



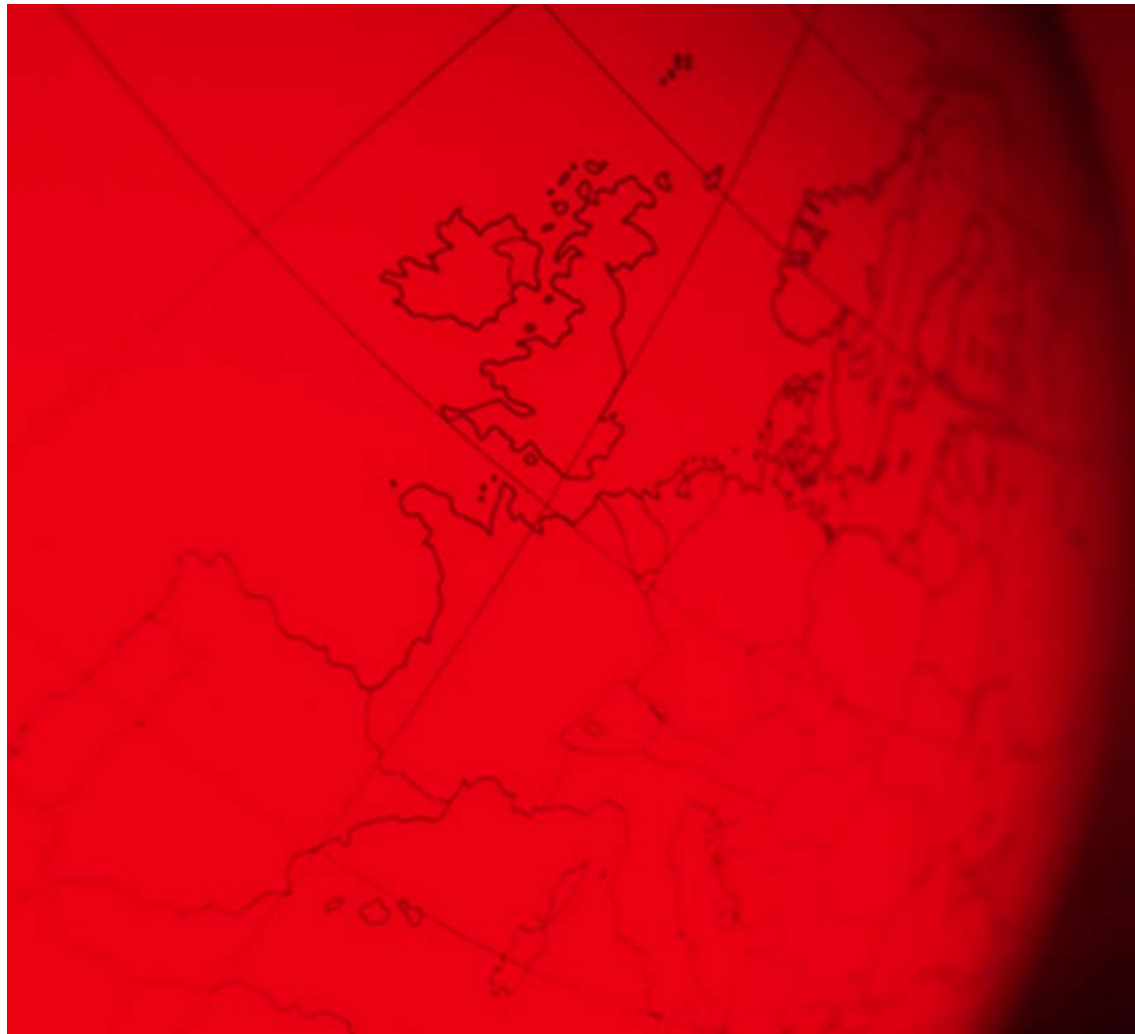
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GUIDEBOOK

SIEMENS PLM SOFTWARE FOR HIGH TECH AND ELECTRONICS



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TOPICS

Enterprise Applications

THE BOTTOM LINE

High tech manufacturers must balance the competing challenges of price pressures, design complexities, and technological change while delivering products that are innovative, timely, and cost competitive. Siemens product lifecycle management (PLM) software provides a unified, scalable platform to support collaborative processes across the product lifecycle, accelerating time to market while reducing costs.

