The PLM Debate: Vendors Respond

Agile Software Opinion

Chris Farinacci, Vice President, International Marketing and Strategy, Agile Software

Recently, we put PLM (and ourselves) under the microscope at an industry roundtable event in London. While passions flared about the term 'PLM' - and what it truly encompasses - practically no one could refute its potential for making the business of making products more effective, higher quality, and therefore more profitable for companies. If only we could agree to what it should be called...

When the discussion wasn't mired in semantics, it explored all the various business, process and product data challenges - old and new - to which PLM is being applied today: engineering change management, product portfolio management, product compliance, and even package management, are all benefiting from PLM.

However, many folks are still under the misconception that PLM is some kind of intelligent filing cabinet in the sky - one that specialises in housing product data. We think this is a myopic view, which undercuts how far PLM technologies have come. PLM has enabled the marriage of market and customer economics, regulatory controls, as well as traditional product data - that gives products a head start in life, enables products to reach their fullest potential in the marketplace and complete their lifecycle, as intended at the start of the process. For many, this is still a difficult concept to embrace.

The hard fact is, people will likely continue to grapple with the term PLM, but for reasons one might not expect. Increasingly, PLM is being leveraged to manage and protect that most elusive of company assets: intellectual property (IP).

After all, it doesn't get anymore 'fuzzy' than brands, customer relationships and capabilities (i.e. best practices and methodologies). But increasingly, they are what products are about, versus a list of parts and the suppliers who furnish them. Companies are beginning to wake up to the possibility of managing both these worlds - the fuzzy realities of IP, plus the economics of supply and demand - and make them work in the spirit of product development.

We think these are some of the most exciting times for PLM, while acknowledging that there's still a tough and winding road ahead (for the market, let alone the category).

But we must get our heads out of the physical world, where PLM is concerned. Product data alone just doesn't cut it anymore, if manufacturers are to succeed in the new world economy. What does make the cut, is the confluence of people, process and technology that makes the difference between product for the sake of product; and a product like the iPod, and its far-reaching impact on popular culture. And that's IP that is worth preserving.

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Arena Opinion

Michael Topolovac is founder and CEO of Arena Solutions

Michael says we are asking the wrong question. The method of applications delivery, rather than the applications themselves, is the next new wave in manufacturing IT.

The End of Enterprise Software
(As We Know It)

Prior to starting Arena Solutions, I founded and served for ten years as chief executive officer of the world's leading manufacturer of high-performance underwater imaging products for consumers. During that time, while developing dozens of cool new products, I also implemented a wide variety of enterprise software systems.

This painful experience led to my epiphany, now shared by many others: the emergence of the Internet as a redundant, low cost global network made it possible to consolidate hardware and software and deliver enterprise software as a Web service. Manufacturers didn't need to waste precious resources buying boxed software, installing it, patching it, upgrading it, and paying lots of money for the hardware and personnel to run and maintain it. Other companies could focus on IT and let manufacturers focus on product development and manufacturing.

Outsourcing isn't really a novel concept. Most product companies outsource processes that aren't core to their business such as payroll or die-casting, and some outsource manufacturing entirely. So why shouldn't they outsource software systems? For nearly all manufacturers, IT is only a means to the end; it isn't an end unto itself.

To be clear, delivering software as a Web service is more than simply hosting a client-server application remotely, kludging together VPN links and such. Enterprise software as a Web service means engineering software systems from the ground up to leverage the Internet as a global network, while ensuring financial-grade security. Companies such as Salesforce.com in CRM software, NetLedger and Intacct in accounting software, Buzzsaw in project management software, and Arena Solutions in PLM software have over the past five years introduced such systems, based on a new Web-native architecture that supports tens of thousands of simultaneous users on a single software/hardware platform.

The introduction of these new "on-demand" solutions has enabled enterprise software to start moving out of the primordial muck of manufacturers' server closets to a more refined and secure environment. Consider the benefits of enterprise-class software delivered as a Web service:

Secure universal accessibility without hardware or software to maintain - Using only a Web browser and Internet connection, manufacturers access sophisticated software solutions 24x7 globally.

Low Risk - The Web service delivery model lets customers pilot the application without a large investment to validate that it provides measurable benefits.

Pay as you go: Instead of prepaying for the software for the next 10 years of use, manufacturers pay for it as they use it.

On-demand, instant deployment - Companies using software Web services are up and running in days, rather than the months typical of client-server systems.

