IDC Manufacturing Insights

BUSINESS STRATEGY

IDC PlanScape: Building the Product Innovation Platform

Jeffrey Hojlo
Robert Parker
Kimberly Knickle
Christopher Holmes

IDC MANUFACTURING INSIGHTS OPINION

FIGURE 1

Planning for the Product Innovation Platform

Source: IDC Manufacturing Insights, 2015

Product development software has progressed steadily over the years from product data management (PDM) to collaborative PDM (cPDM) to product life-cycle management (PLM) including customer needs management, product portfolio management, and direct materials sourcing, to visual PLM, where it is possible to view detailed, visually supported information about products, designs, and the development process globally. Manufacturers today are increasingly faced with multiple challenges that we think necessitates the next iteration of PLM — the product innovation platform. This is PLM, with core engineering processes and design integrated tightly to customer, supplier, and manufacturing, all in a single, digital user interface.

What's different now from five years ago that drives this broader approach to PLM? Companies have been discussing the benefits of extending PLM for years. Why now? There are a number of market factors accelerating this approach:

- **Product complexity:** Products have more software within them, and need to be modeled and developed on a systems engineering platform, that a disparate, global team of software, mechanical, electrical, and manufacturing engineers works upon.
- **Global expansion and competition:** Manufacturers are expanding into new, local markets and face tough competition; they must be able to design and develop products quickly to suit unique needs.
- **Mass customization and personalization of products:** Customer demand is very dynamic, so a platform must be in place that can adequately sense and respond to demand.
- **Value chain expansion:** Increasingly, manufacturers work with more partners, suppliers, and even customers to make better products, so they need an open platform to enable easy collaboration and open innovation.
- **Enormous increase in the amount of data that can fuel innovation:** Making products connected leads to a lot of high-value data created about product performance, usage, quality, failure modes, and service information that should be unified for maximum benefit. Customer, quality, manufacturing execution, and supply chain information can complement this information if available in a broader context. This is also where PLM analytics can be applied.
- **3rd Platform technologies:** Social business, Big Data/analytics, mobile, and cloud are all available to complement and simplify a product innovation platform.

When a product innovation platform is in place, these challenges can be addressed through, as outlined in our initial piece last year on the product innovation platform (see *Perspective: The New Vision for PLM — The Innovation Platform*, IDC Manufacturing Insights #MI249718, July 2014), the following foundational PLM initiatives:

- **Visual decision making** is an initiative that presently takes the form of executive dashboards and 3D CAD visualizations to aid in multidisciplinary decision making, and in the future, will benefit greatly from "real time" analytics, using the product data that's available (e.g., materials data, performance data, compliance data, or costing data) to gain insights and make more informed decisions. Visual decision making will also be expedited through a social networking approach to product development (i.e., providing a social medialike interface for the design and development team to collaborate on new ideas, designs, or product changes).
- **Systems engineering** takes a "systems level" approach to effectively manage the software development process alongside the mechanical and electrical/electronic design and development process, integrating PLM with application life-cycle management (ALM) — mechatronics, as it is widely known. The massive increase in the amount of software within complex discrete products is what drives this systems approach.

- **Product life-cycle economics** involves taking a more comprehensive, more business-centric view of product development — one that balances and optimizes multidisciplinary decisions and rationalizes investments throughout the total product life cycle. For manufacturers, it's really all about being able to deliver innovative, market-driven products, cost effectively.

The product innovation platform, we think, will provide this unified, collaborative, and wide view for not only design and engineering but internal and external development team members from every discipline, leading to better decision making, collaborative systems engineering, profitable products, and exceptional customer experiences.

IN THIS STUDY

In July 2014, we published our initial piece on the product innovation platform, focusing on defining this and discussing how manufacturers can benefit by evolving their PLM approach across their enterprise and value chain (see *Perspective: The New Vision for PLM — The Innovation Platform,* IDC Manufacturing Insights #MI249718, July 2014). This PlanScape report will complement the initial Perspective by providing detail on the building blocks for the product innovation platform: the planning approach, the framework, and the reference model, as well as reinforcing the value of this enterprisewide approach to designing, engineering, and manufacturing products.

