PLM & ERP: achieving balance in product development

HOW COMPLEMENTARY TECHNOLOGIES DELIVER THE COMPETITIVE EDGE

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Do you hear that? That's the daily rumble of manufacturing companies struggling to meet increasingly finicky customer demands, to stay on schedule, adhere to budgets, and deliver products on time. Do you feel that? That's the anxiety of product development professionals untangling the never-ending chaos of modern manufacturing: It's the endless change orders. Inventory outages. Regulatory compliance laws. Supply chain snafus. New global competitors.

So, what can you do? Relax. Breathe deeply. Seek balance. Visualize harmony.

No doubt, the manufacturing industry is more challenging today than ever before. And to win in the global battle for competitive edge, manufacturers must arm themselves with an arsenal of technologies that improve their ability to develop and manufacture better products, and to do so faster. Simultaneously, they must optimize their business processes and create the efficiencies necessary to streamline product development and manage ever-expanding supply chains.

For too many organizations there's an imbalance between the management of business operations and the control of product development processes. When these vital applications are out of sync – or not present at all – the organization will struggle in a variety of vital areas. The solution: balance.

Key technologies help manufacturers strike a good balance

To achieve this balance, companies are implementing technologies that address both sides of the product development equation namely operations, and product development. On the operations side, enterprise resource planning (ERP) systems are increasingly being deployed to help drive greater operational efficiencies and to better manage suppliers. ERP has become a vital part of manufacturing success because it focuses on helping companies facilitate the operations required to manage the physical assets (logistics, purchasing/planning, manufacturing, accounting, distribution, and inventory) that drive their business.

On the product and process side, manufacturers are juggling thorny issues such as frequent design changes, disparate design systems with data incompatibility, regulatory compliance, and globally dispersed design teams. That's why product lifecycle management (PLM) systems are now being widely adopted to help companies accelerate innovation and support design collaboration efforts by closely managing and tracking the development process throughout the lifecycle of a product.

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Now, the big question: Can ERP and PLM work together to optimize your product development efforts? Can these powerful solutions be deployed within a complementary, dynamic system so that the strengths of each are leveraged for the manufacturer's benefit? When implemented effectively, both technologies can deliver significant payoffs for manufacturers by addressing the critical functions and processes needed to compete effectively and to stay balanced through turbulent economic times.

To understand why both technologies play a vital role in manufacturing success today, let's review some of the top-level business hurdles manufacturers are still trying to overcome to stay ahead of competitors:

- Reduce costs while increasing quality of products
- Develop multiple configurations of products, without increasing costs and slowing product delivery
- Develop and deliver products that meet customers' needs
- Coordinate collaboration among global, multi-disciplinary design teams
- Increase productivity and improve asset utilization
- Facilitate innovation
- Comply with corporate standards and procedures
- Implement inter-enterprise initiatives
- Ensure regulatory compliance
- Support sustainability initiatives

According to The McKinsey Quarterly, companies invested $300 billion in ERP solutions in the 1990s.

Let's break these challenges down and take a closer look at how PLM and ERP technologies can help enterprises maintain balance in today's unsteady global market and achieve synchronicity between the operational and product development sides of their business.

ERP: Taking control of operations

For nearly every step in the product development process, there is an operations function put in place to better control and manage it. Adjacent functions, such as manufacturing, logistics, distribution, inventory, shipping and accounting, each play a vital role in getting innovative new products to market – and ultimately to customers – faster than competitors. To be successful, companies must ensure that these functions are performed in sync with product development efforts, a task made more difficult because it requires coordination between disparate departments.

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When each individual department deploys its own stand-alone software, the result is often a lack of integration between software systems, causing deep inefficiencies. This challenge is often referred to as "islands of automation." Companies without this integration suffer from a host of complex issues, including over- and under-inventory of parts and products, procurement problems, manufacturing scheduling conflicts, and order fulfillment and distribution difficulties.

In an effort to bridge these software islands, manufacturers began to recognize the need for a single, enterprise-wide solution that could integrate discrete – yet increasingly interdependent – operations functions. ERP systems, first introduced in the early 1990s by big market player SAP®, delivered a powerful solution by integrating all functional areas, thereby providing alignment of operations, improved planning and productivity, greater efficiency, and better visibility and control. Today, ERP also facilitates the sharing of materials data between functional areas, and integrates manufacturing and supply chain processes, thus improving efficiencies.