Latest version - Companies have immediate access to the most current, powerful, robust, and secure version of the software, and benefit from regular software innovations without needing to install software on their computers. Bug-fixes, upgrades, and security patches to Web-native applications are incorporated transparently.

Dramatic reduction in IT costs - The total cost of ownership for Web-native software is many times less than client-server solutions. Web-native applications need only work and be tested on one set of hardware and a single operating system on the server side. Compatibility issues are limited to browser compatibility; there is no need to test compatibility with different hardware platforms, different operating systems and different versions of the same operating system.

Data redundancy and security - Web service providers maintain sophisticated security and data backup systems. If a disaster strikes your company, you don't have to worry about losing their business' core intellectual assets.

Collaboration is an additional factor that makes enterprise software as a Web service even more compelling. Client-server systems trap data inside the enterprise. If a manufacturer wants to communicate complex, dynamic data across a geographically dispersed supply chain, it has a big problem. Yet for manufacturers in the 21st century, collaboration is the name of the game. Most companies today share this information haphazardly, at best, via phone, fax or unencrypted email. This presents significant issues of data security and integrity, in particular the miscommunication of data and the reconciliation of data that has been duplicated and sent to different locations. If you don't think this is an issue in your business, total up your scrap costs sometime. Or ask yourself when was the last time your products shipped on time?

With Web-native software, manufacturers and their extended global supply chain have universal access to the same information with financial-grade security that is simply cost-prohibitive for most companies. The problems inherent in trying to collaborate with client-server applications disappear. There's no need to open up firewalls, duplicate data, and email multiple copies and versions to different suppliers. With web-hosted applications, everyone can log into the same database real-time and access exactly what data they need when they need it.

The ability to deliver enterprise-class software across the Internet means the end of enterprise software as we know it. And, more importantly, it means that manufacturers can go back to doing what they do best - creating and building products. That can only be a good thing for CEOs who have better things to worry about than the latest IT crisis … like staying competitive in their product markets.

Michael Topolovac is founder and CEO of Arena Solutions, a leading provider of online Product Lifecycle Management (PLM) software.

For more information, go to www.arenasolutions.com

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Baan PLM Response

Dennis van Bodegom, Director Product Marketing, Baan PLM
January 2003

The discussion about whether PLM and SCM will merge is theoretical. Both "pillars", as they are being referred to in the article, have their own justification to exist. However, these pillars cannot possibly be "pillars"…

Referring to Tracey and Wiersema value disciplines, no company will be able to solely focus on just one value discipline (represented by the 4 pillars), while neglecting the other two. Product Leadership for example can only be achieved by applying the right balance with Customer Intimacy and Operational Excellence. No company can become a product leader if they do not have the ability to also tap into the information that is typically stored in the CRM, SCM or ERP pillar. After all the information on customer requirements, feedback from service engineers or the ability to line up the supply chain for a go-to-market in 2 months is typically not stored in just the PLM "pillar". In other words, what applies to the interaction between SCM and PLM also applies to CRM and PLM, and to ERP and PLM, and vice versa.

Should the conclusion be that everything is PLM then? No, every "pillar" has its own raison d'etre but these pillars are rather the cornerstones that together make your building. We cannot tear them apart, yet we cannot claim that they are one and the same.

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IBM Comments on PLM: Is PLM an enterprise application suite like ERP, CRM, SCM or is it simply an umbrella concept?

Christine Lemyze, VP marketing and Steve Shoaf, Strategic Marketing Manager, IBM Product Lifecycle Management

This question can be answered by asking another: Can the lifecycle of a product be managed from concept through to its retirement using a single application suite? Most people would answer, "no." Clearly, applications such as ERP, CRM, and SCM play a major role during product development, but products do not get developed and managed in these environments.

PLM is not limited to applications traditionally associated with product development, such as CAD/CAM/CAE and PDM. While these applications play a major role, they are insufficient to support today's requirements for product lifecycle management. While product development in the past was centered within a single vertically integrated company, it is now distributed throughout a network of companies, all of which focus on adding value within a specific portion of the product development process. These "value chains", as they are often called, seek competitive advantages against other value chains that may be developing competitive products. They obtain a competitive advantage through greater efficiencies and greater abilities to innovate, thus enabling them to get the right product to market first with the best quality.

Value chains gain efficiency by lowering the overall costs of their product. Understanding costs early in the design cycle cannot be accomplished by CAD/CAM/CAE alone. Overall product cost is dependent upon availability of individual components, for example, which could exist in an inventory. Understanding whether a component is in inventory, and if not, when it might become available, requires integration to other enterprise applications, such as ERP and SCM. In this sense, ERP and SCM play a vital role in product development, and therefore fall within the PLM umbrella concept.