Siemens product lifecycle management (PLM) software includes the Teamcenter platform for end-to-end collaborative PLM; Tecnomatix digital manufacturing applications; and NX computer-aided design, manufacturing, and engineering applications. For the high tech and electronics industries, Siemens provides three customized solutions:

- Strategic Product Planning
 - > Portfolio, program, and project management capabilities help manufacturers to balance brands, product lines, investment opportunities and ideas; manage ideas and ideation; track and automate program and project management tasks and workflows; and manage budgets.
 - > Systems engineering and requirements management capabilities support integrated requirements management; lifecycle requirements traceability; cross-domain systems definition; and support for multiple design tools as well as Microsoft Office for creating, editing, and maintaining requirements.
 - > Community collaboration capabilities support information sharing throughout the product lifecycle through real-time, ad-hoc collaboration, application sharing, visual issues management, and business application integration.
- Virtual Product Development
 - > NX Design supports industrial design and styling requirements, visualization, real-time and photorealistic rendering.
 - > NX for digital lifecycle simulation supports sophisticated computer-aided engineering requirements.
 - > Teamcenter supports engineering process management with product data management, 3-D visualization, and digital validation and change management capabilities and lifecycle visualization with support to view, manage, capture, analyze, and route product manufacturing information and geometric dimensioning and tolerancing markups. Additionally, the JT format supports PLM visualization and interoperability across multiple CAD platforms and versions.
- Environmental Solutions. Environmental materials aggregation and reporting systems integrated with Teamcenter enable manufacturers to meet environmental regulation requirements including functionality to support data collection, verification, and management; components qualification and exemption management; product qualification and reporting; product bill of materials aggregation across multiple sourced components; compliance validation; data exchange and reporting; and design for compliance.

Siemens PLM can be deployed to support end-to-end requirements management and system engineering including software lifecycle management, ECAD process management, IP management, and platform management.

THE SITUATION

In addition to time-to-market, innovation, and cost management pressures, high tech and electronics companies face many external market challenges.

Volatility

High tech manufacturers must manage ongoing price pressure, design complexity, evolving regulatory requirements, and technological evolution on an ongoing basis with both a long-term and short-term view of market demand and their competitive positioning. Rising supply chain volatility, both on the supply and the demand side, makes it even more difficult for manufacturers to plan, produce, and deliver timely products — and for public companies, missing a delivery data or taking a quarterly earnings hit to ensure delivery can have serious repercussions for stock values.

Globalization

Reductions in barriers to free trade and the economic advantages of producing components in countries with lower labor costs means manufacturers must effectively manage communication, collaboration, and negotiations about complex products and components across multiple countries, time zones, and languages. As the cost differential diminishes between manufacturers and their Asian or Indian partners, understanding resources and managing communications will become even more important.

Disruptive technology

Disruptive innovations are constantly threatening market leaders by creating new markets that make existing technology obsolete or by displacing market leaders through performance improvements. Manufacturers must manage research and development investments to optimize innovation and time to market while keeping existing products price and feature competitive.

Sustainability

Governmental regulations such as the Waste Electrical and Electronic Equipment Directive in Europe and various federal and state laws in the United States have made electronics and high tech manufacturers increasingly responsible for the disposal or recycling of their products at the end of life. To cost-effectively comply with these requirements, manufacturers must design, engineer, and source products with a vision of how they will be disassembled and recycled. They must also meet demands like traceability and lead-free manufacturing, and automate the delivery of as-built information back to enterprise systems.

Data integration

The most successful high tech and electronic companies seek to automate and streamline product development and collaboration across the product lifecycle from design to manufacture to end of life.

