

Guide to



Product Lifecycle Management

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Why PLM?

Rapidly changing technology is creating short market windows for technology companies. Product complexities due to embedded and installed software are increasing the need to manage software development as part of product development. Along with globalization and aggressive pricing, these challenges are placing intense pressures to optimize new product development from discovery to development, from commercialization to retirement.

When technology platform and product features are not aligned with customer needs, products are late to market and costs are higher than anticipated. When product development and management activities are not collaborative, the timing of new product launch or retirement of declining product is off resulting in lost market share or profit.

Nearly 50 percent of high technology companies fail with new product development and life cycle management. One of the key reasons why technology products fail is the lack of proper methods and tools for managing their product development process. Typical product development process management issues include:

- lack of formal requirements management,
- inadequate portfolio management resulting in premature launch or retirement,
- unresolved design, engineering, manufacturing issues,
- lack of rapid prototyping and virtual product development,
- inability to facilitate real-time collaboration from product concept to retirement,
- complexity of change management (hardware with both installed and embedded software)
- poor supply chain visibility.



What is PLM?

Product Requirements, Product Designs, Bill of Materials, Revision Information, Compliance Information. All these are classes of the enterprise product information from concept to retirement. Portfolio Management, Configuration Management, Design Process, Release Process, Engineering Change Order Process. All these sub-processes are part of the overall product lifecycle process.

Product Life Cycle Management (PLM) integrates the product information and processes for ideation, design, engineering, manufacturing, and maintenance through the life cycle of products. Successful technology companies use PLM to create and launch innovative technology products faster than competitors, to leverage globalization as a competitive advantage, and maximize profit from mature or declining technology products. They do it by defining and implementing a defined PLM process, deploying proper PLM software, and adopting a collaborative organizational culture.