SITUATION OVERVIEW

The product innovation platform, with PLM as its core, essentially ties together all enterprise applications, data, and tools used to design, develop, manufacture, and service products in one system. This includes extension into the front end of innovation to sense demand and manage intellectual property, the value chain of knowledge inside and outside the company for new product ideas, the supply chain for collaboration and rapid time to market, and manufacturing for rapid production, accuracy, and quality. Perhaps the biggest benefit of a product innovation platform is that the development of products, the lifeblood of a company, can be tied to strategic business goals and multiple product, sales, and marketing efforts.

Why embark on this multiyear journey to establish a true global, cross-enterprise platform to design and develop products? In summation, here are some of the key benefits:

- Enabling more rapid collaboration across the value chain: customers, engineering, manufacturing, supply chain, and service.
- Collaborative manufacturing — engineering and design work closely with manufacturing from the beginning of the product life cycle resulting in fewer errors, higher quality, and better products.
- Full view of data to provide the opportunity for product life-cycle analytics.
- Integration of service information (product failure modes, customer feedback) for product improvement.
- Enabling more rapid response to quality issues as well as product and software updates.
- Unification of information on complex products, whether, for example, heavy equipment that requires a systems engineering view or consumer packaged goods that have process and discrete (i.e., the packaging) requirements that need to come together.

The key components and elements of the product innovation platform that we think you need to keep in mind as you consider extending your product development process are discussed in the sections that follow.

Why

Why should an organization consider this technology approach and its inherent challenges?

- Improve success rates of new product launches by 25% through advanced decision support.
- Increase your speed to market 50% by improving the design review process and collaborating more closely with customers, partners, and suppliers.

- Achieve 90%+ customer satisfaction rates through closer connection to customer requirements and excellent product quality.

What

What is the technology approach and its inherent challenges?

- Visual decision making and open innovation is difficult if all parties involved in the product development process are not working in the same system.
- Systems engineering across multiple engineering and manufacturing domains is unified.
- Product life-cycle economics includes business and cost rationalization of product decisions, and product development is tied to business strategy and goals.

Who

Who needs to be involved in this effort in order to make it a success?

- Engineering and manufacturing are the core.
- Marketing and product management help drive customer-facing innovation.
- Supply chain and partners optimize products and speed time to market.

How

How do you build sponsorship at a high level and begin to leverage this approach?

- Start with PLM as the core, building on current investments.
- Integrate customer, manufacturing, and service information to PLM, providing the global team with a single view to all product data and information.
- Communicate value of product innovation platform to product development team via your executive team.

THE APPROACH

Before starting to expand your current product development approach, it is important to note that the product innovation platform is not one size fits all. Different size companies and companies in varying industries will complement their core PLM implementation with the key initiatives most critical to their business, whether that is managing a portfolio of products, enterprise quality management, digital manufacturing, or service life-cycle management. From there, they can extend outward to other enterprise applications, data, and processes. Different "flavors" of the product innovation platform are also driven by other factors such as number of manufacturing sites, number of product launches per year, product complexity, supply chain complexity, and number of customers. Table 1 shows the different critical initiatives by industry and the likely platform owner.

TABLE 1

Product Innovation Platform for Industry

Industry	Product Innovation Platform Critical Initiative	Product Innovation Platform Owner
Pharma and medical device	Quality management	Business line and R&D
Automotive, aerospace and defense, and machinery	Systems engineering and service life-cycle management	Engineering
High tech and semiconductor	Quality management	Engineering
Consumer packaged goods	Product portfolio management and ideation	Marketing and product management
Chemicals	Material science/formula management	R&D and application specialists
Retail and apparel	Design and sourcing	Design and procurement

Source: IDC Manufacturing Insights, 2015

The product innovation platform enables better decision making, collaboration across your entire value chain, and a single view of all relevant product, demand, and supply data for any industry, resulting in faster time to market, higher product success rates, and improved customer satisfaction. This approach extends, or democratizes, product life-cycle information to the entire team involved in new product introduction and enables faster response to customer needs, quality issues, or service requests. This is not a wholesale new approach to PLM but rather builds on your current implementation as required by your business: the initial approach may be as simple as integrating with a single application or as extensive as tying to multiple applications and data from customer to manufacturing to service and combining with semantic search, analytics, and visual collaboration tools. The approach is flexible, and we think the future of PLM.