Although many manufacturers started with point applications for design, mechanical drawing, simulation, product documentation, and other needs, most are finding the integration challenges and costs outweigh the benefits of giving each group of users best-of-breed tools. A better approach attacks the product lifecycle management problem as a set of interconnected phases where feedback and

development can be shared between different groups through a central platform — without the need for everyone to learn a new set of tools.

Siemens PLM software enables high tech and electronics manufacturers to manage these challenges and improve the efficiency of their product lifecycle management practices. Key benefits companies achieve from the solution include:

- Reduced cost of goods sold
- Increased productivity
- Accelerated innovation
- Optimized return on research and development
- Improved supply chain collaboration and resource optimization
- Faster time to market
- Reduced cost of compliance

This Guidebook explores best practices, fine-tuning tips, and missteps to avoid for companies to maximize returns from their investment in Siemens PLM Software in the high tech industry.

BEST PRACTICES

Companies deploying Siemens PLM software maximize return on their investment by leveraging the technology's ability to support complex product lifecycles. Key best practices include aligning PLM strategy with PLM maturity, balancing strategic goals with quick wins, linking projects to measurable goals, and training for both skills and attitudes.

Align your PLM strategy with your PLM maturity

Different companies use different measures of PLM maturity and many are very subjective; however, companies that look to IT projects to solve PLM challenges without a clear understanding of how effective their existing PLM processes and practices are are unlikely to achieve a positive return on their investment. Understanding where the biggest challenges are in your PLM strategies today can help you identify the greatest areas of improvement and where process changes need to be made that can then be supported and reinforced by technology. Key areas to consider include:

- **Data.** How many different applications or programs store product data? How much is spent on data and design translation?
- **Processes.** How much of the product ideation, design, engineering, sourcing, assembly, delivery, and end-of-life processes are codified? What share of processes is automated? How prevalent are manual workarounds?
- **People.** How much of your designers', engineers', product managers', and other personnel time is spent in productive work — and how much is spent in rote tasks, information requests, and rework?
- **Partners.** How do you collaborate with partners? How much is spent on travel and meeting expenses? What are other partner management costs related to product lifecycle management?

Considering these areas and the financial impact of inefficiencies in each area can help you to drive your PLM improvement strategy and to identify the best potential return areas from your PLM technology investment. Although some companies

follow the big bang approach to moving to a unified PLM platform, Nucleus has found pilot strategies that migrate product groups and tools to the new platform over time are less risky and more easy for users to adjust to than a large disruptive project.

From a functionality perspective, more mature manufacturers tend to adopt platforms that are flexible enough to import CAD from almost any source while being scalable enough to support both long-term and short-term needs. Technomatix PCB Assembly and Test streamlines the sharing of data between processes, people, and partners throughout the PLM process, by converting digital product development specs into manufacturing programs, and ultimately production launch and documentation. The result is better process management, faster cycle times, more error-free new product introductions (NPIs), and more efficient documentation library management.

Balance strategic goals with quick wins

Once you have identified the business goals of your PLM initiative, planning your project in phases that enable you to achieve some quick wins can help to build support for your overall strategy while driving ongoing incremental ROI. The most successful manufacturers plan their overall PLM strategy to be self funded by breaking the deployment up into manageable phases that each deliver clear business benefits.

There are many benefits from adopting a unified architecture. It reduces employee training and ramp-up time, reduces the number of new tools a user must learn, and increases productivity of users who now have a centralized design environment they can access to have the most up-to-date information, reducing searching and rework. Such a unified approach has second-order benefits for managers who can now have greater visibility across resources to better manage multiple projects or initiatives; it also reduces the number and diversity of skills of IT staff needed to support PLM.

