The Many Faces of PLM

 *Featured Author* - Jim Brown - December 29, 2003

Event Summary

The Product Development Managers Association (PDMA) is a professional organization dedicated to furthering the practice of product development. In October of 2003, PDMA held their annual conference with the theme "The Business of Product Development – People, Process & Technology Across the Life Cycle". The conference was an excellent event for professionals with a common interest in better managing commercial products to share ideas and learn from each other. The meeting highlighted a series of industry companies that spoke on the value they had received from implementing best practices in developing products. What was rare about this conference is that under one roof an attendee could listen to the value of implementing effective Stage-Gate Processes to better execute product development programs, learn about how better Portfolio Management can improve the value of the choice of products a company chooses to take to market, and also explore how Design for Cost / Design for Manufacturability concepts can help to decrease product costs.

Seeing a collection of very different, but inter-related aspects of product development in one place provides an interesting parallel to PLM initiatives and PLM applications suites. The overriding observation from the presentations was that many of the solutions presented target the same value propositions – faster time to market, more efficient new product development and introduction (NPDI) projects, decreased product cost, improved product quality and increased product revenue. However, despite sharing common objectives, the approaches to achieving the value varied widely. This points to the fact that better product management comes in many forms, and that in each of those forms it provides tangible, realizable value. Not surprisingly, this is also the case with software applications that aim to improve the processes which companies use to manage their products.

The software vendors that sponsored and exhibited at the PDMA conference represented a large cross-section of PLM software. The participating vendors included large ERP vendors, "pure-play" PLM suite providers, and niche application providers that handle very specialized areas within PLM. Each of these vendors highlighted how their particular solution contributed to the overlapping value propositions that are associated with PLM. **SAP**, for example, presented a new collaborative application for NPDI in addition to their mySAP PLM solution. The new application, known as SAP xPD, was developed to streamline the process of designing and developing consumer products.

Another large ERP vendor, **Oracle**, used the event to communicate the broad and significant effort they have put into providing PLM solutions to their customers. On the other end of the spectrum was a company named **imaginatik**. The imaginatik product focuses on a narrow, but extremely valuable aspect of PLM known as Ideation that aims to help companies improve their process for innovation and idea management. Other vendors, such as **Sopheon** and **IDe**, highlighted their value in helping to execute NPDI programs more effectively.

PLM Pure-Play vendors **Agile Software**, EDS PLM (now known as **UGS**), **PTC** and **MatrixOne** also exhibited at the show, displaying their approach to delivering the value of PLM. The diversity of the vendors and their application offerings further highlights the need for manufacturers to understand PLM as a whole, determine the areas that will provide the most value for their business, and then map out a strategy that includes incremental steps to achieve that value. For more information on this approach, see "The PLM Program – An Incremental Approach to the Strategic Value of PLM."

PLM – Just The New Name For PDM?

The discussion about diverse software offerings being labeled as PLM probably has some people asking whether "PLM" is the right name for all of these product-related solutions. Some would argue that PLM is really just then next evolution of Product Data Management (PDM) software packages. If this is the case, then the other applications without a PDM foundation should not be called PLM. Regardless of the name, there are a lot of applications that can help to improve the management of products - and therefore provide a path to the benefits that are currently associated with PLM. Perhaps a new term for the more diverse solution set is "Extended PLM". Whether this name is correct or not, it is clear that PDM is a major component in achieving value.

PDM has come a long way in the past few years. Collaborative processes and technologies have dramatically improved the value of these systems that help companies better manage product and engineering information. The truth is that many companies would benefit from implementing even basic PDM capabilities to help get control of their product information. Many companies today suffer from diminished innovation and product development capabilities because of fragmented, disjointed product data. In those companies, too much product information is still captured in poorly accessible spreadsheets, mismanaged CAD drawings and poorly integrated point systems.

The improved structure and visibility of product information available from PDM is the core of most PLM initiatives. PDM can help with everything from improving design efficiency to enabling syndication of product data to e-commerce exchanges, and is a very important part in achieving improved product management. But the PLM value proposition includes more than just improved management of product data.

PLM - Just A New Way To Categorize Old Applications?

