

Product Innovation Platforms: Definition, Their Role in the Enterprise, and Their Long-Term Viability

CIMdata Position Paper

Key takeaways:

- *With a “system of systems” approach, Product Innovation Platforms are enabling next-generation PLM.*
- *The robustness of Product Innovation Platforms is measured with five imperatives and seven strategic characteristics.*
- *It never makes sense to develop tomorrow’s products with yesterday’s tools.*
- *Industrial companies need to review and update their PLM strategy and enabling solutions to be successful.*

In the more than 30 years that CIMdata has been covering the PLM market, the landscape has changed dramatically. Product complexity has increased, with electronics, embedded software, and Internet connectivity now becoming the norm in most industries. Furthermore, PLM solution providers’ offerings have expanded greatly in scope, both organically and through acquisitions. Additionally, the PLM vision has expanded in both depth and breadth, with industrial companies expecting more from their implementations to keep up with product complexity.

And yet, as we have reported on extensively in recent years, the scope of PLM implementations has not changed much over this time. Hard to implement, expensive to upgrade, and too focused on managing mechanical CAD data, many of these solutions have failed to meet the expectations and needs of their users, especially in large organizations. The result is widespread use of complex spreadsheets, email, and bespoke databases to fill in the gaps among legacy systems.

Based on our research and extensive interaction with industrial companies globally, we concluded four years ago that the time had come for a new approach and introduced in partnership with Gartner and IDC the Product Innovation Platform—an innovation-enabling business platform that would support all product related disciplines and users through the entire product lifecycle. Much has been written about it—how the tools for design, modeling, analysis, optimization, production, and maintenance are being brought together to optimize business operations, and how they catalyze new revenue streams. Articles go into detail about benefits from implementing product innovation platforms.

Unfortunately, key parts of the story have not been well told, however, leaving much to readers’ imaginations. Our goals in publishing this position paper are three-fold:

- To clarify that the industry is moving on from where it has been for the last 30 years.
- To help industrial companies plan for a new generation of technology to support the end-to-end product lifecycle.
- To provide a way for solution providers to expand, enhance, and clarify their offerings.

Platforms are comprised of multiple applications and integrated solutions with embedded tools and databases that function as a complete, seamless environment. Product innovation platforms are intended to support groups of technically oriented people collaborating across

the levels of departments, business units, and the enterprise. These capabilities are increasingly needed throughout the entire extended enterprise including customers, suppliers, and business partners, not just by new product development (NPD)—that was product data management (PDM) of old.

An effective product innovation platform encompasses the management of portfolios, programs and projects, profitability, service, systems ideation and realization, and quality and compliance. Moreover, an effective platform optimizes across these multiple lifecycle domains from a product's conception through its entire life.

<i>Product Innovation Platform Compared to PDM</i>		
	Legacy PDM	Product Innovation Platform
Lifecycle Scope	Product development	Full product lifecycle
Discipline Scope	Primarily mechanical	Systems—mechanical, electrical, electronic, software, control systems, manufacturing, and service
Information Scope	MCAD, documents, some parts and BoMs	All product items across all lifecycle disciplines
Supply Chain Scope	Limited supplier involvement	Full supply chain and customer support

In this position paper, CIMdata offers an enhanced understanding of platforms in terms of long-term viability and is, in fact, setting the bar for assessing the lifecycle management capabilities of a platform. Three questions are addressed herein:

- What is a practical “working” definition of a product innovation platform?
- How does one measure a product innovation platform’s long-term viability?
- Why are product innovation platforms vital to enterprise, or, why should anyone care?

The benefits of a product innovation platform are outlined in a recent CIMdata Commentary titled “A Product Innovation Platform and Its Impact on Successful PLM Deployment.”¹

Why You Should Care About Having a Product Innovation Platform

The primary reason for caring about product innovation platforms is so your enterprise’s product lifecycle management processes and resulting products and services won’t be outperformed by rivals. In hypercompetitive markets, rivals exploit any flaw and rush alternatives into the marketplace.

