

The strategic value of PLM

In the past, product developers and engineers were the sole users of product lifecycle management (PLM). However, with the survival of the enterprise often hinging on the success of a single product, more and more CXOs are turning to PLM as a key component of their overall strategy. So how can a comprehensive product lifecycle management solution help businesses compete and thrive in the current economic climate? *CXO* spoke to a number of industry experts to find out.

What business benefits does a PLM system offer? Why should executives consider making an investment in PLM?

SB. Executives should consider PLM because good companies recognize the balance between their people, their processes and their systems. The PLM system is about facilitating the processes to make people more effective. The most common benefits that our clients have realized include greater levels of innovation, quality and profitability in their products through collaboration, an ability to do more with less resources, and stronger integration with their supply chain and customer bases. All of these items correlate to operational effectiveness in today's business environment.

JimH. At the highest level, executives must increase the value of their companies. There are several ways to do this, such as reducing costs, getting to market faster and creating more innovative products. PLM solutions help companies improve the product development processes that impact their financial performance.

Consider the case of LG.Philips LCD, a joint venture between LG Electronics (Korea) and Philips Electronics (the Netherlands). This top thin-film-transistor liquid crystal display manufacturer was able to reduce its design and development cycles by 10 percent, design modifications by 50 percent and development costs by 20 percent. LG.Philips LCD estimated the three-year return on investment of their Windchill-based PLM implementation to be US\$15.9 million. These are the kinds of results that gain executive mindshare.

JonH. PLM empowers businesses to make unified, information-driven decisions at every stage in the product lifecycle. PLM solutions establish a cohesive platform to optimize relationships along the lifecycle and across organizations; maximize the lifetime value of your business' product portfolio; and set up one single system of record to support diverse data needs.

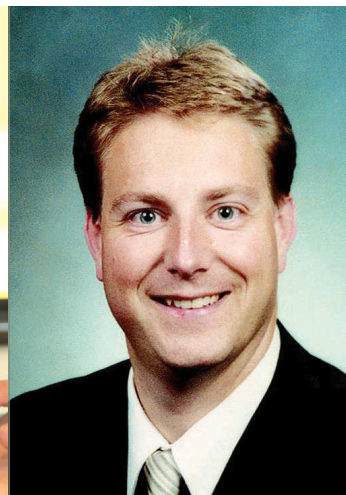
Businesses that fully leverage PLM's end-to-end capabilities have the opportunity to increase yield on innovation by extending product life;



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Jon Heidorn is responsible for marketing all UGS product lines within the Americas. He has over 20 years of enterprise product design, manufacturing, and data management experience in the product lifecycle management (PLM) industry.

streamline processes and manage performance against goals; gain efficiencies and control cost through re-use; and connect systems and people for unified decision-making.

PS. To succeed in today's highly competitive and increasingly global market, manufacturing companies must become agile and responsive to changing market conditions and needs. Companies also constantly seek top line growth by bringing innovative products to the market faster and at a lower cost. Fostering innovation across the ecosystem of strategic partners – and effectively extracting the value of those innovations while controlling costs and without compromising on quality – requires a PLM strategy.

In a recent report, Aberdeen Group notes that small and medium sized manufacturers that seize the opportunity to improve their product innovations, product development and engineering processes receive tangible benefits on a par with larger manufacturers, including increased revenues (19 percent), reduced product cost (17 percent) and decreased product development time (16 percent).

In what ways can a business expect its working practices to change as a result of implementing a product lifecycle management (PLM) system?

PS. Today's best-in-class design process is not just about designing a part or product to meet certain functional requirements. You must consider the entire lifecycle and the overall product experience – from purchasing the product, using it, servicing and maintaining it and finally disposing of it – so that you can design the highest quality product possible, at the the lowest cost.

PLM impacts multiple enterprise processes, such as new product introduction, sourcing, engineering change management, design for supply, manufacturing, maintenance and serviceability.

PLM brings together the once isolated realms of design, manufacturing, sales and marketing. It creates a vibrant ecosystem in which everyone concerned – including partners and customers outside the company – is now involved in every stage of product development. It streamlines processes and provides greater control on costs, time and quality.

