PLM Is a Top Priority for Manufacturers

IT capabilities and the business climate have aligned to make product life cycle management an imperative for manufacturers. Enterprises must define product life cycles and prioritize PLM's support of key life cycle processes.

Product life cycle management (PLM) is the next major wave of opportunity for manufacturers looking to improve business performance. Just as enterprise resource planning (ERP) consolidated disparate back-office activities into a cohesive environment for running business operations, PLM consolidates diverse business activities that create, modify and use data during all phases of a product's life cycle. These include product ideation, design, engineering, manufacturing process management, service, maintenance, product line growth and retirement.

PLM represents the best opportunity to reduce product life cycle costs, while simultaneously increasing an enterprise's ability to innovate on product families and related services throughout the product life cycle. Reducing life cycle costs results in increased profits and financial resources. Increasing the ability to innovate means competitive differentiation that grows revenue and expands markets.

PLM reduces costs by providing a common IT framework to track and improve the financial and time performance of activities associated with each phase of a product's life cycle. This framework aligns product life cycle activities—historically the domain of disconnected engineering and manufacturing groups—within an enterprise IT backbone. The enterprise IT backbone supports procurement, sales, marketing, manufacturing operations, field services and executive management. Increased visibility across these domains can improve performance for each of them.

PLM fosters innovation by creating an infrastructure for collaboration that spans all levels of an enterprise, as well as its business partners, suppliers and customers. PLM inherits a collaborative product commerce (CPC) infrastructure (see "CPC:
Exploiting E-Business for Product Realization”), which provides a rich communication infrastructure for sharing ideas and information. It aligns activities at the executive level, such as managing product portfolios, with activities at operational levels, including creating designs, making product changes and modifying manufacturing process plans.

PLM Defined

The PLM process guides products from concept through retirement to deliver the greatest business value to an enterprise and its trading partners. It uses product information and business analysis to support product portfolio strategies, product life cycle planning, management of activities and the execution of those activities through each phase in a product's life cycle. These phases include product ideation, product definition, manufacturing process planning, production, service, growth and retirement. PLM supports an enterprise's ability to monitor activities, analyze challenges and bottlenecks, make decisions and execute decisions. It can help manufacturers maintain and outperform schedules and budgets when introducing new products. Ultimately, the goal of PLM is the attainment of revenue targets with greater predictability, enabling manufacturers to time the retirement of older products and introduce new ones optimally.

Specific PLM activities include the following:

• Monitoring the progress of a product at any stage in its life cycle — for example, tracking actual cost and time of product development and comparing these to schedules and budgets

• Analyzing issues that might arise at any phase of a product's life cycle — for example, if product development costs exceed budget, PLM provides access to information about products, projects and resources that help users understand the root causes

• Deciding on actions to address problems

• Executing and enforcing decisions

PLM software is emerging that can empower manufacturers with better access to product, project and resource information within a common environment. Building from a CPC framework, PLM helps manufacturers engage their global operations, including suppliers, partners and customers, in efforts to monitor product-related activities, analyze issues, make decisions and execute, so that products deliver business value with greater predictability. The value of PLM goes beyond cost reduction through improved efficiency of workflow and information management. Manufacturers can redirect freed resources — usually creative
and technically skilled personnel — to new activities and innovations that expand the business and improve market penetration.

The scope of PLM deployment effort is broad, rivaling ERP in magnitude and impact throughout an extended enterprise. At the planning level, enterprises must define the stages of a product's life that make business sense and the priorities for managing the product and related information through each stage. Implementers must determine which workflow and decision-making processes to make explicit and support those through software. In addition, the global nature of product definition, manufacturing and service operations across enterprises, suppliers, partners and customers means that product information resides in disparate locations, in paper and electronic format. The effort required to aggregate and organize this information will be significant.

Despite the scope of PLM and its deployment challenges, manufacturers will be compelled to adopt it, because of resource constraints and the growing complexity of value chains that include suppliers, partners and customers. By 2005, most Global 1000 manufacturers will deploy PLM strategies to improve productivity and product innovation in the face of dwindling technical resources with industry-specific experience (0.8 probability).

