E ffective supply chain management (SCM) solutions can provide paint and coatings companies with a means to control and minimize costs while improving customer service. Development of a responsive business strategy underscores all successful SCM implementations. In the face of uncertain demand, balancing the need for cost reductions with the flexibility critical to productive operation of extended supply chains and the desire for increased risk management confronts most companies today. Formulators also face the challenge of managing supply networks to consumer-oriented markets and industrial customers through a number of different channels of distribution. Careful selection of software, business practices, and data collection can result in dramatic improvements in an organization’s bottom line.

Most major chemical companies, including suppliers of raw materials, additives, and resins to the paint and coatings sector, as well as leading paint and coatings manufacturers themselves, have implemented enterprise resource planning (ERP) and supply chain management systems in some form or another. However, many have not gained the maximum level of benefits possible from their initiatives, and some have even taken actions that have inhibited their ability to reap the greatest possible rewards for their efforts.

Supply chain management systems are designed to assist in the gathering and analysis of data to enable accurate demand forecasting, which is then coupled with internal knowledge of production and delivery capability and the desired level of profitability to design and implement an effective and efficient supply chain process that extends from the supplier through to final delivery of product to the customer. There are four aspects of SCM that paint and coatings companies are particularly interested in, according to Kevin Reid, a partner with consulting firm Orr & Boss. These areas include forecasting, order processing and execution, warehouse management, and distribution.

Forecasting demand, or demand planning, has received increasing emphasis recently as markets have tightened, with some key ingredients for the paint and coatings sector being placed on allocation. "Being able to forecast demand in order to increase service levels to customers while minimizing the amount, and therefore cost, of inventory kept on hand is of significant interest," says Mr. Reid. "More and more coatings companies are embracing the demand side of SCM, and are using forecasting models to predict future sales. The key is in knowing when a product truly can be forecast and when it cannot," he adds.

For DSM NeoResins, the key to demand planning is the achievement of better coordination throughout the supply chain. "We need a better understanding of our customers’ product demand requirements and our suppliers need to understand what our requirements will be," explains Mike Strong, supply chain manager with DSM NeoResins. "In today’s business environment, where companies are holding less stock, many products are sourced globally, raw materials can be in tight supply, and costs are increasing in all areas of the supply chain, it is more important than ever to have a good handle on demand so that we can meet our customers’ needs and at the same time not spend resources on inventory that is not needed," he adds.

DSM NeoResins has implemented a globally integrated ERP system and a sales and operation planning (S&OP) process.

Paint and coatings companies serving the building and construction market are more closely related to consumer products companies in this aspect of their business than other chemical manufacturers. “Finished goods inventory management, retail customer demand responsiveness, product lifecycle management, and seasonal capacity planning are all typical focus areas for paint and coating companies that supply generic chemicals companies can ignore,” notes Andrew Sanford, director of supply chain planning, Aspen Technology, Inc. (AspenTech).

In the U.S. at least, the supply chain strategy adopted by the paint and coatings industry is one of postponement, according to Colin Masson, with AMR Research. Paint companies manufacture base colors, and tinting does not take place until the point of sale. Therefore, formulators are supplying to the consumer. According to Aspen Technologies, as much as 80% of larger paint and coating providers are now trading through retail consumer channels.

There are, of course, numerous channels of distribution (“big box” retailers, company stores, small general shops), which adds complexity to the supply chain. However, unlike with most chemical companies, point-of-sale data and information on upcoming marketing promotions is available to the manufacturer. Even the large discount stores are increasingly providing data to paint companies in order to improve their supply chain management. “With the increased visibility into demand and access to multiple streams of data, paint and coating formulators—and to some extent their suppliers—are better situated to anticipate and forecast demand more accurately, and can reduce inventory levels because there is less unexpected variability,” notes Mr. Masson.

Being close to the consumer can have its drawbacks, though. "It should be noted that there has been, and continues to be, an overall increase in demand variability throughout the industry, with seasonality, changing fashion, greater numbers of brands, broadened color palettes, and customers looking for specialized services," Mr. Masson adds. "Formulators need to be prepared to ramp up and slide back production at appropriate times..."
Effective supply chain management (SCM) solutions can provide paint and coatings companies with a means to control and minimize costs while improving customer service. Development of a responsive business strategy underscores all successful SCM implementations. In the face of uncertain demand, balancing the need for cost reductions with the flexibility critical to productive operation of extended supply chains and the desire for increased risk management confronts most companies today. Formulators also face the challenge of managing supply networks to consumer-oriented markets and industrial customers through a number of different channels of distribution. Careful selection of software, business practices, and additives, and resins to the paint and coatings sector, as well as leading paint and coatings companies with a means to control and minimize costs while improving customer service. Development of a responsive business strategy underscores all successful SCM implementations. In the face of uncertain demand, balancing the need for cost reductions with the flexibility critical to productive operation of extended supply chains and the desire for increased risk management confronts most companies today. Formulators also face the challenge of managing supply networks to consumer-oriented markets and industrial customers through a number of different channels of distribution. Careful selection of software, business practices, and data collection can result in dramatic improvements in an organization's bottom line.

