

Strategic initiatives build **Global Innovation Networks** in the machinery and industrial products industry

www.siemens.com/plm

white paper



- ▶ Machinery and industrial products companies compete on quality and cost through strategic investments that transform their business and the process of innovation.

► **Strategic initiatives build Global Innovation Networks
in the machinery and industrial products industry**

Table of contents

Executive summary	1
Globalization and supplier collaboration challenge machinery and industrial products companies	2
Product lifecycle management provides a foundation for Global Innovation Networks	4
New product development	5
Value chain synchronization	6
Knowledge and IP management	8
Modularization and re-use	10
Production efficiency	11
Summary	13

Innovation networks create global opportunities and enhance collaboration

In the machinery and industrial products industry, increasing globalization and the need for greater collaboration with suppliers present manufacturers with intense challenges as well as rich opportunities. Competition from low-cost countries is requiring companies to become more innovative and to partner closely with far flung suppliers to both maintain and grow their businesses. Among the 20 percent of machinery and industrial products companies that are world leaders in their niche and the 50 percent who are among the top five in their sector, most executives agree that innovation is the key to success and prosperity in the global marketplace.

Long-term growth of the industry has been encouragingly consistent over the last several years. As for the future, increasing demand from emerging economies in China and Asia and growth in the US and European Union promise greater opportunities for machinery and industrial products manufacturers.

In 2004, China – the third largest manufacturer in the world – superseded the US as the #1 market for machine tools and absorbed one-fifth of the world's product in this area. Machinery manufacturers must transform their organizations through more innovation and collaboration in order to take advantage of the many partnering and selling opportunities in this growing market.

In addition, customers are demanding rapid quotes and delivery of highly reliable equipment. Responding to this across multiple supply chains that have varying degrees of responsiveness and flexibility is a growing challenge. Companies need to establish the capability to respond to evolving market conditions and customer requirements without introducing delays to already aggressive schedules.

In order to meet the dual goals of revenue growth and cost control, machinery and industrial product manufacturers need a technology-enabled infrastructure that gives them visibility into workflows across the value chain and enables them to manage all the relevant information about their products.

In response to these and other issues (such as new regulatory compliance issues), increasing numbers of machinery and industrial executives are seeing the value of adopting innovation-enabling platforms. Product quality and low cost remain important, but innovation – the ability to dominate their sectors through better managing and executing ideas – has become a top priority. Indeed, emerging markets become more accessible to companies implementing Global Innovation Networks because of their ability to quickly respond to and even anticipate local customer needs.

A Global Innovation Network fosters innovation at every stage of the product lifecycle. When needed, it enables companies to quickly bring in resources and assets from across a value chain that extends enterprise-wide and also encompasses partners, suppliers and customers around the globe. It's a model that requires a digital environment encompassing key contributors from strategic partners, suppliers and customers worldwide. By creating Global Innovation Networks, manufacturers are able to meet key business requirements that support top-line growth plus cost-containment.

In a survey of senior management, Boston Consulting Group found that:

- Globalization and organizational issues were cited as two of the biggest challenges facing many companies
- 74 percent of executives said their companies will increase spending on innovation
- Almost 90 percent of executives said generating organic growth through innovation has become essential for success in their industry

[The Boston Consulting Group, 2005 Senior management survey]

► Globalization and supplier collaboration challenge machinery and industrial products companies

According to leading industry experts, the primary business drivers facing machinery and industrial products companies are as follows:

Outsourcing to and competition from low-cost countries

Machinery and industrial products companies continue to be affected by overcapacity in many markets and a customer base that is compelled to reduce total operating costs. To reduce the labor cost component of many products, companies have the opportunity to access and leverage low-cost countries. Companies also outsource engineering as the local talent pools in such countries expand and they become centers of innovation that introduce another element of competition directly to the innovation process.