Similarly, ability to innovate helps value chains develop the products that customers really desire. Understanding customers' preferences and satisfaction levels with existing products is difficult without a link into CRM. Thus, while CRM stands alone as an application suite, it is vital to product development, and can be considered to fall within the concept of PLM. Why put cassette players in your car, if 99% of your customers want CD players?

So, yes, PLM is a concept that embraces ERP, SCM and CRM applications to the extent that they support the overall process of developing, building, and supporting products. However, this doesn't mean that the application suite which is contained within PLM includes these applications as well. And, PLM as an umbrella concept embraces much more than just other enterprise applications. It includes the process of managing product portfolios - i.e., helping upper management decide what products should be developed and at what price. It includes the middleware and infrastructure that enables multiple companies in a value chain to participate in a distributed product development process. It includes business consultation that helps determine how to realize product development best practices. Finally, it includes implementation services that turn an application into a vital business system.

In summary, the answer to whether PLM is an application suite like ERP, SCM, and CRM or simply an umbrella concept is not an "either-or" answer. PLM is both. As an umbrella, it covers the entire product development and management process. However, it also happens to contain a suite of applications focused on enabling increased efficiency and innovation within product development.

To find out more about IBM PLM, see their website at www-1.ibm.com/industries/plm/

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IFS Response

Anders Berger, Director Research & Innovation

Is there a need for yet another cut of the business fundamentals?

The value of the original article and the new pillars it proposes, is not in the names but in the way the pillars are described. These descriptions point to the value of going beyond pure operational and functionally oriented systems and enable a more holistic view, over time and over organisational boundaries. In essence, the article addresses the fundamental issues of "what customers to serve, with what products and when, by using what resources" - issues still not adequately addressed in most business applications, regardless of pillars and TLAs.

For IFS, the response to these business requirements is to provide a lifecycle perspective on customers, products and assets (human and physical) - a significant addition to business applications functionality. An important driver for adding the lifecycle perspective has been the major shift from direct revenues of product sales to indirect revenue streams from services and additional products. Profit margins and customer loyalty are increasingly found in the very early concept/design phases, as well as in the later service and support phases. Even though a lifecycle perspective on products, customers and assets will start to give managers actionable knowledge of lifetime costs and revenues, it will not do away with the need for highly streamlined planning and execution support, typically found in SCM, ERP, PLM and CRM.

The article claims that the outsourcing phenomenon is one driving force behind the need for rewriting or renaming the "map of fundamentals". We agree that the internet, regarded as a powerful infrastructure enabler, is changing the fundamental "make or buy" decisions in favour of increased outsourcing (verticalization due to decreasing transaction costs), as well as horizontal integration through mergers and acquisitions (economies of scale).

However, and to date not adequately recognized, transaction costs and thus outsourcing economics are dependent on the inter-organisational capabilities of business applications. Today, most collaborative applications support the transactional level of business well suited to contract manufacturing scenarios with limited design and development content or after sales/service processes. The transaction costs, including co-ordination costs and possible revenue, competence and relational erosion over the entire product lifecycle, might well counter any efficiency gains fuelled by specialization. This risk is particularly evident when e.g. the early development phases, the process engineering phase or the later service operations are taken into consideration. One primary reason being that neither collaborative applications nor pillars nor TLAs recognize sufficiently the need for communication and knowledge sharing between organisations and over the entire lifecycle. This is in fact a main reason for the emerging in-sourcing trend seen in e.g. the automobile industry. We would argue that there is still some work to be done on standards, integration platforms and collaborative applications before outsourcing can advance to the next level. However, this step does not necessarily require new IT acronyms, it will require added lifecycle capabilities to the functionality already included in SCM, PLM, ERP, CRM and other business applications.

As a final reflection, one could ask if the answer to the present confusion and future development of pillars and TLAs for describing business fundamentals, is to introduce yet another set of pillars or engage in a discourse around which TLA will replace which? In this respect, debating whether PLM will overtake SCM, or be a module in ERP, is rather academic from an IT-buyers perspective. Instead, the debate and the present confusion around PLM, ERP, SCM, CRM etc should partly be explained by vendors' and consultants' need for positioning and for creating market opportunities, bringing limited help to the IT-buyers trying to navigate in the jungle of pillars and TLAs.

