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Getting started with product data management

Key capabilities and benefits of a PDM system

Companies implement product data management (PDM) systems to provide their diverse and widely dispersed enterprises with access to a single source of product and process knowledge. Once a PDM system is in place, companies can leverage this knowledge to improve productivity, reduce product lifecycle costs, facilitate global collaboration and provide the visibility needed for better business decision-making. This white paper identifies the best-practice capabilities that a PDM system should provide to facilitate these fundamental business needs.

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Overview

Creating innovative products today requires companies to address a wide variety of issues and business challenges. A key challenge is marshalling the resources of the extended enterprise and efficiently using these assets to deliver the right products at the right time to the right markets.

Product and process knowledge is recognized as a key resource in achieving business success. But even in today's digital age, most companies still struggle to utilize this knowledge as a manageable asset from one business opportunity to another.

Product data management (PDM) enables companies to manage all of their product and process-related knowledge in a single secure but accessible system that can be used by multiple applications and multiple teams across an organization. With a PDM system in place, product information assets can be coordinated and synchronized, enabling companies to:

- Improve productivity and reduce cycle time
- Reduce development errors and costs
- Facilitate collaboration with anyone, anywhere
- Improve value chain orchestration
- Provide greater visibility so they can make better business decisions

To deliver these advantages, companies need a PDM system that is able to support their business-specific needs. At its foundation, this system must be able to provide best-practice solutions for:

- Secure data management
- Process enablement
- Bill-of-materials visibility (configuration management)

Choosing the right PDM system provides companies with a solid foundation that can be easily expanded at their discretion into a full product lifecycle management (PLM) platform.

Business challenges

Companies are under constant competitive pressure to improve their top-line business results, realize bottom-line efficiencies and accommodate continually changing market demands. In addition, they are asked to meet increasingly stringent government and industry regulations. All of these challenges require companies to take full advantage of their product and process information.

Yet, in many of today's companies, product and process knowledge is still spread across multiple systems, databases and desktops. A wide variety of tools and software applications are used to create this knowledge initially. Equally important, little or no connectivity is in place to tie these information assets together – even in product development operations, where different disciplines use different applications to create information in multiple formats.

The end result is a series of disconnected information "silos" that inhibit companies from reaching the productivity and time-to-market goals that are crucial to their strategic objectives. More specifically, it is difficult to coordinate and synchronize product and process information that is used to define the company's product offerings and their related systems, assemblies, parts and components.

More and more enterprise participants need access to this information in formats they can understand so they can leverage it as early in the product lifecycle as possible. Seamless access to product requirements, designs, documents and 3D models enables all decision makers, stakeholders and lifecycle contributors – not just engineers – to make more informed and better decisions.

Best practice solutions

As the accompanying table indicates, a PDM system enables companies to address a variety of fundamental business needs.

Business needs addressed by a PDM system

Fundamental business need	How a PDM system addresses these needs
Improve productivity and reduce cycle time	Ensures that every participant in a lifecycle process has access to the right information at the right time. A PDM system synchronizes product and process information across multiple organizations, linking an enterprise's otherwise isolated information silos and dramatically improving access to accurate and up-to-date data. The PDM system brings an enterprise's product and process knowledge together in a single highly accessible and secure source that eliminates time-consuming information searches while facilitating information re-use and better decision-making.
Reduce lifecycle errors and costs	Provides visibility to accurate, up-to-date information in a meaningful context, which reduces errors and lowers the cost of change. A single source of product and process knowledge enables enterprises to more efficiently manage and reconcile multiple application systems. Specifically, it eliminates the costly and error-prone process of manually duplicating information between different applications and trying to align their disparate information assets.
Facilitate collaboration with anyone anywhere	Ensures that product teams and their individual members are working with the right version of the right product information in a meaningful context. A PDM system's proven ability to facilitate global scalability enables dispersed teams, departments, suppliers and partners to seamlessly share diverse types of product and process knowledge without regard to geographic, organizational or technical boundaries.
Improve value chain orchestration	Provides enterprises with a way to consistently manage processes that involve the participation of both internal users and external partners, as well as product and requirement changes that affect these participants. By integrating processes that cross their value chains, companies are able to align the work of otherwise isolated lifecycle participants and reduce errors caused by miscommunications.
Provide greater visibility to products and processes	Enables enterprises to comprehensively manage their product and process data, including CAD data, parts information, documents, requirements, 2D and 3D data and other intellectual assets. This provides users throughout the enterprise with visibility to accurate, up-to-date information in a context that is meaningful to them, where the impact and status of product changes, requirements changes and other decisions can be clearly understood.