Link components to measurable goals

Setting milestones for each phase of your PLM program can help to focus your deployment and training efforts and ensure your projects stay on track. The key is to make those milestones measurable and achievable. Taking advantage of features such as offline programming and offline iterative line balancing, for example, have clear objectives that can be tracked to the bottom line, such as reduced cycle times. Optimizing for setup, and the ability to cluster multiple jobs by parts commonality, can accelerate line changeover time and overall throughput.

Plan for sustainability

Recognizing the growing requirements for environmental care and sustainability in high tech and electronics, smart manufacturers make sustainability and compliance an integrated part of their PLM strategy to ensure consistent auditable compliance at the lowest cost possible. Teamcenter has complete functionality for end-to-end collection, management, and reporting of environmental compliance and material content information:

- Integration of Teamcenter's requirements management solution allows developers to extend compliance analysis through the product lifecycle so products can be more closely designed for reuse and recycling.
- Teamcenter's solution for environment compliance allows manufacturers to capture and track material and substance data from multiple sources, compare it to compliance requirements for specific markets, and manage the data in a product-related context so it can be used across business processes such as strategic sourcing and part qualification.
- Compliance managers can use standard interfaces to distribute reports to design and quality assurance teams and regulatory authorities.

These features and Teamcenter's multiple levels of compliance management can streamline the capture and traceability of requirements, accelerate information exchange, and support cost-effective end-of-life management strategies.

Plan and train for both skills and attitudes

Identifying and addressing barriers to adoption are keys to the success of any application deployment. When a PLM project will drive process changes and greater collaboration across distributed teams, individual, management, and structural changes will need to be addressed. There is no one "silver bullet" for ensuring adoption; instead, companies should build a number of efforts into their project plan including:

- Ensuring the IT lead has excellent project management and communication skills.
- Designating one high-level executive as the project champion and letting them pick their team of mid-level managers to drive the project.
- Giving mid-level managers opportunities for visibility and leadership so they can "own" the project, both inside and outside the organization.
- Encouraging pilot users to be whistle-blowers as much as champions. If managers encourage negative feedback in the early stages, it can be addressed before a broad population accesses the application. This in turn will drive fewer adoption challenges.
- Not overlooking the need for global teams to meet in person to overcome collaboration barriers, particularly if those teams haven't worked together before or work for different partner organizations.

Successful adoption of the technology can drive greater innovation through knowledge sharing and collaboration, and greater designer and engineer productivity. Most organizations moving to a unified PLM environment will need to plan time and resources for data migration and a strategy for migrating or archiving existing data. When moving PLM to a unified environment, most manufacturers also find that this process reveals where bad or conflicting data exists and they may need to devote more time to clean up and consolidate data before unified PLM becomes operational. For less business disruption, plan adequate time to test new systems before moving them to production. The smoothest cutovers happen when companies do "dry runs" multiple times before running their PLM processes in the new environment.

FINE TUNING TIPS

Beyond the initial deployment, ongoing ROI from PLM is delivered by continued efforts to reinforce efficient operations and further streamline the supply chain. Fine tuning your PLM environment through ongoing measurement and communication, using it to drive partner innovation, and further extend the unified PLM architecture to drive greater automation and efficiency are all key to ongoing PLM value.

Keep measuring

Maximizing return on investment from PLM over time requires ongoing measurement and alignment of key PLM objectives and key performance indicators to drive ongoing process improvements and support for business innovation. Scheduling regular division, portfolio, and product reviews to evaluate performance, identify areas for improvement, and track how they can be supported by PLM (either by changes to the system, additional add-ons, integration, or simply training) can help to make your PLM environment a lever for business improvements.

There are always opportunities to improve NPI processes as well. One of the benefits of an end-to-end PLM platform is the ability to gather data on process bottlenecks and further optimize production setup and line throughput. Checking designs against established manufacturing rules, like the more than 300 board layout manufacturing rules Siemens provides, can accelerate NPI and reduce errors.