To find out more, go to the IFS website at www.ifsworld.com

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LMS Response

Tom Curry, Corporate VP and Chief Marketing Officer

Our opinion is that spending on ERP, SCM, and CRM has been disproportionate to the impact these systems can have on real competitiveness, and that this will change. ERP, SCM, etc. primarily effect efficiency and cost savings, and these have a limit.

Competitiveness really has to do with brand values and innovation; a steady stream of innovative new products. We think PLM, and within it "CAE" or virtual prototyping, addresses maybe 80% of product cost (the costs are built in by the design) and has everything to do with brand values.

You can find out more about LMS on their website: www.lmsintl.com

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Manugistics Response

Stephen Franks, VP Manufacturing Europe

What is PLM?

Product Lifecycle Management (PLM) is a set of solutions that facilitate more efficient product collaboration between functions within the enterprise (Sales, Marketing, Engineering, Purchasing, Manufacturing, Planning, Forecasting, Service, Customer Support) and external to the enterprise with the companies' suppliers and customers.

PLM streamlines all the activities and data involved with a product throughout it's entire lifecycle, including product concept, design, sourcing, manufacturing, transportation, storage, promotion, sales, support, maintenance, retirement, and even recycling. There is a significant amount of data associated with the product, the programs and projects, and the people and functional areas involved in this set of complex processes.

PLM Background

PLM is the evolution of Product Data Management (PDM) and Collaborative Product Commerce (CPC). PDM started as a way to keep track of all the complex information about a product. Some of the information it encompasses includes: product configurations, data vaulting (check in and out), audit trails of product information changes, document management, workflow, product data publishing, bill of material (BOM) management, engineering change data, parts definitions, specifications, CAD drawings, geometric models & images, manufacturing process plans and routings, and quality management data.

Data

One of the benefits of capturing this information is in providing visibility to the information throughout an organization, giving people consistent data, and also leveraging intellectual capital that may otherwise be lost when a person leaves the company, or that might be lost because of a long product lifecycle. Aerospace & defense manufacturers can take years for an aircraft to go through conceptualization and design to finally being complete. A PDM system does not just keep current product information, but also keeps all historical information about a product. A company many want to manufacture a product again in the future, so they would need to have access to the product specifications and manufacturing data that were used the last time the product was made. In shorter lifecycle industries like Hi-Tech, the rapid pace of development necessitates a strong engineering change management capability, and the PDM system needs to track these changes and store the BOM configuration for each product iteration.

Collaboration

Once all this data was collected and stored and managed within the enterprise, it was a natural evolution to enable customers and suppliers to have access to this information. Several trends also fueled the need to go outside the enterprise: company outsourcing of key business processes such as manufacturing, the Internet's pervasiveness, stronger computing power, and a shortage of qualified design engineers within North America all contributed to the PLM drive toward collaboration with suppliers and customers. This need to share information centered around allowing suppliers and customers input to the design process, and evolved into CPC.

Product Lifecycle Management

Although most vendors in the PLM market space talk about being able to manage data and collaborative processes around the entire product lifecycle, their traditional strength has focused on the product concept and design part of the lifecycle. Some vendors are also stronger in the support of the "support and maintain" part of the lifecycle, in that they can track assets, serial numbers, and other data associated with repair of products. Recently, however, PLM vendors have been extending into the sourcing part of the lifecycle, because there are many synergies between designing a new product (or making a change to an existing product) and being able to both parametrically search for and source components needed for the design. PLM vendors have also added capabilities to their repertoire to manage the programs and projects associated with getting a product (or product change) from concept through to market launch, enabling the people, functional areas, suppliers, and customers involved to collaborate on the complex product data.

Complete Product Lifecycle Optimization
However, PLM companies today don't really manage the broad PLM vision that tells them how to manufacture, store, transport, promote, price, sell or retire a product. They cannot forecast product demand, determine pricing or promotions for the product that is being designed, or plan for where and when product will be sold, determine where and how much product should be manufactured, and how much of each component should be purchased from a supplier. They also cannot deal with forecasting and planning for maintenance and repair needs, or for the reverse logistics which are a requirement today in some industries. This is where there is synergy with Manugistics' capabilities; Manugistics SCM and PRO solutions together with a PLM vendor can together fill in the complete PLM lifecycle and optimally consider supply chain constraints, component inventories, pricing, and other factors in the up-front design process.