Since India and China are together producing eight times more engineers than the US, US vendors also are rushing to tap inventive minds in these countries. IBM already has an R&D lab in New Delhi, and it announced in mid-2005 its intent to recruit 14,000 additional software inventors in India. Motorola operates 16 R&D centers in China that employ 1,800 engineers – 10 percent of Motorola's global R&D base. If China's technology sector continues to grow at this rate, Forrester predicts that its technology manufacturing exports could enable its economy to grow even more rapidly, reaching \$3.5 trillion by 2015. India and Asian markets also offer tremendous potential for increasing growth and competition in coming years. [How India, China redefine the tech world order, Forrester Research, December 2005]

Demand for more innovation and higher quality with lower costs

To compete in the global marketplace, successful machinery and industrial products companies are developing and delivering products that are more innovative and cost sensitive. Increasingly complex machinery products require a high level of reliability that maximizes equipment uptime. Manufacturing processes are more complex and systems are more integrated, containing many functions to prevent, track and issue system failure alerts. As a result, machinery and industrial products manufacturers need to take a comprehensive approach to design that encompasses systems engineering, as well as electrical, mechanical and software design.

Companies that are meeting market demand for more innovation with higher quality also are able to contain rising material and energy costs in order to remain profitable. These companies are transforming their value chains into world-class Innovation Networks in order to find the new products process ideas and efficiencies that they require.

Global engineering teams create a competitive advantage

"As we have developed products for global markets we have placed more and more engineers around the world. Today about one-third of all of Emerson's engineers are outside the United States working on products for global markets. To do that, being able to design products 24/7, to chase the sun, if you will, is extremely important to us. As an example, when we started our engineering center in India, we were able to get our software tools up and running in less than half a day. This is a tremendous competitive advantage for Emerson."

Dr. Randall Ledford, Executive Vice President and CTO, Emerson Corporate

C.M. Solé satisfies increasing market demands without sacrificing quality

C.M. Solé, a manufacturer of high-precision plastic injection molds, guarantees its products for one full year or one million injection cycles. During the late 1990s, its reputation for quality assurance led to more growth opportunities than it could handle. The company's capacity was approaching the limit. "We needed to reduce lead times dramatically or we would not be able to cope with the excellent growth opportunities of the bullish market," explains Josep Solé, the company's general manager. By using advanced production techniques enabled by PLM, the company was able to address increased market demand without sacrificing quality.

Collaboration with an expanding global value chain

Manufacturers indicate that collaboration capabilities rank very highly in improving product revenue, with more than half of respondents indicating that project collaboration (66 percent) and design collaboration (50 percent) are very important technical enablers for product innovation. [New product development: Profiting from innovation, AberdeenGroup, December 2005]

Successful companies are prioritizing multiple needs. They work with multiple supply chains that have varying demands for responsiveness and flexibility. They face increasing levels of uncertainty with confidence – even when plans change suddenly and they are expected to act quickly to meet entirely new demands on extremely aggressive schedules. They closely scrutinize value chain partners to assure their ability to share designs and parts compliance information and to deliver materials or parts on time, on spec and on budget. They track compliance with industry, environmental and governmental regulations.

To successfully address the key industry challenges outlined so far, many machinery OEMs and suppliers are moving toward Global Innovation Networks, a transformative business model built on collaboration that fosters innovation and informed decision making at every stage of the product lifecycle. This model requires a digital environment that encompasses key contributions from strategic partners, suppliers and customers around the world. By creating Global Innovation Networks, manufacturers are able to effectively address the business requirements that drive top-line growth:

- **Innovate more** – increase the yield on product and process innovation to accelerate top-line growth
- **Reduce time-to-market** – rapidly evaluate concepts and adopt lean, flexible processes
- **Leverage globalization** – leverage relationships with global suppliers and strategic partners for local customer and market input, create cost advantage and capture innovations wherever they arise
- **Ensure compliance** – reduce cost and risk of non-compliance with OEM requirements, local government and environmental regulations that can make a strategic contribution to the company's innovation
- **Optimize resources** – greater efficiency in all phases of the product lifecycle

Hitachi enables collaboration among global sites

For Hitachi Construction Machinery (HCM), a leading manufacturer of construction machinery, the ability to collaborate with and share its current information among divisions in China and Japan was a prerequisite to achieving efficiency in its product development process and improving the overall quality of its designs. In particular, with the globalization trend of the design process, it was critical to establish a data management system that enabled trouble-free collaboration with development locations in China, Europe, North America and Southeast Asia. To address its need for global collaboration, HCM synchronized the management of its product data and process knowledge with PLM.