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“Overall, interest in the paint and coatings industry is centered around detailed plant planning and scheduling with an online link to ERP systems for a current perspective on demand,” says Stephen K. Gaines, vice president, supply chain planning with Aspen Technology, Inc. He adds that scheduling must be sufficiently detailed to represent key unique aspects of the paint and coatings industry that include tank scheduling, shared resources, and linkages between production and filling.

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and optimize inventory for the different distribution channels. In addition to the requirement of being responsive to variable consumer demand, formulators are finding that their retail supply chain partners are pushing inventory costs back to them. "Making the right product at the right time without incurring carrying costs or excessive manufacturing costs is more important than it has ever been," states Mr. Sanford.

That is where supply chain planning comes into play. Supply chain planning involves all aspects of producing and delivering goods to customers to meet demand, while optimizing production processes and inventory levels. A production and delivery schedule is developed that matches forecasted demand with the ability to make/source the product in the most efficient, cost effective, and profitable way possible," explains Mr. Masson. Order processing and execution are important because the lead times customers expect are getting shorter and shorter. Mr. Reid notes. The sales and operation planning (S&OP) process provides the link. S&OP combines the knowledge gained from analysis of sales and marketing data (order information, point-of-sale data, weighted sales rep forecasts, planned marketing promotions, vendor managed inventory data, etc.) with an understanding of what the factory can do, how quickly it can be done, and how profitably.

Production planning includes procurement and delivery of raw materials from suppliers to production facilities, as well as scheduling of production runs given a variety of constraints such as capacity, equipment availability, set up time, and desired profitability. Many types of product wheels come into play (such as a color wheel or packaging sequence) that require production of the smallest possible batch sizes in the least amount of time in order to meet demand and move through the production sequence as quickly as possible in case adjustments must be made. The need to make numerous changes must be avoided as it contributes to reduced productivity and capacity utilization, and therefore increased costs.

Other manufacturing aspects must be considered as well, notes Mr. Masson, including mixing and blending issues, maintenance, repair of color cards and swatches, and sample management. "Paint and coating manufacturing is fraught with regional-world costs and constraints that cannot be ignored by supply chain solutions," adds Mr. Sanford. Examples include multiple potential production lot sizes and product routings, tightly synchronized batch production, vessel-to-vessel piping constraints, and extensive setup costs and constraints. Mr. Sanford also comments that "the capability to model these constraints is not optional."

Multi-plant sourcing is yet another issue that paint and coatings companies must manage as part of their complex supply chains. "These companies have many stocking units, innumerable formulations, and they must maintain consistent production quality not only from lot to lot within one factory, but from one plant to another plant across the world," notes Mark Wells, supply chain solution principle with SAP AG, which focuses on the processes industries.

Warehousing management systems are important for minimizing inventory, reducing order costs, and locating products for shipment, while distribution resource planning is important for meeting customer delivery expectations, according to Mr. Reid. Logistics and distribution issues include packaging size, modes of transportation, and location of destination centers. Because paint companies sell their product through so many different channels, and to the consumer and industrial sectors, their supply chain solutions are highly complex. "The use of supply network design tools to evaluate multiple supply designs for different channels can vastly reduce inventory and transportation costs," notes Mr. Masson. "These tools also help address the myriad of other considerations, such as regulatory and compliance issues. They also make it easier to modify the design when changes are required."

While planning and decision making is a critical aspect of a supply chain management solution, there are other areas that need attention as well. "We consider and address four components of a total supply chain management solution," says Mr. Wells. Planning is the first and involves several different aspects including demand planning, supply planning, supply network planning, and production planning, which have been addressed here. Also important are execution, collaboration, and coordination. "Execution refers to the implementation of business processes and operations determined in the planning process. Collaboration with partners, suppliers, toll processors, and customers involves a large amount of data and maintaining awareness of current performance and potential future demand is another important feature of a successful SCM solution. Coordination refers to the tracking of progress and actual gathering of information as material flows through production and up through the value chain to final product delivery."