You can find out more about Manugistics on their website: www.manugistics.com

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MatrixOne Opinion

PLM for EDA - A New Class of Tools Emerges to Manage Multifaceted System Design
Brad Hafer, VP of Marketing and Business Development for Global Electronics

Business pressures on semiconductor companies are relentless. Global competition continues to drive down the cost of electronic products and force semiconductor manufacturers to lower their prices. Greater economy and higher quality are a competitive necessity. Shorter product lifecycles push turnaround times to the limit. Meanwhile, Moore's Law marches on. Circuit densities are ten times what they were just three years ago. Furthermore, a growing number of designs have moved to highly complex architectures like nanometer-scale systems-on-a-chip (SOCs) and hybrid chips with analog, digital, and software blocks.

Just designing these ICs is tough enough. Changes are frequent and must be reflected in every part of the design, often across teams of hundreds of engineers scattered around the world and working for different companies. Communication typically occurs through e-mail, phone, fax, spreadsheets, lists, and ad hoc meetings-inevitably leading to problems in version control, data correlation, and design bugs. With complex chips, the cost of a mistake-especially one late in the design cycle-could be catastrophic. A design flaw undetected until tape-out could mean scrapping a mask worth $500,000, delaying a new product launch by months, and dashing plans to be first to market.

The focus of the entire EDA industry has been to provide a multitude of design tools to close the productivity gap. Semiconductor companies have long sought these tools as the primary vehicle for time-to-market acceleration - "If I could just cut a few hours off of my simulation run or speed up my timing closure." However, the task of managing disparate design teams, keeping track of huge amounts of rapidly changing design data, and collaborating with a host of disaggregated design chain partners can be just as overwhelming. Here, design engineers and the entire organisation behind them require a different set of tools to overcome these challenges and get their product to market.

Enter the class of enterprise software known as PLM, or Product Lifecycle Management.

PLM: Transforming Innovation

PLM has its roots in mechanical design, where engineers needed to keep track of design files generated by their product design systems. Basic product data management (PDM) capabilities allowed them to store files, control revision levels, and immediately see relationships between parts and assemblies.

The Internet and other technologies emerged in the 90's, providing new capabilities that eased the process of team collaboration. PLM solutions took advantage of new Web-based technologies and rapidly developed as an enterprise platform that enabled collaboration throughout every stage of the product lifecycle-from design through testing, quality assurance, production, and after-sales support.
As PLM matured, capabilities expanded to include workflow, program management and project control - features that standardise, automate, and speed up operations. The scope of information being shared also expanded to include not only CAD files but also analysis results, test specifications, quality standards, engineering requirements, change orders, bill of materials listings (BOMs), requests for quote (RFQs), manufacturing procedures and so forth.

Today's PLM solutions enable companies to manage all of the information about their products; from initial concept through to production within a single information environment-a PLM environment-that ties together all product-related information and processes across a company's value chain of customers, employees, partners and suppliers.

A Competitive Necessity

Across the industrial landscape, PLM is being recognised increasingly in boardrooms as a must-have enterprise application-and has emerged as what a growing number of companies regard as a competitive necessity.

PLM is being implemented across a wide range of industries including automotive, aerospace, industrial equipment, consumer products, and electronics. In fact, a growing number of electronic OEMs are already implementing PLM. Of particular interest is the ability to manage design projects and data across mechanical, PCB, IC and software teams. Toshiba, for example, has developed a single, secure environment that enables cross-functional teams to work more effectively across departmental and corporate boundaries for shortening time-to-market and reducing product development costs, while meeting Six Sigma and ISO quality guidelines. With program management capabilities, the company is able to monitor project status and uncover bottlenecks in real time in addition to controlling tasks and deliverables simultaneously.

Solutions for Semiconductors

PLM offerings for semiconductor companies have been architected around managing the most critical aspects of the chip development cycle, including design engineers, sales, marketing, manufacturing, management and finance. Inter-enterprise constituents such as design partners, IP vendors, foundries, assembly/test, and others (comprising the semiconductor value chain) have also been addressed. Overall, PLM solutions applied to the semiconductor space focus on aiding six key business processes:

Design Data Management is at the core of any PLM solution. Tools have specific capabilities for managing chip design information, the hierarchical relationship between various portions of the design, and all related design changes. With tight integrations to EDA tools such as Cadence and Synopsys, a design data management system enables engineers to track complex chip configurations, maintain stable subsets of all their files, and monitor and control all the various versions. All associated data on the chip design is maintained in these files, giving all engineers -regardless of geographical location - a unified view of the information so that everyone is working with the same versions of files and accurate up-to-date data.