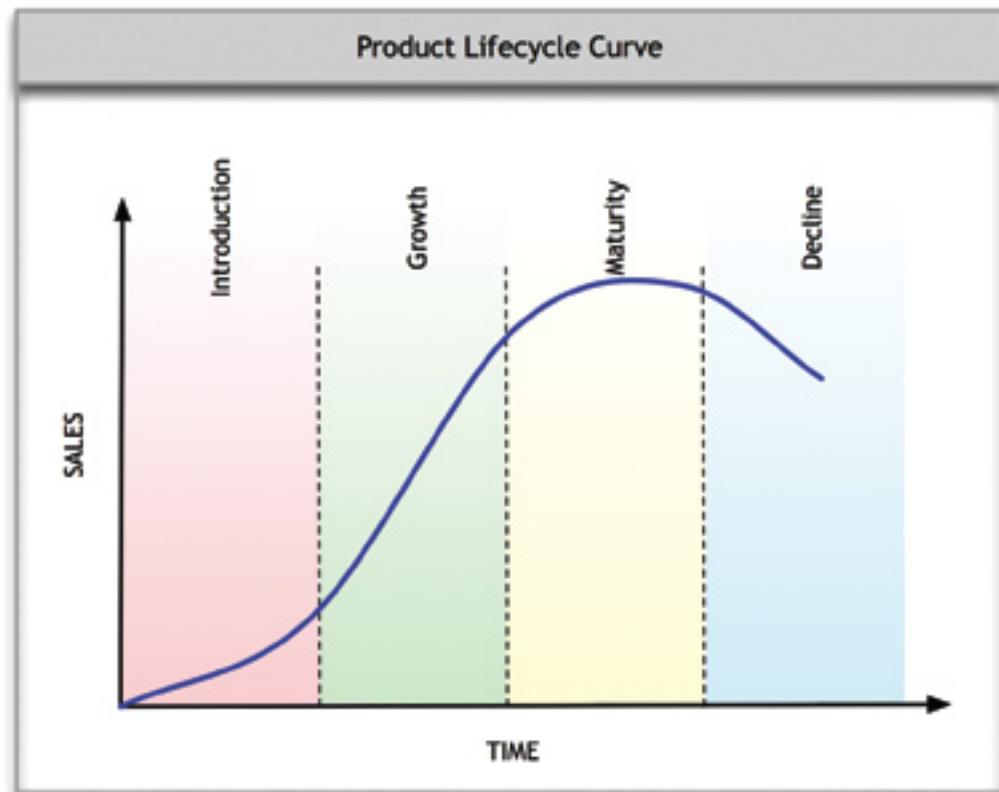


CHART 1. PRODUCT LIFECYCLE CURVE



Benefits and Business Value

- ✓ Accelerate Product Launch – bringing innovative and quality products to market ahead of competitors enables strategic differentiation and high profit margins through premium pricing
- ✓ Increase profitable growth and extend lifecycle returns – coherent platform and PLM strategy provides agility and speed for delivering new product versions and options to diverse, global markets
- ✓ Reduce operational costs – concurrent product/production process design, virtual product development, part reuse, and elimination of rework drives down design and development costs
- ✓ Reduce business risks - requirements traceability, detailed documentation of the product/process history, shared product/process knowledge enables adherence and responsiveness to changing compliance and safety regulations, product liability claims, supply chain sustainability

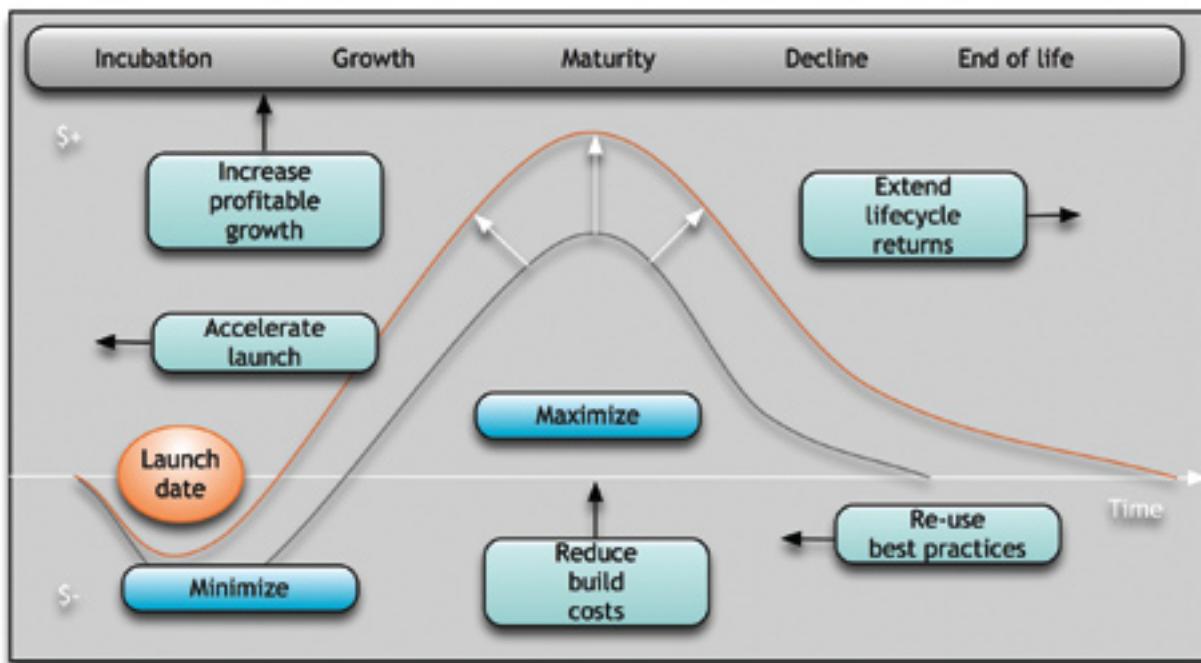


CHART 2. BENEFITS AND BUSINESS VALUE

According to an [Aberdeen Group](#) benchmark research in 2006, best in class small to medium size companies achieved significant performance improvements, including increased revenues (19%), reduced product cost (17%), and decreased product development cost (16%).



Assessment and Planning

PLM has joined CRM, ERP, and SCM as the fourth mission-critical enterprise IT solution. Yet, small to medium size technology companies still need to develop the business case that justifies the investment for implementing a PLM solution and improving the product lifecycle process.