Communicate about and encourage success

Just as results need to be measured on an ongoing basis, communicating results and recognizing individuals' contributions can help to drive ongoing adoption and successful use of your PLM environment. Encouraging employees that are engaged in driving effective use of the PLM environment to drive greater innovation and efficiency can be a valuable carrot. Nominating employees and projects for industry and technology awards programs, enabling them to participate in case studies and industry events where they can be recognized and interact with their peers, and encouraging feedback on your PLM environment (both good and bad) can be a very cost-effective means to build ongoing momentum and support for PLM initiatives.

Drive partner innovation

The more they can streamline handoffs, the more cost effective and competitive partners can be. Using Teamcenter to support handoffs and a common version of the truth can streamline collaboration with partners and suppliers.

Extend PLM workflows

Once an initial PLM system is deployed, organizations can further leverage returns from their investment by leveraging Teamcenter's workflow capabilities to automate and streamline additional product development, testing, delivery, manufacturing, and service and support processes. Greater automation will accelerate processes but also provide valuable data from across the product lifecycle that can be leveraged for new innovations and product iterations.

MISSTEPS TO AVOID

Companies that watch out for common missteps to avoid can maximize efficiency and innovation and, ultimately, return on investment from PLM.

Don't take the big bang approach

Although an investment in end-to-end PLM can be significant, companies that take the old-fashioned "all at once" approach to their deployment will find the business disruption and change management challenges far outweigh the benefits of the transformation. Taking a phased approach to investing in and deploying PLM will enable users to adjust to work changes, ensure data can be cleaned and migrated in an efficient way, and enable you to leverage what you learn with initial efforts to be more successful as you extend the functionality and workflows of your PLM environment.

Don't underestimate the human factors

The impact of globalization and disruptive technology on the high tech and electronics industries has obvious challenges for global PLM initiatives. Different types of workers (engineers, designers, product managers, and marketers) must learn to collaborate effectively, share ideas, and feel comfortable giving and taking both positive and negative feedback. As your PLM efforts expand, building dynamic teams with these skills is critical to success, so ongoing encouragement of effective collaboration is critical. Teamcenter's collaboration capabilities can support some of the work, but ongoing training, team building, and face-to-face conversations will also be needed, particularly when the team spans borders, languages, and companies in the supply chain.

Don't be casual about planning and resources

Planning and scheduling appropriate resources and personnel to contribute to the PLM deployment is obviously necessary: the question is how. Networking with peers (even in other industries) to understand key points in the process and what kinds of input and leadership are needed, planning and reviewing schedules in advance with teams on the critical path to success, and taking advantage of Siemens's industry experts expertise and guidance on allocating resources can help ensure your project isn't derailed by lack of resources or poor scheduling.

Don't assume existing data is good

Bringing all your product data into an integrated design environment will inevitably expose some bad data. Any company's risk of finding their data is less consistent than expected will depend on the number of different systems, applications, authoring tools, and environments being integrated. One of the advantages of the Siemens PLM approach is its support for a broad range of authoring and design tools; however, you should expect and budget for additional investment in data scrubbing and application testing if you find along the deployment process that you have bad data.

Don't treat PLM as a generic toolkit

As PLM has evolved and vendors like Siemens have made investments in particular vertical solutions, high tech and electronics manufacturers can reap the benefits by leveraging built-in support for standards and best practices — and focus their investment efforts on further competitive differentiation. Although this will likely

require some change management initiatives, it can pay off through faster time to market, lower ongoing cost of ownership, and greater innovation.

CONCLUSION

The most successful high tech and electronics manufacturers have a unified view of the entire product development lifecycle from research and development to idea generation to design and engineering and, finally, to end of life of the product. An integrated PLM environment can support this end-to-end view of the product while supporting the tactical requirements of tracking and managing resource allocations, sourcing and spending, and collaboration across a global supply chain. Companies considering an investment in Siemens PLM will maximize ROI by taking advantage of the investments Siemens has made in an end-to-end PLM solution that supports the specific needs and requirements of their industry. Following best practices and continuing to fine tune and leverage greater cost savings from the environment over time will drive both initial and ongoing incremental return on investment.