Design Project Management helps facilitate chip development efforts in the design workgroup, including collaboration with IP vendors and design partners on specs, models, and IP blocks. This level of semiconductor PLM serves as the bridge connecting Design Data Management with Program Management to keep chip design activities on schedule and create better visibility into designs and their status. A manager's dashboard provides a quick summary of the progression of chips underway, what phase they are in and how they are executing to plan. Access to the detailed work breakdown structure is then a mouse click away.

Design-to-Manufacture Management solutions streamline the chip Bill-of Material (BOM) development process and subsequent hand-off of the GDSII tape-out to the foundry according to established semiconductor design rules and physical design kits from the foundry. This solution aids production engineers and operations personnel in organising, compiling and managing the BOM and BOM variants. Automated links directly to the chip design files ensure that changes in the development cycle are fully reflected in the tape-out.

Opportunity Management is targeted at the design-win or "engineer to order" process and managing on-going iterative design cycles with the customer. By allowing orders to be placed directly into their own system, semiconductor companies are able to submit proposals and quotes back to customers in a timely manner. Additionally, advanced pass-through RFQs can be generated to link many levels of the supply chain together in cascading RFQ and quotation response processes. PLM also provides the capability to efficiently identify, organise and document a chip's ever-changing requirements, while allocating appropriate features of the IC to meet these needs.

Product Line Planning helps at the marketing function to define key capabilities for engineer to order and/or engineer to market business models. The PLM solution supports capturing of market requirements, definition of features, product configuration management and product line performance metrics. The overall "engineer to market" process is addressed, enabling management of the entire product portfolio.

Concept-to-Volume solutions for new product introduction (NPI) are needed to manage the entire phase-gate product development process from inception to end-of-life. Program dashboards specifically geared toward IC development processes give management real-time visibility into a program's status in terms of process, costs/benefits-and ultimately enables better decision-making into which programs offer the highest potential return. This capability increases productivity of globally distributed users by managing programs with real-time information, updated automatically through direct links to Design Data Management and other PLM systems.

Substantial Business Benefits

Through these types of capabilities, PLM provides members of the semiconductor value chain a real-time view of a single, consistent source of product data: customer requirements, design data, program status, project history and engineering changes.

Operational efficiencies are improved with PLM because groups work faster through advanced information retrieval, electronic information sharing, data and design reuse, and numerous automatic capabilities. This enables companies to process engineering change orders faster, for example, work more effectively with suppliers and customers in handling bids and quotes, and exchange critical product data more smoothly with production facilities.

PLM also can result in significant savings through cost avoidance, a particularly important issue in the semiconductor industry where simple configuration errors at tape-out to the foundry have been found to account for 20-40% of IC production failures. At a minimum, this wastes a half million dollars per mask set and months of engineering time. More importantly, if the end product is a high-volume, short lifecycle consumer item such as a cell phone, disk drive or PC, the lost revenue from a missed market opportunity can run into the hundreds of millions of dollars.

Through these efficiencies and the avoidance of costly errors, PLM can result in impressive savings-with many companies reporting pay-off periods of one to two years or less-based solely on reduced costs.

The broadest benefits of PLM can be achieved through greater performance at the extended enterprise level, involving information management, program management and collaboration across separate groups and companies throughout the semiconductor development chain.

PLM is about transforming the product innovation process. In the fiercely competitive semiconductor industry, where companies are constantly looking for ways to gain a competitive advantage, those who look beyond EDA productivity tools and start investigating enterprise PLM solutions will emerge as the dominant companies across the semiconductor industry in the decades to come.

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Peoplesoft PLM

Interview with John Webb, Vice President
March 2003

Peoplesoft partners with Agile to provide a combined PLM, ERP, CRM and SCM solution. We've chosen to focus on high tech and life science industries and have created advisory boards to help us understand those industries.

We've several common customers; several key Agile executives are Peoplesoft alumni who will cement the relationship needed to make our two best of breed products inter-operate as effectively as a single suite.

Our integration is a "work in progress". To build a two way interface you have to choose applications and identify all the touch points. Bill of Materials is a key interface but it is one of a number that are seen in a different way from different points in the organisation. We've initiatives to look at improving processes to provide visibility and cost management when dealing with high volumes of Engineering Change Orders that you find in some industries. We're also looking at downstream field service as an area where manufacturers can improve performance.

In the future we'll extend our co-operation step by step to cover more applications. High on our agenda are applications to support sourcing components with a consistent view of preferred parts and suppliers for engineering, procurement, field service and logistics.

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PTC Response

From a conversation with William Berutti, VP Business Development
March 2002

PTC's focus is on manufacturing companies. For these companies, the products that they design and manufacture are the most important factors of success. It is well established that most of a product's cost and performance is settled during its design stage. More efficient production techniques and better management of inventory within the supply chain can only make minor improvements in cost and performance.