Companies in the machinery and industrial products industry must increase global competitiveness and responsiveness to customer and market requirements through stronger collaboration and greater visibility across the value chain. OEMs have increased partnerships with outsourced design manufacturers (ODMs) to send higher cost portions of design and manufacturing processes to geographically favored ODMs. This allows the domestic company to survive and remain competitive. ODMs then need to focus on maximizing their position within the value chain. And all players may need better ways to increase production efficiency at all stages of the product lifecycle.


Global Innovation Networks represent a new model for product-focused companies that recognize the new paradigm in which original equipment manufacturers (OEMs) focus more on core competencies (essentially the intellectual property behind their product lines) while outsourcing design and manufacturing.

According to industry analysts, Global Innovation Networks “enable companies to match their global demand for innovation with worldwide sources of talent and capital. Savvy firms make use of Innovation Networks to bring in new ideas and fresh, outside perspectives as a replacement for stale, vertically integrated approaches to innovation. To effectively meet growing innovation demand, firms must join an emerging market model that lets players co-invent with customers, source and market innovations anywhere, and anticipate as well as respond to supply and demand changes.” [Topic overview: Innovation Networks and Fortune 500 CEOs embrace Innovation Networks, Forrester Research, December 2005]

Once companies have identified their top business challenges, they naturally will want to undertake initiatives to ensure they reach their business improvement goals. Companies across many industries are considering initiatives such as:

- New product development
- Commonization and re-use
- Value chain synchronization
- Knowledge and IP management
- Production efficiency
- Systems engineering and mechatronics
- Enterprise data management
- Regulatory compliance

Many machinery and industrial products manufacturers have found PLM solutions that focus on product and process innovation to be the ideal platform from which to launch business process improvement initiatives. A comprehensive digital product platform based on PLM offers unprecedented capabilities to global teams by bridging siloed departments and systems and providing a virtual environment for collaboration. PLM enables manufacturers to address their key business initiatives internally, then cost-effectively extend these initiatives to include strategic partners, suppliers and customers in the process of innovation.



Optimum PLM solutions are designed to be implemented in cost-effective stages, systematically enabling key business requirements and providing substantial rewards along the way. Each initiative gives manufacturers the opportunity to establish the PLM framework, best practices and product-related data that will form the core of their Global Innovation Networks and help them transform their process of innovation.

Machinery and industrial products manufacturers should start by addressing those business areas that are most critical to their near term success. As more of these initiatives are undertaken, the PLM platform from which they are launched will grow to support a robust Global Innovation Network.

This paper discusses some specific examples of investment initiatives that are critical to machinery and industrial products companies:

- New product development
- Value chain synchronization
- Knowledge and IP management
- Modularization and re-use
- Production efficiency
- Systems engineering and mechatronics

To accelerate the process and ensure demand-driven innovation, a new product development initiative integrates people and processes to rapidly bring innovative products to market in ways that meet or exceed market expectations. Ultimately, the initiative seeks to create a real-time, global, collaborative environment for product development that fully integrates people, processes and systems. Optimum product development management requires implementing systems and technologies that embed market and customer requirements directly into product architectures.

Strategic portfolio management

Machinery companies need to manage product portfolios at the strategic level. To better prioritize investments and guide research and development, they need better ways to capture and contextualize all relevant product knowledge. Strategic portfolio management aims to do this on a global level that achieves comprehensive data management across the entire product lifecycle from concept to end of life. Process automation ensures stakeholder involvement and supports fully informed business decisions by providing the right information to the right people at the right time.

Program execution management

To accelerate time-to-market, key dependencies and leverage points must be outlined early in the design process so they can be acted upon quickly. To ensure optimum program execution management, machinery companies must look for ways to control and manage program development team complexities and establish performance measurements and milestones to keep projects on track. Requirements management is optimized and precisely matched with customer needs and specifications.

Manufacturing planning and validation

A new product development initiative seeks to establish the highest levels of manufacturing planning and validation. This requires synchronizing product manufacturing and sourcing processes with the rest of product development to ensure flawless product launches, smooth ramp-up and compliance. Wherever feasible, the best ideas must be pre-tested and pre-validated against real-world market opportunities.