A company embarking on implementation of an SCM solution has already overcome a major hurdle in the process—making the decision to move forward with the initiative. "The paint and coatings sector is an industry that has performed for many years by having knowledgeable people rely upon to make key planning and execution decisions," explains Mr. Reid. "Either way, there is significant investment required when managing the software aspects of an SCM implementation."

Mr. Sanford also comments that "Companies need to understand what their strengths are as well as what their customers' expectations are and make sure they don't lose focus on the key facts when implementing their SCM initiatives. Modelling the SCM software that fits existing processes will help ensure that this focus is maintained," he explains.

SCM software itself is expensive and accounts for a large percentage of the cost of any solution, which overall can run into the millions of dollars. Extensive training of users is also necessary and contributes to the cost. In general, typical implementations of supply chain management solutions take up to two years to complete, and longer than that to achieve a return on the investment.

When implementing an overall supply chain management solution for global operations, companies need to become familiar with the specific supply chain issues facing it, identify opportunities for improvement, determine necessary business processes, and get management commitment to those new processes and other changes. Only then should software be evaluated. "Taking the time to develop an in-depth knowledge up front will have a large impact on the level of benefits gained after implementation is complete," says Mr. Bragg.

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While planning/decision making is a critical aspect of a supply chain management solution, there are other areas that need attention as well. "We consider and address four components of a total supply chain management solution," says Mr. Wells. Planning is the first and involves several different subcategories, including demand planning, supply planning, network planning, and production planning, which have been addressed here. Also important are execution, collaboration, and coordination. "Execution refers to the implementation of business processes and operations determined in the planning process. Collaboration with partners, suppliers, toll processors, and customers in order to gather as much relevant data and maintain awareness of current performance and potential future demand is another important feature of a successful SCM solution," adds Mr. Sanford. Inventory and yogurt manufacturing must be considered as well.

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A company embarking on implementation of an SCM solution has already overcome a major hurdle in the process—making the decision to move forward with the initiative. "The paint and coatings sector is an industry that has performed for many years by having knowledgeable people rely upon to make key planning decisions," explains Mr. Reid. "Either way, there is significant investment required when managing the software aspects of an SCM implementation." Mr. Strong recommends a business-as-normal approach. "Companies need to understand what their strengths are as well as what their customers' expectations are and make sure they don't lose focus on the key facts when implementing their SCM projects. Modelling the SCM software that fits existing processes will help ensure that this focus is maintained," he explains.

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When implementing an overall supply chain management solution for global operations, companies need to become familiar with the specific supply chain issues facing it, identify opportunities for improvement, determine required business processes, and get management commitment to those new processes and other changes. Only then should software be evaluated. "Taking the time to develop this in-depth knowledge up front will have a large impact on the level of benefits gained after implementation is complete," says Mr. Bragg.

At AspenTech, our strategy involves increasing the flexibility of manufacturing assets and improving the ability to commit and deliver goods to the customer while managing total cost. These activities are achieved through improved scheduling of decisions, increasing
Companies also need to develop common master data, terminology, and nomenclature, and consistent work processes throughout the entire organization, prior to implementing a SCM solution. "Names of data fields all need to represent the same type of data, and processes all need to be the same, with the steps for decommissioning and problems also the same, at every plant site," stresses Marty Etzel, director of solution marketing for chemicals with SAP AG. "If people aren't following the same rules and using the same data, too much time is spent correcting problems and managing issues and not using data to plan, execute, collaborate, and coordinate, in a way that will drive out inefficiencies and increase service while reducing costs."

Air Products is one supplier to the paint and coatings industry that has maintained a focused effort on supply chain management that has included the convergence of many work processes and business rules across the company worldwide. "This was a huge effort considering the number of diverse businesses that make up Air Products," says Pat Flora, supply chain manager—Polymers North America with Air Products. One of the biggest obstacles Air Products faced when implementing a SCM solution was breaking down the functional silos within the company. "Work processes flow across functional groups, so you have to optimize the whole work process, not just the part that is in a functional group. The key benefit for me is visibility of data. You can't manage and improve your supply chains unless you can see and measure how they are performing," he adds.

Responsiveness is fast becoming the watchword for successful SCM implementations. Paint and coating companies need flexibility in their planning solutions in order to be able to respond to changing demand. "When combined with extensive knowledge about its capabilities across the whole supply chain, flexibility can enable a company to respond to and address unexpected events before they ever become a problem for the customer," notes Mr. Gains. Legacy approaches to planning and scheduling remain valid, but they need to be enhanced with real-time optimal response to unpredictable demand events. In addition, real-time operating principles, which include true process modeling and data visualization, are now becoming a part of the full SCM suite, says Mike Bragg, senior manager, Customer Operations. "Asking for a scenario forecast without a fully functional forecast engine is like asking for a weather forecast without a radar," he adds.