JonH. Companies that have implemented PLM can see improved collaboration across the organization and extended enterprise – teams can communicate and see all relevant product information at any point in the product lifecycle. Early in a product's concept, teams can engage sales, manufacturing, customers and marketing to quickly capture and test ideas; this results in the right product for the right market at the right time.

They also realize improved first-time quality of products, leading to reduced scrap, an increase in first-time product acceptance and reduced ECN/ECOs.

It allows them to improve product assembly and service long after the product has been shipped; improve communication across the organization; and improve their ability to respond to the market and their customers – companies that implement PLM can better respond to both customers and markets while knowing how product changes can impact product margins.

JimH. Companies cannot merely look at the installation of PLM software as the endgame. The value of any technology comes not just from

its deployment, but from the business process improvements gained through adoption and employment of best practice usage. Certainly, technology enables changes, but technology alone is not sufficient. Ideally, it would be supplemented with expert service support to realize the full potential. When paired with proper training and user adoption coaching, technology can yield amazingly positive changes in a company's working practices. For example, consider Plug Power, a leading manufacturer of fuel cells, who uses Windchill PDMLink to provide enterprise visibility and accountability to its change process. The average number of days to complete an Engineering Change Notice (ECN) was cut by 63 percent while the variability in the time to complete an ECN was reduced by 76 percent. Collectively, these advancements have helped Plug Power improve efficiencies and strengthen the company's financial position and market position.

“PLM solutions help companies improve the product development processes that impact their financial performance”
– Jim Heppelmann

SB. Having one system serve as the master repository of PLM data streamlines a 'self service' paradigm to the pertinent data to perform one's job function; regardless of what stage in the life-cycle that product data is. So at the simplest level, the need to get help from other departments to get information you need, along with the typical delays that occur as a result, is dramatically reduced, if not eliminated altogether. By securely enabling the right personnel to gain their own access to data at the earliest stages of the lifecycle, the ability to alter business processes is simplified and the product's lifecycle positively affected.

PLM is traditionally thought of as largely a manufacturing concern, but how is it evolving from an engineering-centric to an enterprise-centric initiative?

JonH. PLM encompasses more than engineering in today's implementations. As PLM expands beyond engineering, all parts of a company's organization contribute and review product information throughout the lifecycle. From capturing customer requirements early in the product lifecycle to servicing the product long after the product has been shipped, PLM allows companies to manage all phases of the product lifecycle.

SB. The 'self service' availability of product information provides the ability for the greater enterprise to 'see' and 'participate' in ways that they could not before. It used to be that downstream functions needed to solicit product data from the engineering department. Properly implemented, along with a deployment via the internet, the PLM system can serve data to many other areas of the greater enterprise – from remote divisions, sales and marketing, QA, operations, management, and suppliers/customers. Getting early and frequent interaction with product data provides ample opportunity to influence the lifecycle of the product and the corresponding business ramifications that result.

PS. The core capabilities of PLM facilitate the sharing of concepts, content and context across product lifecycles as well as throughout the value chains of employees, customers, suppliers and partners. Extending those capabilities beyond the processes of product engineering, design and production is a straightforward and natural extension of PLM.

Take marketing, finance and the general C-level in an organization as an example of those involved in a development, manufacturing and roll-out process. These people are not necessarily engineering-centric, yet play a critical role. They don't use CAD. They use spreadsheets and Powerpoint presentations. However, by using a standards-based technology such as 3D XML, 3D PLM data can be usefully shared across the organization, in Excel and PowerPoint – not just within the engineering and manufacturing silos where CAD and digital manufacturing software is used. This basic yet important example illustrates how democratizing technologies, such as 3D XML, are critical to the spread of PLM outside the engineering and manufacturing silos.