PLM, or Extended PLM, encompasses many different software solutions that focus on improving the profitability of a product portfolio. Most companies in the PLM market today came from one of several categories of vendors. The first category of vendors that are now considered PLM includes the engineering-centric vendors. These vendors have strong roots in product design and typically evolved from companies that offered CAD and/or PDM solutions. A second category of vendors includes the commercialization-centric vendors. These vendors have strong roots in product marketing and commercialization and evolved from vendors offering Project Management, Stage Gate Automation and Portfolio Management. The final major category of vendors that are active in the PLM market are the enterprise suite providers. These vendors have strong history in implementing best practice business processes that are integrated across departmental and enterprise boundaries, and have developed PLM as an offering in conjunction with their ERP systems.

But PLM is not just a repackaging or a re-categorization of these existing software solutions. The PLM movement has placed increased emphasis on the value of products and the information and processes surrounding them. Vendors and manufacturers have joined forces to look for new and innovative ways to solve existing problems, and to achieve new levels of value. This has led to a significant amount of innovation in the software industry, resulting in valuable new applications to address everything from product requirements gathering and innovation to improved transfer of production instructions to the plant.

The existence of a common repository of product information within an enterprise has also provided an opportunity to solve product related business problems in a new way. Many initiatives that involve product data, like product catalog syndication and configuration management, have previously been forced to rely on ERP solutions for product information. This is a challenge because companies often have multiple ERP systems and the information is not always complete or organized in the right way. As companies are faced with new challenges such as RFID, new regulations, and other developing needs, the companies and their software vendors will leverage the PLM product repository by developing new applications to take advantage of the core of unified, structured product information. Far from a collection of disparate point applications, PLM is a vision that encompasses many different avenues to achieving the PLM value proposition. As PLM visions mature, the benefits will continue to expand into new areas.

The Future of the PLM Suite

The future of the PLM Suite will include more applications that cover product-related functionality and further expand the benefits available. As the PLM Suite matures, companies will benefit from increased functionality and increased integration between business processes. The ultimate expression of this more mature solution will result in a broad suite of focused, integrated applications that leverage a core of unified, structured product data – the PLM Platform.

In order to understand the future of the PLM Suite, it is important to understand how suites become suites. If we take what we now call ERP as an example, it has evolved over time. The suite started with Inventory Control systems, then became Material Requirements Planning (MRP), then evolved to MRPII which included extensions to MRP including order management, then transitioned to ERP which firmly included non-manufacturing concerns such as Financials and Human Resources.

What happened with ERP is that the definition of the core system extended as complementary functionality was combined with it. As the footprint expanded, it deserved a new name. This is similar to what has happened with Supply Chain Management (SCM) and Customer Relationship Management (CRM) suites. In the final analysis, PDM will probably be to PLM the same thing that Sales Force Automation (SFA) was to CRM. SFA is still a core component within the overall suite of CRM products, and it also served as the catalyst that got the market moving.

PLM seems to be following the same pattern. Software suites naturally grow as suite providers add new products to their offerings, and specialty vendors with complementary value propositions look to take advantage of the marketing awareness that the suite offers. As suites expand, the level of pre-packaged integration typically grows making more functionality available to users. There is a lot of room to grow in the PLM footprint, and as a suite of solutions PLM will probably be as broad as CRM or SCM are today. PLM will continue to expand, as we have seen from the growth strategy of companies like **Agile Software**. Agile has aggressively expanded their product suite through acquisition, with more than 5 acquisitions announced in less than two years, see "Has Consolidation Made The PLM Market More Agile?"

New Additions to the PLM Suite

What new application areas belong in the PLM footprint? There are many valid opinions, and time will tell which functional areas will be most rewarding to the companies that adopt PLM systems. Today, PLM is being leveraged as the source of consolidated, uniform product information. This provides a platform to serve many other purposes. One such area is the publication, or syndication, of product catalogs and product data. Several leading consumer goods companies, for example, have used solutions from **MatrixOne** and **Prodika** to link with exchanges such as Transora and become UCCnet compliant.