Essentially, a PDM system must be able to manage product knowledge and development processes in local, as well as global, environments. Individual companies make their own unique PDM decisions about the applications they deploy, as well as whether they want to enable their workflow-driven processes to span all or only selected aspects of their value chain. Regardless of what decisions are made, the selected PDM system must be able to provide best-practice solutions for:

Secure data management, which enables the PDM system to address multiple end user needs and experiences. A PDM system should be able to capture and manage all of the information required to design, develop and produce today's products. Users across every stage of the product lifecycle need to be able to easily locate and work with the information required to get their jobs done, including parts, documents, requirements, electrical drawings, manufacturing instructions and other meaningful data. This access must respect the entitlements that protect the intellectual property rights and security needs of the enterprise.

Process enablement, which provides the PDM system with workflow and process capabilities needed to enable both internal product teams and external partners to participate in the product lifecycle. A PDM system should ensure that all processes are consistently managed through best-practice rules and conventions. A rules-based engine is especially valuable since it can be used to easily capture best practices and process knowledge and allow consistent execution with appropriate participants and data.

Bill-of-materials (BOM) visibility, which enables the PDM system to manage product information from wherever it is created while allowing it to be used wherever it is needed. A PDM system should be able to manage information across an entire product lifecycle and bridge the gap between the upstream stages of the lifecycle and its downstream phases. The system also should enable participants in each stage to visualize and share information without requiring them to purchase or learn how to use special software. Just as importantly, the PDM system should provide total BOM visibility, which includes being able to see the bill of materials before and after changes are made, as well as from different points of view, including promoting understanding by non-technical users by enabling them to visualize the product's parts in 3D.

Key capabilities

While the general requirements discussed in the preceding section are helpful in conceptualizing the best-practice solutions needed by a PDM system, the following table describes detailed capabilities required by these solutions.

A PDM system's key capabilities

Best-practice solution	Required capabilities
Secure data management	Provides the PDM system with key data management capabilities to capture and manage product information and ensure that the right information is delivered to the right users in a correct context, including: Single source of product and process knowledge that can manage and provide seamless access to all of an enterprise's related designs, parts, documents and requirements. The PDM system also should facilitate: • Management of multiple CAD tools and formats • Authoring coordination (check-in, check-out) • Version and revision control Document management that provides product teams with appropriate document templates, auto-rendering and markup capabilities, as well as support for desktop tools such as Microsoft Office. Search functionality that includes quick search, detailed search and graphical search capabilities for enabling widely dispersed and diverse users to access the PDM system's product and process knowledge "anytime, anywhere". Security and administrative functionality that protects the intellectual property rights of all lifecycle participants through: • Role management • Program-based security • Access privileges
Process enablement	Provides the PDM system with key process management capabilities to ensure that product and process information is delivered to the right person at the right time, including: Workflow capabilities that enable enterprises to establish, manage and execute automated and orchestrated workflow-driven processes that reflect company-specific best practices. Change and revision management that enables enterprises to implement best practices consistent with conventions such as the Institute of Configuration Management's CMII standards for: • Change planning (what-if analysis) • Change incorporation (execution) • Change verification and communication A PDM system should also support other established processes, including phase-gate standards.

A PDM system's key capabilities *(continued)*

Best-practice solution	Required capabilities
Bill-of-materials visibility	Provides the PDM system with the visibility necessary for managing and presenting bill-of-materials (BOM) information from wherever it is created to wherever it is needed. Key capabilities include: BOM management that enables enterprises to accurately represent and efficiently manage a complete BOM in all of its lifecycle stages. The PDM system also needs to facilitate: • Complete, multi-domain BOM that can include mechanical, electronic/electrical, software, and simulation parts, components, and assemblies • Integrated configuration management (change management) • Alignment and synchronization of all sources of BOM data, as well as all lifecycle phases, including the as-designed, as-planned, as-built and as-maintained states • Open applications and systems integration Lifecycle visualization that enables lifecycle participants to share and visualize on-demand representations of the product and its underlying assemblies and parts in a secure portable format without the need for a CAD authoring tool. The PDM system also needs to provide: • Digital mockup capabilities that significantly reduce the need for costly physical prototyping • JT™ support, the common 3D language for PLM visualization

Next steps

Siemens Digital Industries Software and our global network of partners have extensive experience helping companies like yours get started with PDM software that can grow to PLM. Teamcenter® is the world's most widely used PLM software, available for delivery on-premises or on the cloud with our Teamcenter X subscription-as-a-service (SaaS) offering. Take control of your product information and processes with PDM today, then grow with PLM to meet your needs tomorrow.

Whether your focus is PDM or PLM, contact us today.
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