“We’ve definitely seen a significant increase in companies who are realizing the benefits of the hosted, and on-demand type models. Companies are recognizing where their core competencies are and aren’t” – Steve Bruneau

JimH. It is true that PLM is often thought of as engineering-centric. But, if you take a step back and think about it, consider the potential for success of the following two scenarios. In the first instance, a product is developed by the engineering team with little input from other groups such as marketing, suppliers, purchasing or manufacturing. In the second, a product is developed via a cross-functional team with key stakeholders beyond engineering

It's clear that option B is better: product development should not be exclusively the domain of engineering. Sales and marketing can make certain that customer requirements are built into the product. Purchasing can make sure that components are purchased from approved vendors. Suppliers can provide information about component availability and compliance with environmental regulations. An engineering-centric view misses these essential inputs to the product development process. It's only by taking a holistic approach to product development, and by using tools that support this vision, that a manufacturer can consistently deliver superior products most profitably.

At its most complete, PLM addresses all of the components of the entire product lifecycle – from cradle to grave – including application systems, processes, information, working methods and people. What challenges do companies face in terms of managing a project of this scope? And what sort of ROI does it offer?

SB. Without a doubt, the hardest part of implementing a PLM system is the culture change that will undoubtedly occur. In order to facilitate process improvements or establish new business models, the systems today can be made to serve as the framework fairly easily. Getting personnel at manufacturing firms to change the way they do their daily job is a senior leadership challenge. Engineering personnel in particular are

the hardest group to get to change the way they have been doing something, and they are apprehensive about sharing data with other functions too soon. Employees need to understand that with the new system, their workday should be simplified and by using the system correctly, the whole process can be streamlined and positively affected. This will help the company reach its goals, which should produce a great work environment for everyone. This sounds easy but requires strong and steady leadership.

With regard to ROI, I can use two of our clients as an example of the wide array of ROI data points; both of these have made their benefits public. We've deployed PTC's Windchill PLM system for CharBroil and in about a year, they have reduced staff in some key areas by almost 50 percent, reduced the number of disparate systems from three down to one, and more importantly, enabled a business model that could not function effectively without their PLM system. We also applied an advanced PLM field support solution for one product line at Smith & Nephew, an orthopaedic product manufacturer, and in three years of production have seen their revenues increase by approximately five times on a yearly basis, shifted approximately 60 percent of their staff onto other products, and bolstered their customer satisfaction to new levels for that product line.

JimH. One of the big challenges that companies face is understanding where to begin. As you point out, PLM addresses many areas, but it's not necessary or recommended to try to improve everything, everywhere, all at once. Often times that type of big bang approach leads to a long project that doesn't deliver value for years. Instead, we find that if you identify the overall business objectives and analyze the current environment, you can identify the specific processes in the product lifecycle that, if optimized, will result in the biggest overall impact on their business.

For example, ITT was able to achieve significant PLM benefits by first focusing their PLM strategy on improving their change management process. With this focus they were able to use PTC technology to reduce a change process that once took six months down to as few as 16 days, while concurrently reducing scrap and rework and improving customer satisfaction. Then there is MOPAR, who handles all the vehicle accessories for the Chrysler Group of DaimlerChrysler. They focused on the publication of product information and reduced the costs of producing their Accessories Databook by 60 percent and increased their efficiency by 60 percent. To help customers understand where to start thinking about a PLM deployment, PTC offers a free Vision Assessment that identifies these opportunities and then recommends a focused deployment strategy for how to realize that value with little risk.

SB. The biggest challenge that companies most often struggle with is simply determining where to begin. PLM, by its very nature, crosses a multitude of operational silos within an organization. Addressing the diverse range of needs and functions represented within those silos, identifying and agreeing on priorities both at a departmental and organizational level, are a few of the top challenges a company will face in embarking on a path to full PLM capability.

Further, because PLM crosses departmental and discipline boundaries within a company, a significant transformation of business processes and workflows is required. For a smaller company, a phased approach can help minimize disruption, slowly transforming processes in pre-determined steps, addressing highest impact transformations first.

While certainly challenging, the rewards readily justify the investment. Manufacturers of all sizes are experiencing tremendous value and ROI from their PLM systems today. For example, the Swedish company Peltor increased the number of new products introduced to market by 70 percent while at the same time reducing errors by 80 percent, contributing to top line and bottom line returns.

Reduction in time to market, reduction in costs, improving quality, improving top-line revenue, innovating new products, and consequently, creating new revenue streams, are just a few of the benefits that can be derived from a PLM implementation.