- Review the company vision, business strategy and goals, business process improvement initiatives and identify links with the PLM strategy
- Document your current state of product lifecycle with a process model. Drill all the way down to sub-processes and daily operational workflows and considerations
- Assess the effectiveness of your product development processes against industry best practices, and identify gaps
- Build a model of your should-be product lifecycle process and sub-processes such as requirements management, concept development, sourcing, part manufacturing, assembly, test, packaging, distribution, and warranty management
- Define a list operational metrics and targets for improvement in terms of hard, soft and cost avoidance percentage improvements and the means for measuring performance
- List business requirements and define PLM strategy
- Evaluate PLM software solutions and solution providers on the basis of your business requirements and vendor's capability/flexibility to address them



Guide to Product Lifecycle Management



CHART 3. ASSESSMENT AND PLANNING

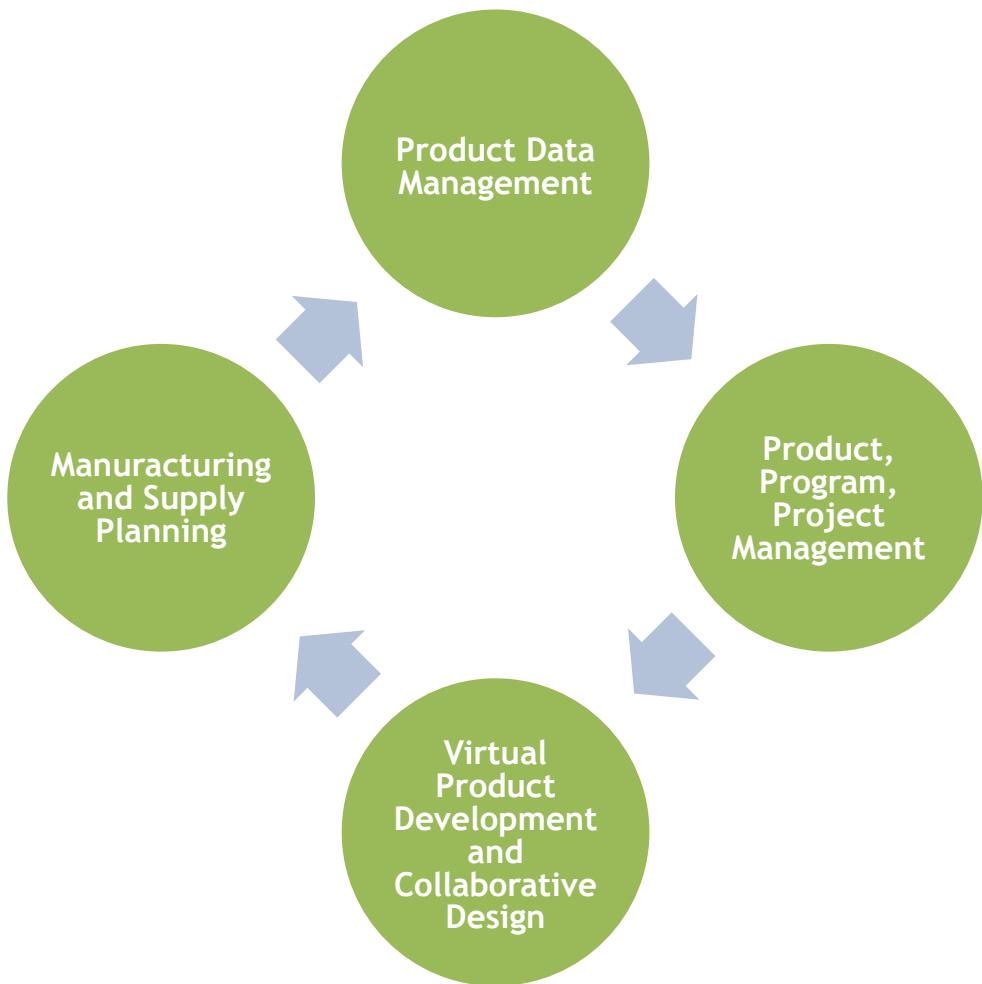
What does PLM mean to a small to medium size high-tech company? Where and how should you start? How do you prioritize your PLM implementation projects? What is a realistic budget for PLM? How do you benchmark your innovation processes against industry best practices? How do you make sure that PLM will deliver the business results you expect? Analyst firms such as [CIMData](#) offer comprehensive education programs for answering these questions and building the business case for PLM.