For heavy equipment manufacturers, the cost of maintenance as a portion of a vehicle's total cost of ownership has become an important factor that can be addressed up front through manufacturing planning and validation. Yet higher quality often introduces higher manufacturing costs. Manufacturers can use the latest digital simulation and validation tools to ensure quality by virtually testing and validating parts, assemblies and components without the need for costly prototypes. Significant savings are achieved by reiterating and evaluating a variety of design solutions and manufacturing options. As a result, companies can design high quality trucks at competitive prices and customers who face demanding delivery schedules can be confident in the reliability of their vehicles.

High-performing machinery and industrial products companies use PLM

AberdeenGroup found that best-in-class companies are four times more likely to have PLM-related technology than their poorer performing competitors. Companies that are better able to meet their new product development targets also are more likely to have centralized data and product knowledge than the industry norm.

[New product development: Profiting from innovation, 2005]

PLM compresses production engineering by almost 50 percent

According to Melbourne, Australia-based ANCA, a manufacturer of CNC machines for the machine tool and metal-based industries, PLM helps it innovate better by increasing its access to global talent. Design people can be assembled from anywhere in the world via the Internet, allowing the company to tap the right minds for each job. As a result, the company has reduced production engineering by about 50 percent. In addition to helping compete in the international CNC machine market, PLM has opened the door for ANCA to make a move into other areas such as medical equipment.

Toshiba doubles product development through collaboration

Toshiba TEC DPTS manufactures multifunction peripherals for copying, printing, faxing and scanning. With multiple design centers in Japan involved in the new product development process, the need for better collaboration and complexity management were becoming serious issues. Collaboration challenges also were increasing between design and production. Relaying design information accurately to its remote production site was arduous, and repeated design changes were difficult to communicate in a timely manner. With PLM, Toshiba was able to cut development time in half. Collaboration between the design and manufacturing engineering operations have been optimized, collaboration between its two main design centers in Japan is more efficient, and submission of formatted design data to its manufacturing center in China is smooth as silk. Instead of taking days and weeks to make corrections, they are now made quickly at the production site.

Value chain synchronization initiatives enable machinery companies to respond effectively to global demand by optimizing idea exchange and effectively sharing product and process information among all value chain stakeholders. These initiatives help companies gain the needed visibility to collaborate effectively across the value chain. Engineering and procurement are integrated with suppliers. Design data is synchronized with workflow driven processes. And manufacturing processes are aligned and simulation results are shared with OEMs. The exchange of knowledge and information is enhanced at every link in the value chain so that the best ideas, assemblies, parts and process data are readily shared.

Supplier relationship management

Research shows that up to 80 percent of a product's cost is committed during design. And of those costs, up to 80 percent are direct material goods. What's more, the cost of a design change rises by a multiple of 10 with every subsequent stage of development. It is clear that there is significant opportunity for improvement when companies synchronize the contributors of that 80 percent (their value chain) with their design processes. Machinery manufacturers can involve their global network of suppliers early in sourcing discussions, assessing change implications and initiating "should cost" discussions by establishing a real-time, digital collaboration environment.

Strategic sourcing

Two industry trends are placing significant pressure on sourcing-related processes. Increased outsourcing makes companies more dependent than ever on their supply chains. Rapidly shifting market demands are driving increased change volumes, which suppliers must quote in very short time frames. This has placed sourcing teams and suppliers on the critical path of product development and time-to-market. Additionally, extended design teams have led to complex collaborative processes that significantly hamper the ability to deliver products to market quickly while still meeting cost targets.

According to AT Kearney, executives want their sourcing teams to create value through their relationships with key suppliers. And yet the same study found that sourcing teams spend 70 percent of their time on tactical activities, such as processing RFQs, with little value added to those strategic relationships. [Assessment of excellence in procurement, 2004] By contrast, manufacturers that collaborate with procurement earlier in the design process and make sourcing decisions a higher priority during the early phases of the product lifecycle are realizing product cost reductions of nearly 18 percent, as well as 10 to 20 percent improvements in time-to-market cycles. [Procurement in new product development, AberdeenGroup, March 2006]

Information exchange and synchronization

Through open solutions that leverage industry standards, information exchange and synchronization creates an environment that ensures that dispersed teams collaborate freely and confidently across heterogeneous systems with proper security and interoperability. In an optimized, multi-CAD environment, assemblies can be created and visualized regardless of the geometry in which the CAD system was created – and with full functionality.

