Platformization: Dealing With a Matrix of Headaches

CIMdata Position Paper, Part 2 of 3

Recap of Position Paper Part 1 of 3: *The combination of scarce resources and globalization are driving an upheaval in innovation and end-to-end lifecycle management. These changes are coalescing into business strategies that include the platformization of PLM. The Iron Triangle of better / faster / cheaper, along with clever fixes, are being superseded. Skeptics overlook many enterprise-level lifecycle benefits and overestimate the remaining challenges.*

Key takeaways:

- *Ideation, or idea generation, the essence of creativity, is the fundamental rationale of Product Lifecycle Management (PLM) and end-to-end lifecycle management in general—for 21st century enterprises, it is not optional*
- *Platformization is the culmination of four irresistible trends: (a) the evolution of personal productivity tools and their integration capabilities; (b) the migration of discrete end-to-end lifecycle management capabilities to the extended enterprise level; (c) recognition of greater cross-functional and extended-enterprise collaboration; and (d) the evolution of specific platform-enabling technologies such as service-oriented architectures (SOAs)*
- *A far-reaching shift is underway in end-to-end lifecycle management, which increasingly is about sustaining the extended enterprise and not just enabling better, faster, and cheaper products*

In the first of CIMdata's three-article series on the platformization of Product Lifecycle Management (PLM), the emerging platforms were described as "dynamic" and "boundaryless." In reality, those descriptors fall short. Platformization is a living digital construct, one that evolves with technology, competition, opportunity, and the business needs of the extended enterprise.

What this mouthful of words means is that an entirely new approach to innovation is at hand.

This new approach is driven broadly by the Circular Economy, which addresses the pending resource constraints of the near future, and by globalization, which turns even the most innovative products into commodities. CIMdata defines a product as a physical item, a system, and/or service that is defined, delivered, and supported by its manufacturer.

Platformization is driven by the ubiquitous difficulties in allocating investment capital, overcoming the scarcity of human talent, complying with increasing regulation, satisfying fickle consumers, and guarding against the risk of litigation. Dealing with these headaches one at a time is hopeless; they must be tackled as a matrix.

To tackle the matrix head-on, a key requirement is "ideation," which is techno-shorthand for idea generation. Ideation is the essence of innovation—ingenuity, creativity, along with personal and engineering resourcefulness. As the heart of lifecycle management, ideation empowers business decisions that are information based (i.e., data driven), timely, sound, and validated with simulation and analysis wherever needed.

The power to deal with the enterprise's matrix of headaches establishes platform-based ideation and end-to-end lifecycle management as a core strategy for the enterprise. Bolstered by ideation, end-to-end lifecycle management is really about the sustainability of the enterprise, including its extension to customers, suppliers, distributors, lenders, regulators, and stakeholders.

This goes far beyond developing better, faster, cheaper products, i.e., the role of PLM as we have defined it for years. The importance of the shift to end-to-end and highly connected lifecycle management is far reaching. The emphasis broadens to sustaining the extended enterprise from PLM's original role of enabling product development.

CIMdata defines an end-to-end lifecycle management platform as a foundation on which functional capabilities, data, and processes are enabled and executed—it is everything users need, when they need it, all in one place. The near-term, everyday goal is to enable the innovation essential to the creation of physical and digital products, systems (a combination of the physical and the digital), and services. Users and managers know these must be employed globally, sustaining the enterprise *and* the environment.

The long-term goal of end-to-end lifecycle management is, however, sustainability. This is why in the first article of this three-part series, we labeled platformization as inherently:

- Dynamic, helping users adapt rapidly and innovate continuously across multiple lifecycles in ever-changing marketplaces
- Seamless, meaning that all the digital bits and bytes of innovation work together to enable collaboration among users anywhere in the lifecycle across an extended enterprise's landscape

Among a myriad of benefits, platformization achieves a "single source of truth," as well as end-to-end lifecycle management—access to all the information needed by innovative users, when and how they need it.

Platformization also clarifies the distinctions between strategic and tactical. At its core, strategic is anything that sustains the extended enterprise and stays ahead of challenges in technology, markets, competition, regulation, etc. In contrast, tactical is concerned with short-term objectives of departments and business units, and is usually focused on tasks and disciplines in engineering units known as "silos of expertise."

These distinctions underlie CIMdata's characterization of strategic as enabling to the enterprise and tactical as supportive of the enterprise. This is not a distinction without a difference; quite the opposite. This difference also explains why some analysts and consultants see strategic as proactive and tactical as reactive.

Linking the Physical and Virtual Worlds

From a conceptual viewpoint, platformization links the physical and virtual worlds, connecting the actual of today with the potentials of tomorrow. This is why so many who define and/or implement PLM strategies see them as living things, although "virtual" rather than biological.