Implementation

Key considerations for kickoff are selecting a specific business problem (for example, product data management) as the starting point, targeting the first implementation project to solve that problem, and limiting the first project scope. Another important consideration is to minimize customization by using common workflow templates (e.g. engineering change, version control), industry-specific solution templates, and pre-defined data configuration templates.

Executive leadership with passion for product and process innovation is critical to successful implementation of PLM. In best-in-class technology companies, a senior executive such as the VP of Product/Portfolio Management or the CEO becomes the PLM advocate. The leader assembles the core implementation team and assigns roles and responsibilities to process managers and owners. The PLM advocate also identifies, engages, and shares the vision with the key beneficiaries of the outcome of the PLM process as well as those responsible in supporting the implementation.



Guide to Product Lifecycle Management

For small to medium size technology companies, the following lifecycle processes represent opportunities for improvement with PLM.

- Product Data Management
 - Bill of Materials (BOM) Management
 - Engineering Change Control
 - Configuration Management
 - Classification
 - Security Management
- Product/Program/Project Management
 - Requirements Management
 - Portfolio Management
 - Regulatory and Environmental Compliance
- Virtual Product Development and Collaborative Design
 - Mechatronics Process Management
 - Visualization
 - Concurrent Design and Test
 - Change Management Upstream and Downstream of Engineering
 - Software Configuration Management
 - Content Management
- Manufacturing and Supply Planning
 - Document and Part Dispositioning
 - Part Manufacturing Planning
 - Assembly Planning
 - Process Planning
 - Plant Optimization



Improvement and Optimization

Like any other process, PLM process must be measured and continuously improved. Success metrics can be organized in a hierarchy. At the highest level, expected business value has to be defined in terms of increased revenues, increased productivity, reduced cycle time, product cost, and decreased product development cost. These metrics can be monitored with dashboards targeted for executives. At the lower level are the performance indicators such as total number of design/engineering, and project/program man time hours per project. These metrics need to be tracked with a project management reporting tool. Using a bottom-up approach, time/cost savings for performance indicators should be rolled up, and targets vs. actual should be compared.

Business Value	Drivers	Performance Indicator
Increased Revenue	Faster Time to Market	Percent Gross Margin
Increased Productivity	Reduced Design/Engineering Cost	Time Savings * Hourly Rate
	Reduced Design Validation Cost	Time Savings * Hourly Rate
	Reduced Prototyping Cost	Time Savings * Hourly Rate
	Synchronous Development/Test	Time Savings * Hourly Rate
Reduced Cycle Time	Reduced Time to Search Product Info	Time Savings * Hourly Rate
	Reduced Time for ECO	Time Savings * Hourly Rate
Reduced Development Cost	Manual BOM Creation/Mgt	Time Savings * Hourly Rate
	Number of Engineering Charge Orders	Time Savings * Hourly Rate
	Manual Requirements Mgt	Time Savings * Hourly Rate

TABLE 1. MEASUREMENT AND PROCESS IMPROVEMENT



PLM Software

Most PLM software products offer standard modules for:

- Product Data Management
- Document/Content Management
- Process/Workflow Management
- Design Integration
- Configuration Management
- Product Collaboration