In the first stage of the product lifecycle, both the product and the resources that will be needed to create it are fluid. Gradually the product design iterates and evolves to a point where it's resources and costs become largely fixed. This transition from the design stage to the fulfilment stage often causes problems for manufacturing companies. PTC's aim is to provide solutions that create real value by easing the transition between the design phase and these later stages. Enabling Product Lifecycle Management (PLM) and Supply Chain Management (SCM) to work together is one key drive.

Designs evolve by iteration. As engineers collaborate, the product improves continuously. Outsourcing of all kinds is increasing. Sometimes these collaborating engineers are in different disciplines and/or different companies. Today, a lot of the focus in engineer-to-engineer discussions is about product and part function. Often there isn't enough time to also consider cost and delay issues. Engineers need to exchange concepts, requirements, test specifications and documentation, rather than just simple geometry. Data transfer is not their main issue.

The problem today is the need to extend control beyond simple geometry capture to all the product information in the supply chain. PTC's focus is to provide collaboration and control in the transition from design to the later stages, across sites and enterprises. This focus in PTC's solutions will permit engineers to concentrate on driving down costs, not simply exchanging geometry.

From an email exchange with Shaun Ennis, Manager of Analyst Relations
July 2002

In the short to medium term PLM will emerge as an enterprise applications category recognised by users, industry analysts and journalists.

What makes a category emerge?
Categories emerge to be generally recognised when:
- They are large enough and have distinct category vendors
- Needs are generic enough to cut across industry sectors
- The technology or implementation best practices are difficult

When these criteria are met the most experienced vendors increase their market advantages. They grow enough both organically and by acquisition to help shape the category.

ERP, CRM and PLM fit this bill
- ERP because a common transaction environment within a company is difficult and valuable
- CRM because unified sales, support and marketing best practices are difficult and valuable
- PLM because unified rich product data (unlike the transactional data for ERP and CRM) is difficult and valuable

ERP will remain the biggest category because it was the first category and now has the largest enterprise and market footprint. CRM will remain a category because, like PLM, it is backed (i.e. proved) by many non-ERP vendors with proven histories and deep technology.

PLM will emerge as a category.
PLM will emerge as a category, because the PLM space already has critical mass independent of ERP. Agile, Autodesk, Dassault, EDS PLM, PTC and MatrixOne are all non-ERP vendors with a dedicated focus on the PLM space. i2, SAP and Oracle are entering the market realizing that PLM is going to be a big category.

Unlike SCM or CRM, there is no single vendor dominating the market. PTC, Dassault or EDS PLM each have a roughly equal share of the space.

According to AMR Research, the PLM market will grow from $2B in 2001 to $7.5B in 2006.

PLM is still growing
PLM ploughed ahead with 30%+ growth. This is because the product development software market is much more established (albeit as islands) than other enterprise applications were at this stage. Also, like CRM, PLM is increasingly critical to real competitive advantage.

The longer term
PTC agrees generally with Cambashi that there will be new synchronisation categories but think that transition is 10-15 years away. Those synchronisation pillars are higher-level business functions that need to be built on core systems such as ERP, PLM, CRM and SCM solving base level business functions.

Remember it took 10-15 years for ERP to emerge as a true category and even the most celebrated IT architecture of all time (the Internet) took 10 years to become the mainstream platform choice for corporate applications.

You can find out more about PTC on their website: www.ptc.com

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SAP Response

Stephan Schindewolf, PLM Business Development Director

In terms of pillars it's difficult to set the right cut in my point of view. e.g. at SAP we talk about the 3 value disciplines according to Treacy and Wirsema: customer intimacy; operational excellence; and product leadership as the major business drivers to make companies successful. These disciplines have to be supported by the right set of tools, including CRM, SCM, SRM, PLM, in addition to the core ERP functions in HR, manufacturing and finance.

One of your quotes suggests that SCM will disappear and merge into PLM and ERP - I don't share this viewpoint; SCM is a pretty clear defined marketspace with a clear value proposition.

I agree with your definition of PLM, however I would not include the authoring tools. Depending on the industry, the processes supported within this definition of PLM become far too broad - for example you would have to include Word or Excel as probably the most used authoring tools in product development and engineering. MCAD and ECAD work in discrete, but widely fail in process industries which do use different authoring tools, e.g. for formulation management. Otherwise the definition of PLM stays as mechanical CAD - discrete industry centric - back to the roots where PDM evolved from CAD file management about 10 years ago.