JonH. While traditional IT investments have focused solely on cost reduction (bottom line) as a means of developing a justification, PLM offers companies an opportunity to not only achieve costs reduction which are similar to other IT investments, but is one of the few IT investments which enable companies to grow their top line revenue. A successful PLM strategy helps companies innovate better products which directly affects their leadership position in their markets, revenue, and ultimately their market share. No other type of IT investment can bring this level of ROI.

Do you have any advice as to how they should get started? What would be your top tips for implementing and managing a successful PLM solution?

PS. PLM is as much a strategy as it is a solution. Therefore, prior to settling on any specific software, an internal assessment should be conducted to determine the most critical competitive challenges the company faces in delivering the right product to the market at the right price and right time.

A team approach to the internal assessment, involving key employees representing the various product stakeholders, is critical to its success. The team might begin their PLM strategy assessment by asking such questions as: Are we consistently missing scheduled launch dates? Are suppliers struggling to keep up with our product development efforts and complaining they lack visibility? Are warranty claims and product recalls too numerous? Do we need to get closer to our customer and be more responsive to prevent ‘offshoring’ and remain a viable supplier? Only after such an assessment has been conducted can a company then define their unique PLM-centric strategic roadmap and implementation plan.

Because it seeks to streamline business processes across an entire organization, the composition of the PLM deployment team is vital. This core team should not only include engineering and IT but also corporate executives and business units’ decision makers who understand the business drivers of a PLM deployment and its impact on the organization. Their ability to make decisions on enterprise-wide process design, to enforce change and to foster users’ adoption will be key to a successful PLM roll out.

Dassault Systemes has a 25-year history of providing and deploying PLM solutions in companies of all sizes and in all industries. We offer a wide range of industry industry best practices that facilitate PLM deployments.

JimH. We feel there are really five key factors in a successful PLM solution: identifying the right value opportunity, applying a methodical implementation approach, ensuring end-user adoption, creating a contract for success and strong program governance.

The first thing I’d recommend is making sure you identify the top business objectives that you want PLM to help you accomplish. PTC has a great tool for helping companies to identify these objectives – our Value Roadmap. The other major factor I would stress is focusing on ensuring end user adoption. This is one of the biggest challenges customers face in any software deployment because you will never realize the value you expect from new technology or new processes if nobody uses them. PTC has a Global Services team that focuses on the adoption of our solutions rather than their installation. In fact, PTC’s delivery methodology incorporates a unique adoption framework to help customers overcome the geographical and cultural issues common among global software deployments.

“The latest trends have to do with the competitive business culture and how companies are being forced to deal with globalization and driving products to market faster than they ever have” – Jon Heidorn

JonH. PLM has various components that include data management, product design and authoring, digital manufacturing and integration with core business systems – all of which need to be considered when developing a PLM strategy. In some cases, it makes sense to identify those areas that would have the biggest impact in helping a company achieve its business objectives. Some clients choose to implement a segment of PLM with the idea they will further implement other disciplines at a later time. Other clients choose to implement all functional areas during the initial project. Each approach has its pros and cons depending on what the client is trying to achieve.

One approach is to identify a specific project and implement as much PLM as possible to affect a change in a companies innovation and manufacturing strategy. Having metrics in place to benchmark against is very important.

SB. NetIDEAS motto is ‘Think Big. Start Small. Scale Instantly’. The basis for this philosophy is years of PLM deployment expertise in numerous industry verticals with companies of various sizes. While the slogan is pretty clear, the notion of evolving your PLM as opposed to the ‘Big Bang’

As far as reduction in costs, PLM can help companies reduce the following:

- Reduction in scrap
- Reduction in headcount
- Increased R&D/manufacturing capacity/throughput
- Reduce warranty costs
- Improve manufacturing utilization and cycle-time reduction
- Reduce inventory carrying costs
- Reduced product costs – structural and components
- Improved product performance

theory gains results sooner and minimizes risk with each subsequent step. We recently attended a conference that is held on an annual basis and I continue to be amazed at how many companies are stuck at the starting line waiting for all the right answers to produce their utopian system. Shortly after last year's conference we launched the PLM system for CharBroil and continued the educational processes with numerous other companies. At this year's event, CharBroil was in a position to present their experiences and appreciable business benefits to the attendees, while many of the others companies that we spoke with last year continue to ask the same set of questions this year.