A product innovation platform assures the company’s flow of new products because the tools, staff, and information are working in sync throughout the lifecycle. Business unit and departmental goals are met, incentives and bonuses are paid, job security is improved, financial forecasts are attained or exceeded, and business milestones are reached.

¹ See: <http://www.cimdata.com/en/resources/complimentary-reports-research/commentaries/item/7298-a-product-innovation-platform-and-its-impact-on-successful-plm-deployments-commentary>

Definition of a Product Innovation Platform

A product innovation platform is a set of evolving functional domains—process, lifecycle stage, and technical domains such as system ideation, profitability management, and quality and compliance (see Figure 1). They are orchestrated by the platform with a “system of systems” approach that, in essence, makes a product innovation platform the enabler of the next generation of PLM-enabling solutions.



Figure 1—CIMdata's Product Innovation Platform

This system of systems-centric lifecycle management strategy supersedes the efforts of individual “owners” of product data. Working mainly in silos, these owners’ thinking about connectivity and integration is often hemmed in by their narrow and limited responsibilities. We all know how silo-oriented integration and connectivity efforts have turned out. Everything from plug and play tools, to real-time collaboration, to the holistic governance of NPD is frustrated.

The product innovation platform is defined by five strategic imperatives and seven strategic characteristics. The balance of this position paper explains them.

Measuring the Product Innovation Platform	
Strategic Imperatives	Strategic Characteristics
Connections / platform integration	Sustainability
Gravity	Data management and find
Flow	Configuration and traceability
End-to-end lifecycle support	Process and knowledge management
Openness	Upgradeability
	Enterprise infrastructure utilization
	Availability and stability

Strategic Imperatives Described

The label “platform” is regularly abused by marketers and subject matter experts. A Harvard Business Review article² summarizes platforms in six characteristics—three building blocks and three success factors.

For authors Mark Bonchek and Sangeet Paul Choudary, the building blocks are:

- **Toolbox:** architectures and interfaces that make it easy to plug into and use the platform, which is presumed to be an open system.
- **Magnet:** a combination of look-and-feel, ease of use, and power that attracts users to the platform “with a kind of social gravity,” as Bonchek and Choudary phrased it. Their example is the Apple iOS operating systems and architecture that draws in developers, as well as users.
- **Matchmaker:** fostering the flow of value by connecting producers of information with those who “consume” it. The authors cite how Google matches supply and demand for online content.

Bonchek and Choudary’s three success factors are:

- **Connection:** the ease with which others can plug into the platform to share data and accomplish tasks. Perhaps now better known as collaboration, “connection” in this form is indispensable to innovation.
- **Gravity:** how well the platform itself attracts those who need information. When innovative users are drawn in by positive experiences (and word of mouth), well-organized platform capabilities and compelling interfaces will soon outdistance older tools.
- **Flow:** specifically, how well the platform fosters collaboration and the shared creation of information. More completely understood today as interoperability, seamlessness, and traceability, “flow” is also essential to innovation.

Note the emphasis here on connectivity and collaboration. CIMdata adds two more success factors specific to product innovation platforms:

- **End-to-End Lifecycle Support:** supports the full product or plant lifecycle from concept through end of life, recycling, and beyond—support that includes a lifecycle oriented systems engineering approach and reaches all the extended enterprise’s technical disciplines and business processes.
- **Openness:** provides unencumbered access to product-managed data, workflows, and services; openness ultimately means both plug and play and transparency without using proprietary, “monolithic” architectures.

Strategic Characteristics Described

A big worry for every leader of a technology project is long-term solution viability (i.e., sustainability). *Could the solution be obsolete in three years?* **Sustainability** means supporting an enterprise’s data- and process-management requirements over an extended period of years—at a reasonable cost while business needs evolve. Companies get much-needed fresh starts as they evolve from discrete solutions to platforms. These fresh starts

² Bonchek, Mark and Sangeet Paul Choudary. “Three Elements of a Successful Platform Strategy.” Harvard Business Review. Jan 31, 2013.

give the entire enterprise an opportunity to leverage the sustainability of product information platforms as a vital characteristic necessary for continued business success.