Why? Achieving Vitality and Stability Is a Big Reason

The goal of every organization is to achieve the balance of rapid innovation and production of quality products (vitality) while consistently making money on the right portfolio of products (stability). Vitality happens when there is a high number of innovative, brand new products introduced to existing and new customers; stability occurs when existing products are sold to new customers and new products are produced primarily through reuse – reuse of designs, components, and resources. If you are a vital, innovative company, you are taking a lot of risk for high potential reward; a company focused on stability (not a bad thing) is focused on optimizing existing knowledge and resources to stay competitive and maintain a predictable revenue stream.

The most successful companies are able to strike a balance between vitality and stability, where revenue is derived from new, innovative products as well as through existing products and new products that reuse designs, components, and suppliers. Figure 2 shows that those companies able to achieve this are the likely leaders in a particular market.

FIGURE 2

Vitality and Stability Balance

Source: IDC Manufacturing Insights, 2015

The product innovation platform provides the open, inclusive decision-making environment required to achieve that perfect balance of vitality and stability. Not only can you have your finger on the pulse of customer demand with this architecture in place but you can also have the existing set of product and institutional knowledge built up over the years to draw from. Instead of individual groups making disparate decisions based on the same data, decisions can be made collaboratively across product development team discipline: engineering, marketing, sales, supply chain, manufacturing, and service. Manufacturers cannot achieve this necessary wide view with a PLM system that is only utilized by design and engineering. IDC Manufacturing Insights anticipates that with the product innovation platform, new product launch success rates will improve, speed to market and service response rates will increase, and customer satisfaction rates will improve.

FUTURE OUTLOOK

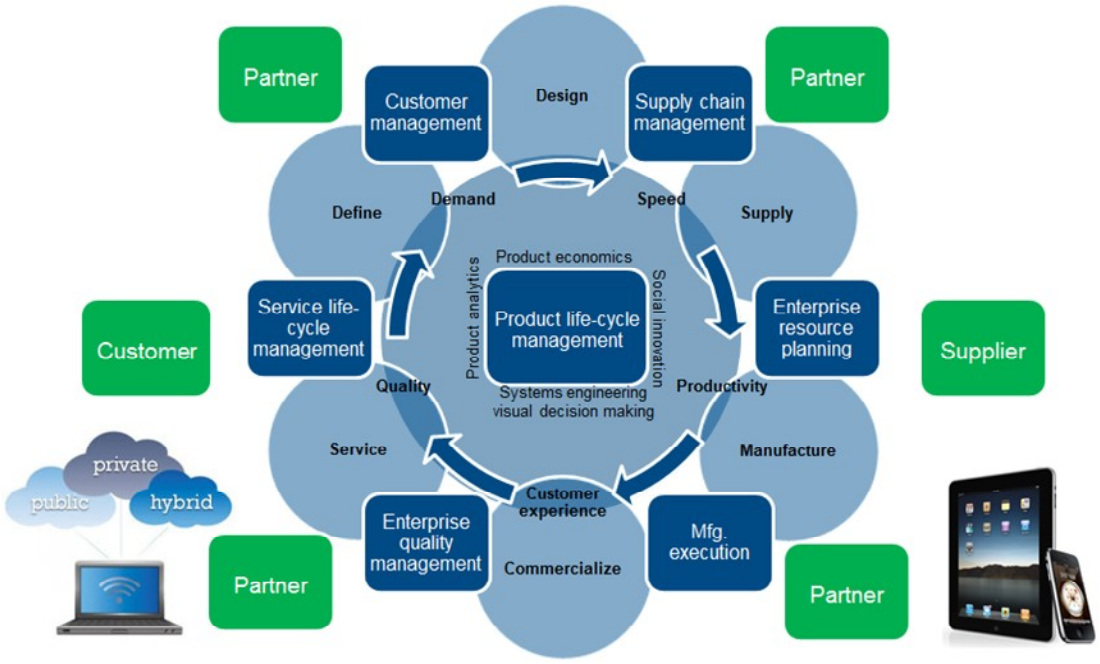
The product innovation platform is PLM integrated to manufacturing for concurrent engineering, modeling, MES analytics, and quality; supply chain for planning and collaboration; customers, partners, and extended development team members for open innovation and product improvement; and service for better quality products and an excellent customer experience.