The key is to prioritize today's biggest problem areas and tackle them in a manageable fashion. Whether it's getting your CAD data under control or improving project execution, companies can easily pick a trouble spot to simplify and evolve toward their ideal PLM environment one portion of the PLM spectrum at a time. This also allows the culture to gain confidence in the subsequent evolutionary steps. Success is ultimately driven by a company's ability to put together the right PLM team with the right charter and mindset along with the right technology. Operational effectiveness will forever be an ongoing process so the team and the PLM system will need to continually evolve in lock step throughout time.

“PLM brings together the once isolated realms of design, manufacturing, sales and marketing”
– Peter Schmitt

And what trends are you getting particularly excited about in this sector right now? What developments will have the biggest impact over the next 12 months?

JimH. One huge trend is the realization among discrete manufacturers that the technical publications process has been mired in the dark ages when compared to the progress made by product design, yet the product has little value without the documentation required to support installation, operation, maintenance and training activities. We're seeing customers get excited about infusing the same type of automation enabled by associative CAD solutions into their publications processes. For example, imagine if you could have the same level of configuration control over a product's technical documentation that you do for the physical product. Further, what if you could better satisfy your audience by delivering more relevant publications, in any desired format, in any required language, on demand? These advantages can be realized by a comprehensive solution that combines XML authoring, robust content management and dynamic publishing capabilities. By delivering better content via a more effective process, organizations gain significant competitive advantage and lasting differentiation. PTC's acquisition and integration of Arbortext uniquely places us at the forefront of this trend.

PS. As the pace of service-oriented architecture adoption accelerates, companies will be able to bridge the gap between PLM solutions and existing enterprise middleware and enable advanced services in five key

domains: collaborative user experience; business process modeling and execution; IP modeling, integration and management; enterprise foundations (search, collaboration, etc.); and openness (web services, 3DXML, etc.).

The increasing realism offered in advanced 3D PLM simulation and visualization technologies will also become more pervasive. These simulation and visualization technologies allow users not familiar with 3D modeling to quickly and easily add life experience to any 3D object, giving it rich game-like 3D interactivity. For example, using the technology, users can experience the shopping behavior of a typical consumer in a supermarket or visualize the ergonomics of a driver as he or she drives a car through a city. This, too, is a key to democratizing 3D and bringing non-engineering knowledge to bear on the development of a winning product.

Coupled with an SOA, this 3D realism offers the potential to create an on-demand collaborative ecosystem that drives both innovation and efficiency.

SB. The complexity involved with deployment of enterprise PLM systems, especially if that deployment includes customers and suppliers outside the firewall, has become better appreciated. As a result, companies are doing a better job of weighing the pros and cons around the various deployment methodologies (e.g. self-deployed, hosted, on-demand model, or software as a service). We've definitely seen a significant increase in companies who are realizing the benefits of the hosted, and on-demand type models. Companies are recognizing where their core competencies are and aren't.

JonH. The latest trends have to do with the competitive business culture and how companies are being forced to deal with globalization and driving products to market faster than they ever have.

Globalization leads to two specific initiatives for many of today's companies, which are developing global product platforms and working globally within their divisions and supplier networks.

In terms of global product platforms, companies are working to increase product reuse and identify product characteristics, which are needed globally. They want to develop a single product platform that enables them to quickly localize it to specific market needs. PLM plays a key role in helping them manage the product information and product variations associated with the both the common platform and localized configuration.

Many of today's products are developed across a large number of global divisions and suppliers. The idea of innovating around the sun is no longer a vision; companies actually do it today. The coordination of information and ideas is essential in deriving the best product for the market while achieving program costs and target release dates. PLM plays a key role in helping manage a single record of the product information while providing a collaborate process of doing design reviews and capturing product issues.

Companies need to remain competitive in today's market place. Achieving first mover advantage and being responsive to market or customer changes can make the difference in improved margins and profitability. PLM plays a critical role in helping companies quickly identify ideas early in the lifecycle and take the best possible ideas to market. PLM is essential in helping companies quickly test virtual ideas and before they get to market. ■