Air Products believe in this approach. "We expect to see continued pressure to reduce costs, so we have to be more creative in where we look," says Mr. Flora. "For example, we are beginning to work more closely with customers on their unique supply chain costs. This type of collaboration will be a source of many new opportunities," he explains.

Companies that have implemented successful SCM solutions have achieved savings of hundreds of millions of dollars through more accurate demand forecasting, increased production efficiency, better sequencing, improved capacity utilization, and enhanced customer service. "SCM presents a tremendous opportunity to make a business level difference now that back office functions are reliable and largely in place," notes Mr. Gains. AspenTech has seen reductions in operational costs of over $200 million in capacity of plant assets of 6-12% for companies through SCM implementations utilizing its software packages. "While we can't quantify improved customer service, we do have several clients who have gained the ability to respond to large unexpected changes in demand without significantly increasing costs," Mr. Gains adds.

Awareness of the supply chain management discipline is increasing, though. "Companies must remember that in order to take advantage of minimized inventories and fewer distribution sites, access to equipment and the capability to move goods rapidly is required," notes Mr. Mason. In the end, effective supply chain management goes directly to the cost structure, utilization of capital, and return on assets of a business, ultimately aiding in the determination of the worth of the enterprise, according to Mr. Wells.

Those organizations with more advanced and mature supply chain management solutions in place are currently exploiting areas of management and pricing management as further ways to maximize the performance across their entire supply chains. "Risk management hasn't reached the paint and coatings industry yet, but we expect it will be adopted by this sector soon," says Mr. Bragg. Risk management involves the development of various possible scenarios, which are then used to take actions. A production arrangement is worked out that will enable the company to meet all of the most likely scenarios. New

viability of the schedule and minimizing deviations from it, supporting brand management, and extending the full consumer packaged goods (CPG) supply chain to customers, suppliers, and contract manufacturers. The aspenONE SCM for chemicals software includes over 10 modules that address the key aspects of SCM management, including forecasting, production scheduling, distribution and inventory management, enterprise/operations integration, and data management.

Most recently, AspenTech added a Supply Chain Analytics module to its suite of SCM tools in response to customer requests to make the data in the supply chain more readily available to other applications and people through the web. Combined with AspenTech's Operations Manager, the new module comprises a full supply chain cockpit application which can also provide supply chain information into any portal or application.

SAP AG also has an industry focus, utilizing the extensive experience of its personnel, many of whom have come directly from the chemicals—and more specifically—the paint and coatings industry. "The depth and focus that SAP places on different industries enables us to provide a 'best practices' offering that is designed and supply chain management software that can be configured to the specific needs of individual companies," says Mr. Adam.

According to Mr. Etzel, SAP has been developing solutions for the chemicals industry for over 30 years. As a result, its supply chain solution, its SAP SCM, is fairly mature, and the company is involved currently in building out deeper and deeper into the industry functionality. The software suite offers three major facts necessary for building an adaptive supply chain network: synchronization of supply and demand so that the entire supply chain is paced to actual demand; creation of an adaptive fulfillment network that includes RFID (radio frequency identification)-enabled sense and respond capabilities; and network-wide visibility, collaboration, and analytics tools that include event management and result in greater transparency throughout the supply chain. Specific modules address the four key areas of supply chain management, including supply chain planning, execution, collaboration, and coordination.

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Companies also need to develop common master data, terminology, and nomenclature, and consistent work processes throughout the entire organization prior to implementing a SCM solution. In addition, real-time operating principles, which include close management of inventory and data validation, are now becoming a part of the full SCM suite.

Ray Adams of SAP AG’s industry business unit says this adds that leading firms have efficient supply chains that not only achieve cost savings, but are also able to change business processes in order to meet variables in demand. “The most adaptive companies have the power of continuous business process improvement to their advantage,” he adds.

Aligning all aspects of the supply chain with overall business objectives is also critical to the successful implementation of a SCM solution. “Both sales and production incentives must be aligned with the business objectives. If done correctly, most times limitations in technology can be surmounted because the entire organization is working towards the same goals,” notes Mr. Mason. He adds that inefficiencies in the supply network often occur because of disconnects within the organization between marketing and manufacturing. “SCM software tools won’t improve the situation as long as these disconnects remain.”