The product innovation platform is optimized by the 3rd Platform – analytics, social, mobile, and cloud – to enhance product innovation, product quality, speed time to market, and better service the customer. The 3rd Platform provides a foundation for business process and business model transformation that affects how you interact with your customers, the speed at which products are brought to market, how you innovate, the reliability of operations, and overall company resiliency.

The product innovation platform framework, as depicted in Figure 3, leverages PLM as its core and integrates all necessary data and workflow from inside and outside the enterprise in part by leveraging 3rd Platform technologies.

FIGURE 3

The Product Innovation Platform Framework



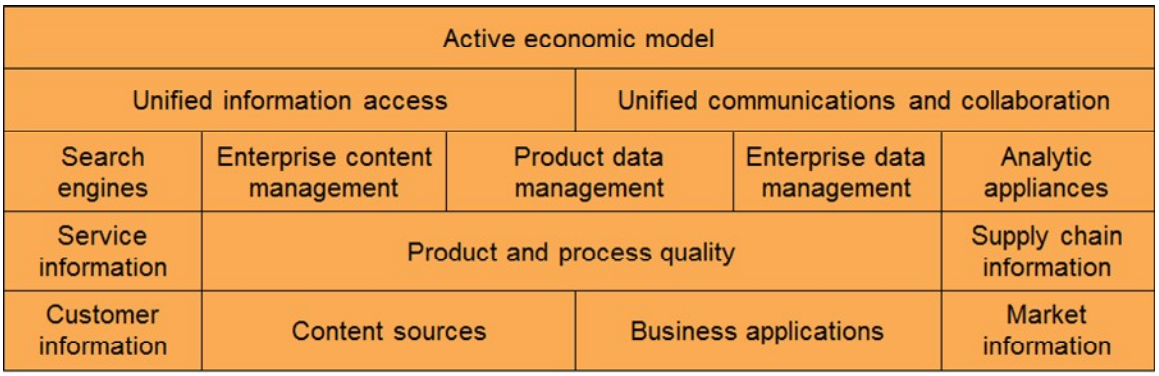
Source: IDC Manufacturing Insights, 2015

The reference model that is required for a product innovation platform, as shown in Figure 4, includes a combination of enterprise content management, product data management, enterprise data management, service and customer information, and supply chain and market information with unified communication and access complemented by search and analytics tools to find the information one needs quickly whatever role they are: marketing, product management, engineering, supply chain, or manufacturing.

This model encompasses all the structured and unstructured information that can complement product innovation and analytics and enable you to find meaning in all the product, demand, and supply data that is captured, as well as social business, open innovation, and product portfolio management which empowers you to apply the learning from the aforementioned data within an active economic model to improve product and business success.

FIGURE 4

The Product Innovation Platform Architecture Reference Model



Source: IDC Manufacturing Insights, 2015

Unique Value from the Product Innovation Platform

Engineering, design, and product management are the primary users of a product innovation platform. But the user base of PLM has expanded considerably, upstream to customer and partners, downstream to manufacturing, and outward to the supply chain and partners. And, of course, other internal roles like marketing, sales, and field service all can benefit from a product innovation platform.

CEOs will derive great value from this approach because of the top-down view into the organization and how and when products are being designed and manufactured. Marketing and product management will have a platform on which they can engage with customers and partners to gain input and expand their knowledge. Design and engineering will have the capability to digitally connect with any member of the value chain on new product ideas, designs, or other product development issues. Perhaps, most importantly, the design and engineering process will be tightly connected with manufacturing and service. Table 2 shows the primary value that we think each team member will derive from a product innovation platform.