CIMdata defines three key elements of platform sustainability:

1. **Adaptability**—the ability to configure the platform’s data model, user interface, and workflows to fit an organization’s specific requirements over time.
2. **Extensibility**—the ability to add or extend the platform’s baseline capabilities via configuration rather than modification to core technology at any time.
3. **Maintainability**—the platform’s ability to stay current with organizational, process, and IT technology changes at a reasonable cost.

Unfortunately, sustainability is never easy to assess. It is a forecast made amid endless changes and disruptions. Moreover, a solution need not be fully mature—fully built and fully implemented—to be sustainable. A solution that is immature is still sustainable provided that the continuous improvement needed to reach maturity is not too costly or too disruptive.

CIMdata is defining the strategic characteristics of a product innovation platform maturity model. This model will help organizations measure and compare platforms. Sustainability is, of course, one key strategic characteristics; CIMdata adds six others:

- **Data management and find:** basic capabilities of any digital solution along with the associativity to reuse insights and product related information. Starts with the ability to manage data from many sources, including external systems such as data authoring tools (either directly or through a data management environment) and includes data from applications built directly on the platform. Also includes IP management, data security, longevity, and reliability. The platform must also provide a comprehensive search and find service.
- **Through-Life Configuration Management and Traceability:** the ability to manage a product's configuration from concept through its entire lifecycle with verification to requirements and bi-directional traceability. Traceability begins with requirements and runs through the successive bills of materials (BOMs) from as-designed, as-built, as-delivered, as-maintained, and on to the end of the product’s useful life; end-of-life can mean refurbish, rebuild, recycle, or remanufacture. Traceability is invaluable in determining causes of failures and resolving warranty claims.
- **Process and Knowledge Management:** the accurate representation of business processes and capturing their inputs and outputs, while organizing and securing all data representing an enterprise’s knowledge of its products, processes, systems, and intellectual property. Process and Knowledge Management can also track, compare, and analyze discoveries and insights through research tools and simulation.
- **Upgradeability:** accommodating updates with minimal disruption to data authoring, reviewing, and consuming tools. Includes changing to new versions of the platform backbone and updates to any of the components in the platform’s application layers. Upgradeability is a measure of how easily the backbone or any application layer can accommodate newer releases with added functionality. The architecture of a platform also allows reconfiguration, or tailoring, without customizing the underlying code, avoiding customizations that are user modifications to core software and processes which are rarely supported in updates and new software versions and can be expensive and risky to update.

- **Enterprise Infrastructure Utilization:** leveraging existing and future IT infrastructure to meet the lifecycle management requirements and growing user population (scalability) without duplicating resources or assets or hitting performance barriers. Usability or ease of use to support a broad range of roles must be maximized—including support for people with disabilities, for example.
- **Availability and Stability:** providing all product innovation services promptly and reliably, which over time means robustness, scalability, and balancing ease of use against capability and the need for optimizing across the enterprise. This is seamlessness: all the bits and bytes working together to enable collaboration among innovation-minded users anywhere in the lifecycle—past, present, and future—and anywhere in the extended enterprise.

When assessing their own implementations or a solution provider's offerings against these criteria, for now, CIMdata recommends that PLM teams and managers resolve questions about platform sustainability with yes-or-no answers. Are the building blocks in place and being used? Are the success factors in place? Are the strategic characteristics implemented?

This will not be as simple as it might seem at first glance. Solution providers, PLM teams, and IT project managers will describe the success factors and strategic characteristics in different ways. Best practice is to make sure first that all the platform elements are present and able to interoperate. Beyond yes and no, sustainability measurement means taking account of many factors that must be quantified against baselines and assessed for improvement opportunities.

Taking the Next Steps

There is, however, no perfect complete product innovation platform. Many enterprises have one in some form, but there are yet no solid baselines from which to measure.

