on the profitability side. Systems like FactoryTalk will enable customers in a corporate location to get insight into what's happening in their plants by making that information readily available — and helping them better communicate with their suppliers and customers.

Says Lazzari: "Tighter collaboration with suppliers and supply chain partners is going to be something businesses will have to do to in order to compete effectively. And in order to do so, they will need to integrate their information internally, and across their entire company. FactoryTalk enables them to do that."

Source: Rockwell Automation



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Rockwell Automation has long been recognized as a global leader in factory automation. To extend the value we deliver to our customers, we've established the Global Manufacturing Solutions group. This division is dedicated to providing solutions focused on manufacturing excellence — from the factory automation level throughout the entire enterprise. Our goal is to give our customers the ability to aggressively pursue a competitive advantage against increasing earnings pressure, while maximizing returns on internal investments.