This capability eliminates error-prone CAD-to-CAD translations and enables suppliers' CAD files to integrate with top-level design. Multi-CAD capabilities allow for visualization and even digital validation of assemblies that otherwise might never come together in any "single-CAD" solution. When properly implemented, suppliers can deliver their final design data in a neutral format, not only satisfying the OEMs' need for accurate design data, but also protecting their intellectual property.

Managing the product development process from design through manufacturing is a complex task that is further complicated by the need to incorporate sub-tier support and low-cost country operations. Machinery and industrial products companies need to ensure that their suppliers, customers and business partners keep their information synchronized throughout the process regardless of organizational or geographic boundaries.

Value chain integration

Machinery companies must establish strong links between external contributors and stakeholders and internal departments by connecting information systems and processes. They must synchronize activities across the product lifecycle – from development to manufacturing and service – through standards-based data exchange. Ideally, value chain integration should include an integrated development environment, process management, open information exchange, manufacturing integration and service integration.

While it might seem counterintuitive, the fact is PLM solutions might better support value chain synchronization than traditional Supply Chain Management (SCM) solutions. PLM solutions with Web services or Service Oriented Architectures (SOAs) focus more directly on product and process efficiency improvements. By providing a managed development environment with secure access to the latest product information, PLM makes sure that suppliers respond accurately and fully to RFQs. In addition, integrating supplier operations more closely with product development reduces the impact of changes that can quickly erode negotiated pricing and cut into the bottom line.

Interoperability sharpens German machining edge

As a leading German engineering service provider, Schuler Konstruktionen requires seamless interoperability with the design software used by its clients in special machine construction, machine tool and consumer goods manufacturing, as well as some larger firms in the automobile and transportation industries. Schuler uses PLM to achieve the efficiency and accuracy required for precise data transfer among CAD systems. This enables the company to carry out construction based on as little as a hand-drawn sketch and some project notes. PLM helps simplify the exchange of information in the development process and maintains transparency from the onset of each project. Beyond CAD interoperability, Schuler must now provide data that is compatible with downstream design applications such as digital simulation. Using open, state-of-the-art PLM applications, Schuler is now leveraging interoperability to deliver excellent service at competitive prices.

OEMs must take advantage of intellectual property (IP) as it is generated anywhere across the value chain. Gartner's 2006 report "Knowledge Management Enables the High-Performance Workplace" suggests that effective knowledge management initiatives are critical to keeping companies on the road to global innovation. A knowledge management and IP initiative seeks to implement better ways to capture, re-use and automate product and process knowledge.

Enterprise knowledge and IP management strategy

To truly embrace new and innovative ideas from multiple sources, machinery and industrial products companies must gather and make widely available relevant product and process knowledge from key constituents across the value chain. Knowledge and IP management empowers decision makers by enabling the exchange of accurate and timely information with the right people – from ideation, engineering and design through specification and requirements, sourcing, manufacturing, production, sales and service.

Effective IP management solutions require mechanisms to document key information relative to innovations. This is especially important in a complex, distributed organization that includes multiple suppliers. Once knowledge has been identified, contextualized and stored, companies must find ways to share this knowledge internally and externally across the value chain.

Global knowledge access

Without a centralized home to manage information, there is little opportunity for knowledge sharing and re-use, not to mention smart, fully informed decision making. Companies can waste enormous amounts of time either searching for the knowledge they need, or in re-inventing the wheel – performing unproductive and repetitive tasks over and over again. To effectively leverage the power of knowledge within and beyond the enterprise, machinery and industrial products companies must have a centralized knowledge base that consolidates key product information from strategic partners across the value chain and breaks down siloed information and business practices.

Knowledge-driven automation

Companies need to capture dispersed knowledge and leverage it in automated processes that maximize the efficiency of product development. Effective knowledge management dramatically reduces design cycle times by leveraging corporate-wide knowledge.

To turn data into actionable knowledge, machinery companies must implement knowledge management systems that are sophisticated enough to match the right data elements – for example, all the designs for the components that comprise a jet engine, or the history of all the molded plastics required for a line of toothbrushes. The most advanced PLM solutions feature powerful content and context-based search and retrieval capabilities to maximize information re-use.