Nevertheless, CIMdata is developing a maturity model to address worries often heard from clients:

"We think we're pretty good, but are we really?" One worthwhile indicator is in product successes compared with one, two, or three years earlier. Autodesk surveyed users of its Fusion product innovation platform³ and came up with three metrics:

- 25% improvement in successful new product launches.
- 50% increase in new-product speed to market.
- 90% or better rates of customer satisfaction.

CIMdata believes surveys by other providers will yield similar results—and will add up to solid justifications for product innovation platforms.

"With a better platform, could we do better?" This is really a question about the competitiveness of existing products and the adequacy of profit margins. Are they sufficient? Is market share growing? Do new products meet or exceed customer requirements? Are feedback loops closed? Are lifecycle processes holistic? If the answer to any of these questions is no, then there is room for improvement.

"Better in which areas, specifically? Metrics? Methodologies?" In metrics, what are the tools we use to measure lifecycle effectiveness? Even simple measurements can enable

³ "Implementing the Product Innovation Platform." autodesk.com/industry/manufacturing/resources/engineering-leadership/implementing-product-innovation-platform

significant improvements. In methodology and approach, i.e., what are the tools and architectures product lifecycle management relies on? This question is best answered by two other questions: How often are the tools updated? How disruptive are those updates?

“Can we sustain the product lifecycle management solutions we have now?” Not unless you believe tomorrow’s innovations can be created with yesterday’s systems—especially given that so many capital- and design-intensive products remain in use long after the tools with which they were created are digital history. Some technology can be improved or extended, but sometimes there is no option but ripping out and replacing to get a new baseline solution.

“Can we further ramp up our innovation momentum?” If there is significant unused capability in product development, probably yes. If not, then sweeping changes and a product innovation platform may be overdue.

Sustaining and ramping up innovation bring us to another query we get from clients: *“Why is knowing this important? Why not just play it safe?”* Playing it safe—watching, waiting, and making no real commitment—risks being permanently left behind. It is axiomatic in technology that “tools lead, products follow.” Being left behind guarantees obsolete solutions, more data lost or buried in silos, more cutting and pasting, and more repetitive data entry when an upgrade can no longer be avoided. Disruption to work can be expected, as well. Tools must be in place before anything can be produced; users stuck with obsolete tools will struggle and most likely fail to deliver innovative products.

Amid ever-changing requirements, additional play-it-safe risks include:

- Curtailed ability to support the business for the foreseeable future at reasonable cost.
- Inability to support digital twins and digital threads.
- Difficulty enabling end-to-end processes.
- Getting approval for a PLM upgrade without a viable platform.

Conclusion

The growing complexity of products and customer demands for innovation are driving changes in industrial companies and their PLM solution providers. For PLM solutions and new product development, platformization is the path forward.

Product innovation platforms are a significant undertaking; while some solution providers have embraced this approach, many are too entrenched in their assembled-over-time architectures to be able to move quickly. PLM is complex and assessing the current state of a PLM solution and comparing against upcoming business requirements requires both quantitative and qualitative methods.

Enterprises taking a first look at product innovation platforms should begin by assessing their current PLM capabilities and anticipated business requirements. Once the gaps are quantified, and a prioritized roadmap is developed, technology can be evaluated. In some cases, rip and replace is inevitable while in others, an embrace-and-extend strategy can be used.

Ultimately, the goal is to ensure that your company is able to compete—to meet and exceed customer expectations profitably—by leveraging the technology that underlies a product innovation platform. Nothing short of this can guarantee success in the future.

About CIMdata

CIMdata, an independent worldwide firm, provides strategic management consulting to maximize an enterprise's ability to design and deliver innovative products and services through the application of Product Lifecycle Management (PLM). CIMdata provides world-class knowledge, expertise, and best-practice methods on PLM. CIMdata also offers research, subscription services, publications, and education through international conferences. To learn more about CIMdata's services, visit our website at <http://www.CIMdata.com> or contact CIMdata at: 3909 Research Park Drive, Ann Arbor, MI 48108, USA. Tel: +1 734.668.9922. Fax: +1 734.668.1957; or at Oogststraat 20, 6004 CV Weert, The Netherlands. Tel: +31 (0) 495.533.666.