TABLE 2

Product Innovation Platform Value

Role	Product Innovation Platform Benefit
CXO (CEO, CIO, CTO, CFO)	▪ Full view into cost benefit, profitability, performance, and quality of product enables rapid decision making and product life-cycle analytics
Business line management	▪ Full view into cost benefit, profitability, performance, and quality of product enables rapid decision making and product life-cycle analytics ▪ View into performance of employees, partners, and suppliers
Marketing	▪ View into market needs, competitive landscape, and customer input in the context of new product ideas
Design	▪ Easy sharing of new concept designs; CAD models with customers, partners, and team members; and supply chain for expedited collaboration and feedback
Engineering/R&D	▪ Global view of product ideas, development process, procurement, manufacturing process planning, manufacturing execution, product quality, customer feedback, and service information ▪ Collaboration environment with manufacturing and contract manufacturing ▪ Expedited update of software in connected products ▪ More accurate information on customer requirements, product quality issues, and customer feedback means likely greater product success
Manufacturing	▪ View of upcoming new product launches ▪ Enhanced collaboration with engineering to enhance speed time to market and provide feedback for on new product designs ▪ View of manufacturing execution and process
Supply chain	▪ Detailed view into new product designs and ability to collaborate with manufacturer's design and engineering team to expedite supply of materials and product
Field service	▪ Communication platform for receiving service work instructions and communicating product issues back to engineering for addressing product quality issues or connected product updates
Partners	▪ Rapid collaboration with manufacturers on new product design and engineering to expedite product launch ▪ Bilateral view into service-related information for rapid service response
Customer	▪ Direct input to marketing, design, and engineering at manufacturers to share new product ideas and any product quality issues as they arise

Source: IDC Manufacturing Insights, 2015

ESSENTIAL GUIDANCE

The product innovation platform's time has come: the evolution of PLM to the point where it connects with other enterprise applications and data to enhance innovation has been discussed for years, but there were no real overriding factors driving this evolution forward. Now, with enormously complex, connected, and "smarter" products, the need for systems engineering and digital manufacturing and hyperdynamic customer demand for customized and personalized products, the time is right for an approach to product life-cycle management that truly leverages all-demand, supply, and manufacturing information to optimize products and processes.

Actions to Consider

With that in mind, we offer the following guidance to manufacturers to employ the right innovation approach to their business:

- **Start with the primary PLM need.** Understand what your core PLM initiative is during product development, whether it's quality management, product portfolio management, systems engineering, or collaboration with manufacturing and that will be your starting point for the product innovation platform. Product data is the engine of the product life cycle, and knowledge of the core initiative and primary users will help form the context in which that information is provided, and how it is consumed.
- **Determine the data sources that would complement your PLM process.** Assess all data sources that impact product development, delivery, service, and improvement. These may exist within your current PLM process or outside the process in another system.
- **Understand where your organization is on the PLM maturity curve.** Know whether your organization's product development system is PDM with office tools, cPDM, or full PLM as a decision support system for your design and engineering process. Assess how successful you've been with product launches, and what challenges you've had. If you currently have a unified, digital platform to capture the intersection of demand, supply, and product information, your organization is probably ready for a broader PLM approach like the product innovation platform.
- **Look to the product innovation platform to enable digital manufacturing.** Simultaneous modeling of product and manufacturing process reduces rework and quality issues and increases productivity, resulting in better products. Extending PLM to manufacturing results in collaborative engineering and up-front validation that products can be manufactured as designed.
- **The front end of innovation can no longer exist in a silo.** Customer demand is simply too dynamic across industry (from engineering to technology to brand-centric companies), and markets are too competitive to let your virtual suggestion box sit apart from PLM. A product innovation platform architecture enables the connection of ideation with customers, partners, suppliers, and other product development team members to product portfolio management and the rest of the PLM process, so you can sense demand and respond as appropriate, whether that is a product update or new product.
- **Consider a cloud approach to the product innovation platform.** This could be for ideation and supplier collaboration to start, with product data existing in a private cloud or on-premise, then evolve to a full cloud approach. It's clear that the market is moving this way (although design and cPDM is a bit slower), when you consider that according to our research, cloud services will grow at a 23.5% CAGR through 2020. It is likely, however, for manufacturers in certain

industries that are highly competitive or driven by governmental compliance that a cloud approach to PLM is hybrid for the foreseeable future.

- **Establish executive support.** A necessity for any IT initiative, implementing the product innovation platform, in particular, is wide reaching and a multiyear process, so it requires consistent executive support to drive this innovation unification and reinforce the value across the enterprise.
- **Partners can help with strategy and execution.** Manufacturers must work with partners to establish strategy and accelerate implementation, adoption, and management of the product innovation platform. Manufacturers must recognize that they need external resources and expertise, especially if they are going to move quickly to tie their existing PLM system to other complementary data sources and processes.
- **Keep in mind the product innovation platform is not one size fits all.** You don't need to be an enormous, multinational company to need a platform tied to multiple data sources, applications, and people that complement product design, development, and introduction; the product innovation platform may be different per company or per industry. Where pharmaceutical and medical device companies may focus on quality first tied to the front end of innovation, automotive and aerospace companies may want to tie together the front end of innovation, engineering, manufacturing process planning and execution, and supply chain data in a single, role-based view for the global team.
- **Remember the importance of collaboration tools.** If the first wave of investment (CAD/PDM) was about organizing information and the second was about understanding it (PLM as a decision support platform), this wave is about making sure the organization is using the information to its potential value.