ERP focuses primarily on the physical assets of a company and the flow of materials, making it an ideal solution for managing recurring transactions. Because ERP systems were designed to control planning and accounting for production, they only require production-related data. While ideal for executing and optimizing manufacturing and distribution processes, ERP systems are not well suited to deal with activities that involve less tangible assets, such as the intellectual capital encapsulated in product data and bills-of-material (BOMs).

ERP solutions can help manufacturers solve critical challenges like:

- No integration between stand-alone departmental software
- Lack of a reliable flow of materials data between functional areas
- No link between operational functions and departments
- Inability to plan and schedule resources efficiently
- Procurement problems
- Lack of coordination with manufacturing schedules
- Problems with order fulfillment and distribution
- Inadequate supply chain management capabilities

"For a business to be successful in today's highly competitive global market, PLM is not an option... it is a competitive necessity."

– CIMdata

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PLM: Finding harmony amid process and product data chaos

Designing and manufacturing new products today is an increasingly complicated endeavor for many reasons. Today's sophisticated 3D CAD systems – used to create data-rich CAD models – also produce a torrent of data, and not just models, but supporting documentation, such as bills-of-material (BOMs), drawings and other metadata. To leverage the value of this engineering information, manufacturers must harness it and make it available downstream to facilitate processes such as process planning, assembly, manufacturing, service planning, and product documentation.

While deep, comprehensive product knowledge is inherently valuable, managing all these increasingly complex, interdependent CAD files – the "crown jewels" of manufacturing – has become a headache for most companies. As well, the globalization of development teams and supply chains adds another dimension of complexity to product development, greatly extending the number of team members and partners tasked with collaborating on product information.

Due to the iterative nature of product development today, and the increasing complexity of having to integrate mechanical, electrical and software components, manufacturers now need to effectively capture and continuously update product data – all while ensuring that it is easily accessible to all team members, both internally and across the supply chain.

"Chaos in the world brings uneasiness, but it also allows the opportunity for creativity and growth."

– Tom Barrett, US Congress, State of Wisconsin

Why PLM?

Let's take a quick look at some of the obstacles that PLM technology can help manufacturers overcome:

- Prolonged product development cycles
- Low revenue generation on new products
- Little or no reuse of engineering data and parts
- Lack of visibility into status of new product development projects
- Inefficient engineering change order (ECO) process
- Problems complying with regulatory requirements
- Redundant parts, excess inventory
- Errors due to manual re-entry of data
- Inability to share data across design teams
- Little to no protection of intellectual property (IP)

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CAD/CAM vendors, recognizing the growing need of their users to bring order to the chaos resulting from this explosion of product data, initially introduced product data management (PDM) solutions to help secure the exchange of data, and to better manage the engineering change order process. Though PDM helped track revisions and facilitate file management, companies still needed a way to leverage engineering data downstream and share it safely with outside supply chain partners, not only during the engineering phase of development, but throughout the lifecycle of the product, as well.

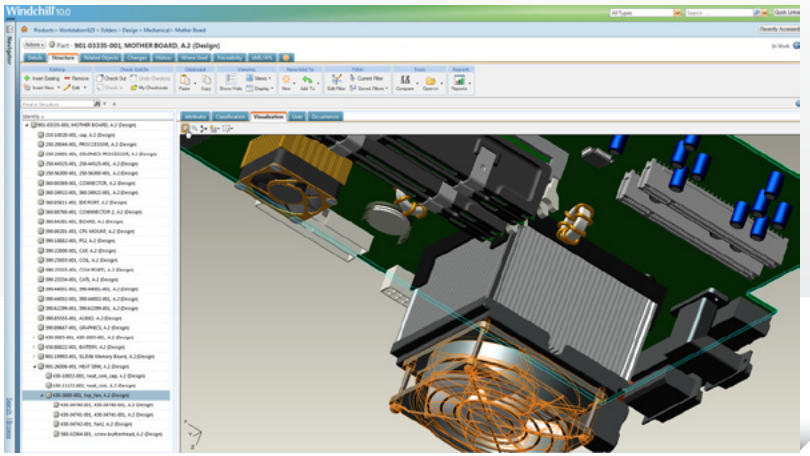
In response to these growing demands, CAD vendors took their PDM technology a step further, which led to the creation of PLM. Today, PLM has been widely adopted by manufacturers to help manage all engineering data (models, spreadsheets, assembly drawings, BOMs, etc.) throughout the lifecycle of a product, and to share the data safely and efficiently among disparate members of their extended collaborative teams.