The Market Is Ready for PLM

Manufacturers Need It: To remain competitive, discrete and process manufacturers among Fortune 1000 companies will need to deploy a PLM strategy by 2007. Small and midsize businesses (SMBs) that adopt PLM will gain an advantage over competitors that don’t. Increasingly, manufacturers face problems with the availability, timeliness and relevance of product information during all stages of a product's life cycle. For example, executives planning product strategy often do not have timely access to marketing analysis, technical risks, resource availability, current projects or product information that would help them do systematic and disciplined planning. Engineering and manufacturing groups often report unnecessary scrap and rework because communication of engineering changes is not timely. Manufacturers constantly seek ways to reduce production costs. PLM helps by providing access to the status of product definitions across an enterprise. This access can help identify ways to reduce costs, provide more-efficient procurement and streamline production processes.

IT Is Poised to Deliver: PLM requires visibility of enterprisewide information to support product data management (PDM),
financial analysis, project management, product portfolio management and human resource management (HRM). When the data changes, a comprehensive PLM environment notifies those affected and updates their views of content. Hardware performance improvements, high-speed networking, the Web, enterprise application integration (EAI), collaboration software and programmable graphical user interfaces (GUIs) make it possible for users to create more-comprehensive PLM environments.

**Maturity Level of Users and Software Vendors:** Users (particularly discrete manufacturers) and vendors have more than 30 years of experience applying generations of software to product life cycle activities. PLM software offers business benefits for process manufacturers that rival those for discrete manufacturers; however, software vendors have only supplied PDM products to process manufacturers since the late 1990s. Therefore, process manufacturers and software vendors have less experience with PDM and PLM software. PLM opportunities also exist for utilities (see "Utilities Need to Apply PLM to Improve Performance").

PLM is the next logical step in software evolution from the department productivity tools of 30 years ago to corporate strategy support (see Figure 1). As each phase matured, its growth rate declined, but it stimulated the need for the next generation, which built on top of it. Users' experience with PDM software (including the latest generation embodied in a CPC framework) demonstrated the need for PLM. The exposure to PDM and CPC increased the understanding of the requirements to support enterprisewide processes. It also helped develop a keen appreciation of deployment challenges, such as enterprise integration. Therefore, manufacturers have achieved a level of experience that prepares them to attempt PLM.
The learning curve will still be steep, however. No major manufacturer will have a comprehensive PLM environment functioning before mid-2003 (0.8 probability). PLM is evolving because PDM does not bring together financial analysis, resource management, project management and product information within a single environment to support vital decision making and execution for product strategy. PDM, which helps manage product data and information, is an essential, but insufficient element of PLM. The most-comprehensive PLM software suites will bundle data management, design and documentation capabilities, along with support for product strategy planning.

**Getting Started With PLM**

Manufacturers should begin their PLM efforts by identifying how they want to structure product life cycles, including the life cycles of key product elements, such as parts, software and subsystems. Each of these elements will have a different set of priorities, challenges and workflow to define, create, produce and support them throughout the life cycle of a product. PLM implementers must determine and synchronize milestones for each of these elements to deliver a product.

Manufacturers must also identify the business processes critical to product success that PLM should support. This effort will require them to identify the key PLM roles, who plays the key
roles, what information these players need to support PLM activities and how the software should represent relevant information. The understanding of the product life cycle definition, business processes, key players and information needs will provide insight to selection of software vendor partners and deployment priorities.

**Bottom Line:** Supported by software, PLM practices will deliver competitive advantage through 2005 and become an imperative by 2007. Manufacturers that have not begun PLM deployment should get started now, because it will be a multiyear effort. Those that have not deployed it by 2007 will struggle to remain competitive. Manufacturers should begin their PLM efforts by defining structures for product life cycles and prioritizing processes and information needed for life cycle management.