According to an ARC study of various SCM solution implementation, selecting good project managers that can sell upper level management on the value of the project is also important. ARC also found that most successful implementations involved at least one or more team members with a deep understanding of the SCM solution’s application and implications for the company’s business processes. “Use of internal employees (rather than consultants) is growing, the use of industry-specific knowledge will often result in faster implementation of the real world, and greater price flexibility,” notes Mr. Mason. In the end, effective supply chain management goes directly to the cost structure, utilization of capital, and return on assets of a business. Ultimately aiding in the determination of the worth of the enterprise, according to Mr. Wells.

Those organizations with more advanced and mature supply chain management solutions in place are currently exploring ways to manage and pricing management as far as to the performance throughout their entire supply chains. “Risk management has reached the point of reaching and establishing a new standard for supply chain, and we expect that it will be adopted by this sector soon,” says Mr. Bragg. Risk management involves the development of the various possible scenarios, which are currently the responsibilities of the operation. A production arrangement is worked out that will enable the company to meet all of the most likely scenarios.

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SAP AG also has a market focus on utilizing the comprehensive performance management and measurement tools of the company, including the supply chain management software that can be configured to the specific needs of individual companies,” says Mr. Adam.

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Market Update
“SAP’s SCM packages are designed for adaptive companies, or companies that desire to have the ability to make decisions in an integrated fashion, considering all aspects of the business’ sales, marketing, financial, and operations activities,” he continues. In order to create this adaptive business environment, SAP’s sales and operation planning tools are evolving so that they more resemble integrated business planning tools. SAP also offers multidimensional decision support and supply chain planning software that enables companies to quickly respond to unexpected supply chain events. “Our supply chain event manager includes an alert system that sends e-mail notifications when a potential problem occurs anywhere throughout the supply chain, including on the supplier and customer ends. With this alert system, companies are able to address issues before they ever become a problem for the customer,” Mr. Etzel explains. SAP’s Transportation Planning & Vehicle Scheduling program also helps paint and coatings companies manage the complexities associated with the distribution and delivery of goods, whether by rail or tanker truck, or with in-house or third-party providers.

SAP, along with AspenTech and many other vendors, is also involved in the development of S-95, an international standard for defining the interface between business and manufacturing systems that will enable “plant-to-business integration.” The company has built requirements of the standard into its solutions, including new manufacturing intelligence dashboards that provide plant personnel with role-specific information, alerts, and performance indicators. SAP is also working with Intel to encourage the adoption of RFID, focusing on direct data exchange between reader hardware and business applications so that information can be fed directly into SAP, and ultimately used in mySAP SCM for real-time monitoring and response capabilities. The company is working with partner Vendavo to integrate price optimization tools into its supply chain management solution that will enable users to improve margins through better management of product portfolios. Overall, SAP is migrating completely from its client server environment (SAP R/3) to its SAP NetWeaver web-based capability.

One trend of interest to Mr. Masson is the move back to less complicated supply chain management systems, which rely on a pull-based approach and largely focus on demand. “Some people now have the view that complex supply chain optimization systems take too long to set up, are difficult to maintain, and don’t adjust readily to changing conditions. These folks are looking to a simpler system based on inventory collaboration with customers and suppliers,” he explains. The challenge, of course, is establishing that reliable collaboration. Currently it is difficult, because specific rules and software are often required for each customer.

Development of collaborative planning, forecasting, and replenishment (CPFR) systems by major software vendors should address this issue.

This trend toward simplification may in part be due to difficulties companies have created for themselves. A recent Deloitte Consulting LLP benchmarking study of more than 750 global manufacturing companies, including many leading chemical manufacturers, found that many key activities of companies geared toward reducing costs and expanding into new markets are actually reducing the effectiveness of their supply chains.

In an increasingly more competitive environment, fewer companies are establishing close collaboration with customers to improve demand planning. Expansion into low-cost regions is often accompanied by local optimization of supply chains, but not global optimization across the entire organization. While most companies indicate that innovation is the key to success, few have introduced systems or tools to aid in the management of innovation or new production introduction processes. Efforts to drive down costs are also reducing the flexibility of many supply chains, which ultimately increases both risk and many hidden costs.

The Deloitte Consulting LLP survey did find examples of successful companies that have established close customer partnerships, maintained flexibility, optimized their supply chains across the global organization and from sourcing to product delivery, and introduced systems for managing production innovation and introduction. These “Complexity Masters” utilize many different supply chain management tools to attain a more efficient and effective level of performance. Rohm and Haas Company, OxyChem, Rhodia, and Dow Chemical Company were listed as examples of companies that meet these criteria.