"The whole is more than the sum of its parts."

– Aristotle

PLM systems are providing manufacturers with a single-source database that can control, manage and track changes to the model, and link multiple layers of product data. In addition, by fundamentally defining each and every component within a BOM, PLM can benefit the downstream business operation processes being controlled by ERP, SCM (supply chain management), and CRM (customer relationship management) applications.

In addition, PLM enables every detail of a new product to be tested, updated and refined while designs are still in digital form, so problems can be pinpointed and addressed long before they arrive on the shop floor. In addition, manufacturing process management (MPM) processes, managed within PLM, provide tighter integration between design and manufacturing functions, and enable the manufacturing process to be proven out simultaneously with product design efforts.



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PLM and ERP: Essential technologies, respective strengths

Manufacturers are increasingly recognizing the value of integrating both ERP and PLM technologies to facilitate and control product development, manufacturing, sales and support initiatives. Many companies that have successfully implemented ERP solutions have seen significant gains in productivity and efficiency in their business operations. Nevertheless, it's important to note that ERP is not well suited to dealing with the highly iterative, intensely collaborative nature of product development. ERP systems simply can't handle the complexity and changeability of product data. That's where PLM comes in.

PLM solutions facilitate and streamline the business processes of identifying, developing, improving, and refining new products, thus creating the framework for continuous improvement. PLM, due to its open, collaborative structure, also brings more stakeholders into the product development process, helping ensure that design intent is adhered to and customer requirements are met.

As companies realize the respective strengths of both technologies, there will be a move towards the integration of ERP and PLM. An ideal integration scenario will leverage the PLM system to manage and update all the digital product data and processes often captured in a complete BOM. The ERP system then can focus on the operational aspects of the physical product.

Ideally, an integrated ERP/PLM system will provide a bi-directional framework and reliable closed-loop transaction management, and allow for the release of vital business objects from one system to another.

PLM and ERP play distinct, yet complementary, roles in today's complex manufacturing environment. When their deployment is properly balanced, together they optimize all aspects of the product lifecycle, ensuring sustainable competitive advantage.

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The bottom line: Establishing balance

PLM and ERP technologies each offer distinct strengths that can greatly improve a manufacturer's ability to streamline operations, develop better products faster, and ultimately strengthen their ability to compete in today's global market.

PLM can be used to manage and update all aspects of a product in its digital state, including its complete BOM, while ERP takes over for the operational aspects of the physical product. When implemented and integrated effectively, both solutions should be able to support bi-directional data sharing and reliable closed-loop transaction management, allowing the release of important data from one system to another as dictated by the product development process.

Both ERP and PLM technologies can help companies gain competitive advantage by ensuring the smooth, ongoing flow of product innovation, as well as process innovations such as continuous cost and quality improvement–without the fear of losing control in the process. PLM and ERP play different, yet complementary roles in product innovation and execution, and when used in conjunction with one another, can help companies focus on what will truly sets them apart from competitors: innovation.

By incorporating both technologies, companies can realize the maximum possible value from their product development and manufacturing processes, and find balance and calm within the chaos of today's product design challenges.

Now…can you hear that? It's your sigh of relief when you realize that well-integrated ERP and PLM solutions are able to deliver the peace of mind that comes when both sides of your business–the operational side and the product development side–exist harmoniously, performing perfectly in sync with one another.

PLM and ERP play different, yet complementary roles in product innovation and execution, and when used in conjunction with one another, can help companies focus on innovation.

Learn more

For a more extensive look at the benefits of both PLM and ERP technologies, download the free white paper "PLM and ERP: Their respective roles in modern manufacturing".

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