Another area that has been regularly included in PLM conversations, that again leverages the single source of focused product data, is Regulatory and Compliance. Vendors such as **Advanced Software Design (ASD)**, a sponsor at the PDMA conference, and Atrion provide regulatory focus in the process industries, for example. **Sopheon** highlighted the need for regulatory compliance by introducing their capabilities to support FDA 21 CFR Part 11, an important requirement in the Life Sciences industry. This focus is increasingly important as new regulations are being unfurled, such as WEEE (Waste Electronic and Electrical Equipment) and the TREAD (Transportation Recall Enhancement, Accountability, and Documentation), whose requirements span large segments of the product lifecycle. PLM focus on regulatory and compliance issues is not entirely new, as **SAP** has long included Environmental Health and Safety in the definition of their PLM offerings and vendors like **Formation Systems** support many regulatory requirements for the process industries.

There are additional areas that are moving into the PLM footprint as well. Component Event Management, for example, focuses on managing the disruption that component obsolescence and change place on products that rely on electronic components. This application, from vendors such as **PCNalert**, provides complementary value in the product lifecycle. Another area that overlaps considerably with PLM is product configuration. While Configuration Management has clearly been included in the PLM footprint, product configurators are just beginning to be looked at as PLM. As more product-related information is included in the PLM application, configuration information in PLM will likely expand from the current design-centric solutions such as **PTC's Dynamic Design Link** and **RuleStream**, to include more sales-related information like what is found in solutions from **BigMachines**, **Cincom**, **Firepond**, **TDCI** and **Trilogy**. For more information see "Customization Drives Complexity – Why It's Hard to Design, Sell and Produce 'Simple' Products."

Another area that seems destined to collide is Computer Aided Process Planning, or CAPP. CAPP manages and captures the processes by which complex assemblies are produced and maintained. This product-related information is currently addressed by applications from companies like HMS Software and iBASEt, and is more tightly aligned with Manufacturing Execution Systems (MES) than with PLM.

Where is the logical end to the expansion of the footprint and the consolidation of markets into PLM? One could argue that there will be continuous innovation in the software industry and that new solution areas will continue to be identified. The inevitable result will, of course, be an overlap with other solution areas in the same way the CRM and SCM collide with functionality in ERP suites today. This natural evolution will continue to provide more pre-integrated functionality, and will make the trade-offs between integration and best of breed functionality more important, requiring more detailed and overlapping product selection criteria. For more information on the tradeoff between PLM functionality and integration, see "Can ERP Speak PLM?"

The PLM Platform

Is every software application that focuses on products really a part of PLM? If you take a broad definition of PLM, such as "a suite of applications that focus on leveraging product information to improve product profitability", the answer is yes. More important than a simple answer to this question is recognition that application "spaces" are artificial boundaries, and that PLM is still a relatively immature market (see" The Different Evolutionary Stages of ERP And PLM"). The most valuable reason to expand an application suite is when integration between business processes spans applications in a way that a lack of integration makes the overall process less effective. Advances in integration technology have greatly improved the ability to pull together disparate applications into coherent processes, (see What's Wrong With Application Software? Business Processes Cross Application Boundaries), but companies still value pre-defined integration and business processes when they are available. Companies would ideally prefer an approach that builds off of a common architecture and data model that can support the related business processes of PLM. This integrated view of the PLM Suite is sometimes referred to as a "PLM Platform".

The PLM Platform provides a central location for product related information and processes. This approach provides for consolidation of product information and processes into a common system. The common system promotes higher levels of data cleanliness because it is focused solely on being the source of product information, as opposed to simply providing enough product information to fulfill a particular function. By naming one system as the core system of record, companies will have a much clearer answer to where they should source product information for other activities and other applications. The common platform also promotes integrated business processes and provides for greater product intelligence and analysis.

Companies that are developing a long-term strategy will need to weigh a vendor's vision to provide an integrated PLM Platform vs. best of breed functionality, and may need to make short-term tradeoffs between integration and functionality. Companies that have stated a strong direction towards a PLM Platform are **Agile**, **PTC**, and **MatrixOne**. The architecture of the PLM Platform must be very flexible to support varying types of information and processes and must provide strong capabilities for information visibility and collaboration.