The integration of the knowledge infrastructure layer in a PLM environment significantly enhances the traditional product-oriented focus by replacing it with a knowledge-and-context-oriented view that supports strategic decision making. PLM is already intensely focused on the most likely source of valuable knowledge – product design and manufacturing. The best PLM solutions provide collaborative environments supported by a single source of product and process information for a comprehensive, enterprise-level approach to knowledge and IP management.

Machinery and industrial products companies need to maximize their re-use of parts, assemblies and best practices across their product development and introduction processes. Even with new innovative products, up to 60% of components can come from existing part designs. To facilitate the re-use of existing components, companies should leverage PLM technology and capabilities such as shape recognition to enable design engineers to search for and retrieve components and assemblies that already exist. With this capability, designers can make better decisions on whether to re-use proven components or to create new content.

Through modularization and re-use, companies can manage complexity thereby increasing their flexibility in design, manufacturing and assembly and reducing downstream costs in maintenance and repair. The following key areas need to be addressed in order to improve business processes through modularization and re-use:

Proactive modularization

Analyze requirements to understand the drivers of customer and business value. Establish long-range product and manufacturing plans that optimize re-use at the portfolio level. Leverage structural modularization of product designs to facilitate outsourcing of non-core systems. Define a digital strategy to enable execution throughout the organization.

Preparation for re-use

Proactively create and capture validated product and process content. Structure content and knowledge into digital templates and archetypes to promote efficient and consistent re-use.

Global data access

Establish a single source of re-usable content that can scale to the company's operations. Enable all contributors across the value chain, regardless of location, to easily search and view re-usable content in their own context.

Cross-functional integration

Tie related work at different sites or within different departments together so that work and content re-use can be synchronized. Enable re-use of existing content and capture new content in full context. Continually improve modularization and re-use by measuring the impact on business operations.

The integrated, digital environment offered by PLM enables modularization and re-use by providing knowledge-enabled frameworks, global access to a single instance of re-usable product and process content and synchronization of globally distributed business operations utilizing that content. Scalability is required to allow higher levels of re-use as a company's appreciation for the power of modularization matures. PLM provides an optimal method for implementing and tying together these elements.

Rotobec grapples with limited information

Rotobec is a leading manufacturer of rotation attachments or "grapples," as well as harvesting heads and log loaders. In designing new products, information access was a big problem. Since designs were printed and stored as drawings, designers had to search through stacks of paper to find what they needed. With a PLM solution that enabled modularization and re-use, Rotobec spends less time searching and more time innovating. Designers can find what they need with a few mouse clicks. Now that information is available on a global basis, circulation of new design information is more fluid, teams can work together concurrently and re-use is applied more consistently.

Production efficiency initiatives integrate product design with process design and production information. This enhances the visibility of innovative processes across the enterprise and increases profitability through the optimization of manufacturing resources and capital investments.

These initiatives aim to accelerate every phase of the product lifecycle, ensuring that products are delivered well within the window of market opportunity. Decision support must be provided at all critical phases of the product lifecycle. Since product design, process flow and production information are tightly integrated, machinery companies gain increased flexibility, performance and quality. This promotes better production standards and significantly contributes to manufacturing best practices.

To quickly ramp up to volume production with desirable yields and the right price points, Production efficiency initiatives must enable the following key capabilities:

Design for manufacturing

To optimize efficiency, machinery and industrial products companies should create a fully digital design and manufacturing environment synchronizing manufacturing requirements with product development. A digitally managed environment enables manufacturers to conduct virtual manufacturability analysis up-front to ensure that products are designed for manufacturability and assembly in existing or planned facilities. It provides the capability to capture re-usable standards and best practices that can be leveraged for future products and variants.

Manufacturing planning and validation

Companies must be able to evaluate their manufacturing capability and capacity to build or source innovative new products virtually, with full representation of factories, production lines, cells and machine tools. This enables them to identify any necessary adjustments in products or processes needed to increase efficiency and quality, and ensure that products can be made and delivered on time and on spec. To do this, they must synchronize product manufacturing and sourcing processes with the rest of product development to ensure flawless product launches and smooth ramp-up.