As we stated in our initial piece on the product innovation platform, the journey to this approach is evolutionary: some manufacturers may be content with a PDM hub, office tools, and an internal social media platform for the engineering team, or PLM, disconnected from the broader enterprise and value chain. But when a manufacturer grows to the point where they are managing multiple product launches and updates a year on complex products, has to configure a single product thousands of different ways to meet customer demand, and collaborates with hundreds of suppliers and partners, they need more than a homegrown or disconnected PLM system. We think the product innovation platform, which encapsulates supplier, product, and demand information from multiple enterprise applications and data sets into a unified, digital view, and leverages 3rd Platform technologies for communication, collaboration, and decision support, is the next logical step.

LEARN MORE

Related Research

- *Perspective: What Is the Impact of Connected Products on Product Innovation?* (IDC Manufacturing Insights #MI254962, March 2015)
- *Perspective: The View from CES 2015 - Connected Innovation Abounds Across Manufacturing* (IDC Manufacturing Insights #MI254265, February 2015)
- *Best Practices: Moving to the Innovation Platform: Evolution of Product Life-Cycle Management in India Manufacturing* (IDC #IN250916, January 2015)
- *IDC FutureScape: Worldwide Manufacturing Product and Service Innovation 2015 Predictions* (IDC #253397, December 2014)

- *IDC FutureScape: Worldwide Manufacturing 2015 Predictions — Changing the Industry with Technology* (IDC #253305, December 2014)
- *Best Practices: Technology-Oriented Value Chain 2014-2015 Investment Guide* (IDC Manufacturing Insights #MI251840, October 2014)
- *Best Practices: Engineering-Oriented Value Chain 2014-2015 Investment Guide* (IDC Manufacturing Insights #MI251691, October 2014)
- *Perspective: The New Vision for PLM — The Innovation Platform* (IDC Manufacturing Insights #MI249718, July 2014)

Synopsis

This IDC PlanScape report lays the foundation for manufacturers looking to mature their product life-cycle management (PLM) process to the next step. The product innovation platform's time has come: the evolution of PLM to the point where it connects with other enterprise data to enhance innovation has been discussed for years, but there were no real overriding factors driving this evolution forward. Now, with enormously complex, connected, and smarter products, the need for systems engineering and digital manufacturing and hyperdynamic customer demand, the time is right for an approach to product life-cycle management that truly leverages all demand, supply, and manufacturing information to optimize products and processes.

"The product innovation platform provides the open, inclusive decision-making environment required to achieve that perfect balance of vitality and stability. Not only can you have your finger on the pulse of customer demand with this architecture in place, but you can also have the existing set of product and institutional knowledge built up over the years to draw from. Instead of individual groups making disparate decisions based on the same data, decisions can be made collaboratively across product development team discipline: engineering, marketing, sales, supply chain, manufacturing, and service," said Jeff Hojlo, program director, Product Innovation Strategies at IDC Manufacturing Insights. "Manufacturers cannot achieve this necessary wide view with a PLM system that is only utilized by design and engineering. IDC Manufacturing Insights anticipates that with the product innovation platform, new product launch success rates will improve, speed to market and service response rates will increase, and customer satisfaction rates will improve."

About IDC

International Data Corporation (IDC) is the premier global provider of market intelligence, advisory services, and events for the information technology, telecommunications and consumer technology markets. IDC helps IT professionals, business executives, and the investment community make fact-based decisions on technology purchases and business strategy. More than 1,100 IDC analysts provide global, regional, and local expertise on technology and industry opportunities and trends in over 110 countries worldwide. For 50 years, IDC has provided strategic insights to help our clients achieve their key business objectives. IDC is a subsidiary of IDG, the world's leading technology media, research, and events company.

Global Headquarters

5 Speen Street
Framingham, MA 01701
USA
508.988.7900
Twitter: @IDC
idc-insights-community.com
www.idc.com