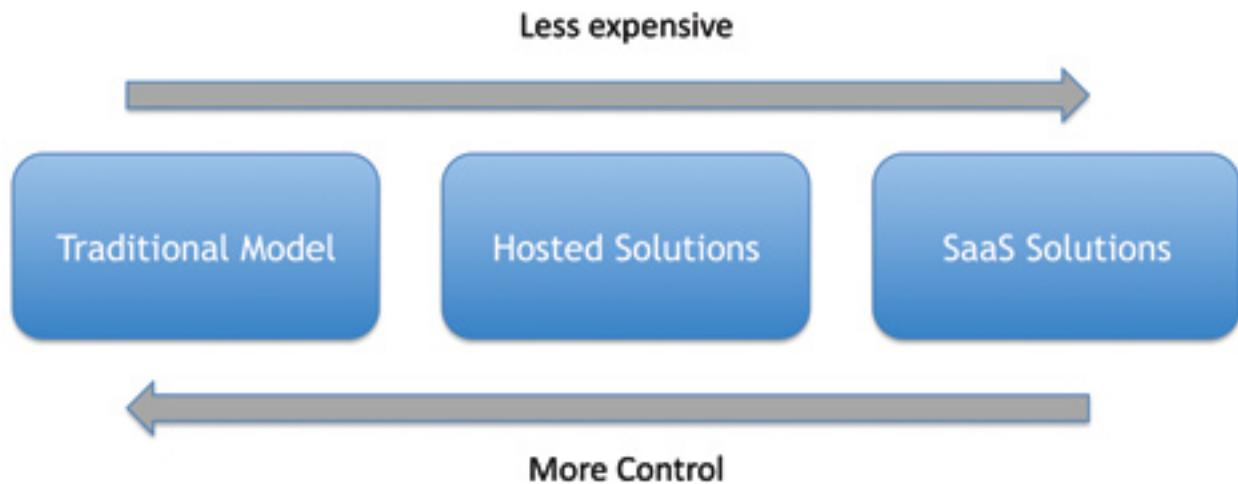
Comprehensive PLM software products offer optional enterprise integration modules for:

- Integration with ERP, CRM, and SCM systems
- Integration with CRM systems
- Integration with MS-Office and SharePoint
- Integration with IBM Rational Rose

PLM software solutions are typically offered in three different business models.

- Traditional model – PLM software is owned, installed, configured, managed, and maintained in house on the company's own IT infrastructure.
- Hosted Solutions – PLM software is owned or subscribed to by the company but installed, configured, managed, and maintained on someone else's IT infrastructure.
- SaaS Solutions – PLM software is offered as a subscription service for access and use by the company. The company does not own the software and has no control over it.





Each model has its tradeoffs. The traditional model puts the company in complete control of its data and intellectual property; however, cost of IT resources and environment for the PLM implementation are not insignificant. The hosted and SaaS solutions eliminate majority of costs associated technical resources and all the cost of infrastructure; however, control of mission-critical enterprise data and access to the PLM service is in the hands of a third party.

The leading enterprise PLM software solution offered in the traditional model is [Siemens PLM](#). A comprehensive PLM software product targeted for small to medium size companies is [ProductCenter PLM](#). An extended PDM solution with a cost-effective, subscription model is [PDXpert](#). An entry level SaaS solution for startups and small technology companies is [Arena Solutions](#).

Keys to Success

- **Pre-Implementation**

- Understand the business strategy and issues crucial to the success of your PLM strategy and implementation. Review industry analyst reports and invest in a 5-day PLM certificate program.
- Develop as-is and should-be process models of your product lifecycle process.
- Identify potential business value targets, prioritize your needs, and define metrics for success.
- Evaluate and select your PLM software and solution provider on the basis of your business requirements and PLM strategy.

- **Implementation**

- Start with a tangible business problem. Conduct pilot project with limited scope ideally in central facility.
- Announce PLM advocate, process owners and managers
- Use common workflow templates, industry-specific solution templates, and pre-defined data configuration templates
- Train the super user(s)
- Conduct postmortem project reviews to capture and share “lessons learned”
- Perform customizations and integrations required for full rollout
- Select next project (s) for full implementation, involve deploy in other locations, leverage lessons learned
- Restrict access to legacy systems to accelerate adoption

- **Post-implementation**

- Track actual performance indicators using project process management tools, and compare actuals with targets
- Research the PLM performance of best in class companies in your industry and compare your success metrics and best practices with theirs



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***For further reading on product strategy,
please visit our recommended reading list.***