You can find out more about PLM from SAP on their website: www.sap.com/solutions/plm/

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SolidWorks Contribution

John McEleney, CEO SolidWorks Corporation
From a conversation January 2003

SolidWorks focus is to make our users' lives easier. Our approach to PLM has to be in that context. We don't want users who adopt our products to be forced into engaging consultants in order to implement them. An analogy from the wider IT world would be that SolidWorks aspires to provide design tools equivalent to contact management for sales people, while other vendors aspire to provide design tools equivalent to full scale Customer Relationship Management systems.

We provide a whole series of products and services to enable our community of users to inter-operate. Our tools range from e-drawings to SmarTeam. To make these really useful, we typically develop complementary marketing initiatives. One example is the Manufacturing Network. This program aims to align users with other users or more specifically we help buyers identify suppliers that are SolidWorks enabled.

Of course, like all new technologies, when people adopt SolidWorks, they will change their design flow. Much of our business is built on moving users from a 2D to a 3D design process. Our goal is to make that as easy as possible. Generally speaking, PLM deployments in large companies have often involved co-ordinating a lot of processes. Our approach in SolidWorks is to offer data management tools that are less radical in their transformation but still support co-ordinating key design processes. For example, we have embedded a simple Finite Element Analysis subset of our COSMOS product within SolidWorks, so that a designer can perform a "quick look" analysis of the part they are designing.

We've got PDMWorks as our entry level data management tool. This simply creates an intelligent mechanism for workgroups to manage the data created by SolidWorks. It supports users who want to control versions and find and retrieve existing designs. PDMWorks does not provide automated workflow as we believe that workgroups will choose how to distribute their design information. Our SmarTeam PDM tool fully integrated with SolidWorks, does provide a series of templates with implicit workflow to enable rapid deployment of some common PLM applications, such as "authorise and release".

SolidWorks philosophy is to listen to our customers. They've told us they want to manage their data more effectively, but also that they want to change in a series of simple steps. Our approach has been and will continue to be to provide tools that make these steps easy.

To find out more, go to the SolidWorks website at www.solidworks.com

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Tecnomatix Response

Eric Gautier, European Marketing Director

Firstly, we feel that predicting large IT domains such as PLM and SCM could disappear as early as 2004 is a bit provocative.

Secondly, presenting the IT environment of discrete manufacturing companies as made of four main IT systems is probably a bit schematic; it might well be a long term vision, but there is still a long way to go until we reach this scenario. As you remember, even though the ERP acronym was probably the first out of the four to be promoted by vendors and analysts, we see a large proportion of companies, including the major ones, still a few years from completing their ERP implementation. Other initiatives in SCM, CRM or PLM are usually even less advanced.

You point out the much devalued perception of the word "integration"; we do recognize that this terminology is outrageously over-used by vendors. This probably comes from the fact that when we say 'integration' we are often referring to software integration - this is not enough to make customers happy. When talking about integration, one should also look at having well-defined workflows and procedures, and then develop communication between various software applications supporting them: that's certainly a much harder task.

In your article, you describe outsourcing by major OEM's to their supply chain as an increasing trend; this is definitely a phenomenon we acknowledge at least in the electronics and automotive industries, which represent a significant part of our activity. You also suggest that the development of outsourcing could limit the development of PLM business, or even lead to its vanishing. We believe that as long as the PLM systems actually support, or will evolve to support, collaboration between the various companies involved in the development, planning, manufacturing and delivery of a given product, they should bring enough value to justify their existence. Furthermore, PLM encompasses fields such CAD, CAE, CAM, CAPE, PDM, MPM, etc a vast spectrum of engineering disciplines representing relatively complex processes, as well as huge amount of data to be managed. Based on all this we see the vanishing of PLM as an unlikely event in the near future.

In addition, with the development of web-based architecture, IT systems can incorporate more and more collaborative work capabilities, better supporting the needs of extended enterprise (what you have called the industry network).

In the arena of Manufacturing Process Management (MPM), another acronym, our specific area of expertise - collaboration across the supply chain - is already a reality. A global company such as GM (General Motors Corporation) works with several manufacturing engineering suppliers to design an assembly line - a four month long process - and determine the factory procedures and equipment configurations that work best for assembling car bodies.

MPM covers the planning of manufacturing processes (the downstream side of PLM) to figure out how a product could be best manufactured, and then expands into production to optimize its execution.

You can find out more about Tecnomatix on their website: www.tecnomatix.com

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