Progressive Design Technologies cuts lead time in half

Progressive Design Technologies specializes in precision tool design for a wide range of manufacturing processes such as injection molds, progressive dies and custom semi-automatic tooling for the automotive and semiconductor industries, as well as a variety of others. Its products consist of complex surfaces and highly refined shapes, making them difficult to manufacture using traditional processes. "As the complexity of digital models increases, it becomes more difficult to develop the tooling to produce those shapes in production," explains President Michael Molina II. "We needed to increase the strength of our modeling tools and raise our standards to develop high quality tooling to keep up with this rapidly evolving CAD technology." Using the production efficiency tools built into their new PLM solution, the company can now unform complex shapes and predict what they will look like in the preform stages. Through enhanced design for manufacturing, planning and validation, Progressive Design Technologies has been able to cut lead times in half and deliver products faster, with higher quality and at lower prices.

Production management

Production management helps ensure success by making certain that the product lifecycle is rigorously and relentlessly driven by customer and market requirements, needs and preferences. Since customer needs are constantly changing, it is imperative to have customer intelligence gathering mechanisms in place.

Built on PLM, production management facilitates a continuous process improvement cycle across the product lifecycle by feeding root-cause analysis of non-conformance and defects through production and back to engineering. With visibility into production, companies are able to ensure that manufacturing is executed “as planned.”

Designed to capture and manage all plant, process, product and manufacturing resources, PLM systems are ideal backbones for production efficiency initiatives. Interconnecting design with manufacturing engineering creates robust work instructions and share-as-built data. PLM enables companies to establish processes and workflow procedures that leverage existing ideas and investments. Wherever possible, designs and parts are re-utilized to lower costs and speed product delivery.

Innovation through Global Innovation Networks should become a standard practice in the machinery and industrial products industry. To create a sustainable competitive advantage, these companies must find better ways to develop new products and solutions that not only satisfy current customer demands, but more importantly define and drive customer expectations in the future.

PLM-enabled Global Innovation Networks drive innovation by supporting better business decisions across the value chain. Because decision makers can always view the right information in consistent and contextualized formats, they can harness the power of corporate-wide knowledge and can innovate far more effectively than their competitors.

To continue to win in their markets, machinery and industrial product companies must:

- Be faster to market through accelerated new product development
- Synchronize their value chains
- Leverage knowledge and intellectual property wherever it develops to optimize resources and control costs
- Proactively re-use parts, assemblies, equipment and processes through modularization and re-use
- Facilitate production readiness and design for manufacturability with manufacturing process optimization

Open architected PLM technologies provide an ideal framework for implementing Global Innovation Networks in cost-effective stages. By establishing an enterprise-wide digital PLM environment for dynamic collaboration, companies can manage their product-related ideas more cost-effectively across the value chain and throughout the product lifecycle. This can dramatically improve time-to-market, as companies effectively share knowledge and best practices and spend less time looking for the knowledge they need to do their jobs. Delivering the right knowledge at the right time to the right decision makers can make a huge difference to the success or failure of a product.

Those who adopt a solid platform for global innovation and leverage the power of their value chains through PLM technology will transform their organizations and prepare themselves to benefit from new business opportunities created by globalization.

About Siemens PLM Software

Siemens PLM Software, a division of Siemens Automation and Drives (A&D), is a leading global provider of product lifecycle management (PLM) software and services with 4.3 million licensed seats and 47,000 customers worldwide.

Headquartered in Plano, Texas, Siemens PLM Software's open enterprise solutions enable a world where organizations and their partners collaborate through Global Innovation Networks to deliver world-class products and services.

For more information on Siemens PLM Software products and services, visit www.siemens.com/plm.

SIEMENS

Division headquarters

United States

Granite Park One
5800 Granite Parkway
Suite 600
Plano, TX 75024
972 987 3000
Fax 972 987 3398

Regions

Americas

Granite Park One
5800 Granite Parkway
Suite 600
Plano, TX 75024
800 498 5351
Fax 972 987 3398

Europe

Norwich House Knoll Road
Camberley, Surrey
GU15 3SY
United Kingdom
+44 (0) 1276 702000
Fax +44 (0) 1276 705150

Asia-Pacific

Suites 6804-8, 68/F Central Plaza
18 Harbour Road, Wan Chai
Hong Kong
852 2230 3333
Fax 852 2230 3210