Don't Forget The PLM Program

More important than what applications belong in the PLM application suite, is what applications can provide increased value for the companies that use them. Manufacturers today are facing a dilemma with PLM. They understand and need the benefits that the PLM value proposition offers, but are also confused about which part of PLM will provide the benefits. There is no single answer to that question that works for every company. There is not even a single answer for every company within a particular industry, although industry does play a critical role in identifying PLM needs and potential solutions. For more information on the impact of industry on the requirements for a PLM solution, see "PLM is an Industry Affair – Or Is It".

In order to achieve the value of PLM, manufacturers must carefully prioritize their needs and implement a series of initiatives that not only lead to the long-term value of PLM, but also provide tangible short-term ROI that pays for the program incrementally along the path. The priorities identified will lead to a series of inter-related requirements that should be considered in selecting the appropriate software partner, or partners, for the manufacturer. For more information on selecting the appropriate software partners, see "Selecting a PLM Vendor".

Adding to the confusion for manufacturers is that the same benefits are often touted for different aspects of PLM. For example, faster new product introduction is a common strategic goal for companies starting a PLM initiative. There are multiple paths to improving time to market, all of which may be valid. In fact, the best answer may be a combination of approaches. For example, better project management and the introduction of stage gate processes might help to speed projects along. Reducing the clutter of competing projects through better project selection and portfolio management techniques could help. Design related approaches such as design reuse, parametric search tools and design collaboration can compress the development time. If time to production volume is as important as time to market, then speeding up the handoffs between R&D and manufacturing might help, particularly if outsourced manufacturers are involved. The following table highlights some typical goals in PLM programs, some different approaches to attaining the value, and then some of the tools or solutions that can be used to help. This is not an exhaustive list, but a quick example of how the PLM value proposition overlaps.

Goal / Value	Approach	Solution Area
Faster New Product Introduction	Concurrent Engineering	PDM, Business Process Management
	Stage-Gate Processes	Project / Process Management
	Improve R&D to Production Handoff	PDM, Technology Transfer, Design Collaboration
	Reduce Project Clutter	Product Portfolio Management, Resource Management,
	Design Reuse	PDM, Parametric Search
Reduced Product Cost	Design for Manufacturability	PDM, Design Tools
	Least Cost Design	PDM, Design Tools
	Lower Component Costs	PDM, Strategic Sourcing, Specification Management, Design Collaboration
	Design Reuse	PDM, Parametric Search
	Improved Quality	PDM, Design Tools, Requirements Management / QFD

Better New Product Success Rate	More Customer Input	Requirements Management, Design Collaboration
	Better Product Selection	Product Portfolio Management
	Improved Project Management	Project / Process Management, Resource Management
Reduce Engineering Change Cycle Time	Supplier and Manufacturing Involvement	Product Data Management, Technology Transfer
	Better Visibility and Communication	Business Process Management, PDM, ECO

Summary

Clearly, Product Lifecycle Management is a broad suite of applications that is still developing in terms of footprint. The PDMA Conference provided an excellent overview of a number of the solution areas that contribute to the PLM value proposition. The PLM footprint will grow, and continue to provide deeper and broader functionality. Manufacturers will be the beneficiaries of this continued growth because of enhanced integration of technology and business processes.

The value of PLM to each company may come from different approaches and tools, so each company must focus on defining their PLM Program in a strategic way, providing them a roadmap that offers incremental value along the way. Throughout the PLM Program, PLM applications of many different types will contribute to the ultimate value proposition achievable with PLM. Ultimately, an integrated approach will be available that will provide companies with a unified PLM Platform that integrates all product related information and processes, but at this time companies must prioritize their needs and choose from a selection of different kinds of tools that will help to deliver the value they desire.

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About the Author

Jim Brown has over 15 years of experience in management consulting and application software focused on the manufacturing industries. **Jim** is a recognized expert in software solutions for manufacturing and has broad knowledge of applying Product Lifecycle Management, ERP, Supply Chain Planning, Supply Chain Execution, and e-business applications to improve business performance. **Jim** served as an executive for software companies specializing in PLM and other enterprise solutions before starting his consulting firm, Tech-Clarity Associates.

Jim can be reached at jim.brown@tech-clarity.com.