Like other living things, platforms evolve and re-create themselves as needed.

CIMdata believes platformization will give users unprecedented power to subdue competitive threats, cope successfully with disruption, and keep up with leaps in technology.

The concept of platformization as a living, self-organizing entity inevitably brings us to governance. Users regularly remind us that governance in innovation and end-to-end lifecycle management is crucial. New functions and capabilities must be threaded into existing workflows that link dozens of discrete systems. The intellectual property (IP) associated with new products and processes must be identified and secured. Big Data in all its volume, variety, and velocity must be managed.

Given these challenges, governance should be in the hands of the enterprise's experts in innovation, lifecycles, product development, engineering, production, and service. Essential as they are, governance is far more than assigning passwords and log-ins, creating file-structure taxonomies, and tracking metadata.

Users and managers tell us that the race by solution providers to develop new PLM functions, capabilities, enhancements, and upgrades outruns the ability to implement and manage them in a coherent, rational, and businesslike way. This is true even when these new features are thoughtfully integrated into the existing offerings. *For more detail, see the sidebar, "What Users Ask of Their Solution Providers."*

This is not to disparage solution providers and other software developers. They do an excellent job of making new capabilities and resources accessible to users within their suites of products—what they see as their user "ecology." The problems occur *between* the ecologies. This is a reality that platformization is addressing across all the engineering systems, solutions, and strategies and in all phases of the lifecycle.

PLM platforms come in several flavors and they are still evolving. The broad outlines, however, are clear, comprehensive sets of heterogeneous functions and process-enabling capabilities. These are packaged and configured to support highly connected end-to-end business processes.

First and foremost, PLM platforms enable and enhance the enterprise's innovation processes. Users get much-needed help to create, manage, share, and reuse lifecycle information in all its forms and from whatever sources. These enablers and enhancements also help seize opportunities quickly, as soon as the insights materialize within the lifecycle, and before competitors notice them.

In addition, innovation platforms sustain continuous creativity in products and processes—the breakthroughs as well as the

What Users Ask of their PLM Solution Providers

To enable more innovation in engineering, users are prodding solution providers for:

- *More licenses and partnerships with software developers in the lifecycle basics of engineering simulation and analysis (S&A). Users need to quickly find the consequences of physical properties, forces, and loads; hence the demand for embedded S&A access to materials properties databases and analysis codes. Users need digital manufacturing and virtual reality to identify risks in physical production; these go far beyond spreadsheets and what-if calculations—even beyond graphical spreadsheets that work with geometry the same way conventional spreadsheets work with numerical formulas.*
- *Greater capability and flexibility in application programming interfaces (APIs) to support third-party plug-ins and add-ons; service-oriented architectures (SOAs); neutral-format and direct geometry translators, and the geometry kernels of solid modeling. An imponderable of platformization is, "when does it occur?" One answer may be, when the add-ons, plug-ins, and interfaces overwhelm the packaged solution.*
- *Enhanced bidirectional connectivity to manufacturing engineering, MES, robotics, machine vision, inspection and quality assurance, human-machine interfaces (HMI), and additive manufacturing, or 3D printing.*
- *Embedding the best of the new digital technologies unearthed every day by Google browsers, YouTube videos, Web logs ("blogs"), Facebook, Twitter, Pinterest, and many more.*
- *Simpler accommodation of smartphones; work-from-anywhere, "device agnostic" mobility; and social media preferably implemented in the Cloud (itself a new kind of platform).*

(Continues)

new-and-improved—across generations of products and product portfolios, and reaching far beyond current offerings.

PLM platforms greatly reduce, if not eliminate, dependence on aging applications and fragmented systems. This means users will no longer be constrained by disjointed workflows that hamstring searches for crucial information. Key files will no longer be inaccessible, for example, and lessons learned will no longer be obscured.

Innovators and lifecycle managers struggle daily with these realities as they confront the ramifications of the Circular Economy and globalization. Struggling right along with them are enterprise executives, members of standards committees, and regulators.

This is why end-to-end lifecycle management is so tightly linked to innovation, collaboration, and interoperability. Without them the enterprise flounders. The tools developed with platformization will simplify and speed up all forms of personal and product digital communication. Interoperability among data formats, applications, and systems is just the starting point.

Among the knowledgeable users of successful PLM installations, there is close agreement on these concepts; virtually all these thought leaders buy into the need for platformization.

In our lifecycle business strategy consulting and marketplace analyses, CIMdata sees nearly unanimous agreement on platformization—and such unanimity is rare indeed.

(Continued)

- *More transparent management of IP—the knowledge and algorithms the enterprise acquires as its products are developed, manufactured, and put into use. Management of IP generated downstream (after manufacturing) and in the back-end lifecycle is still seen as weak and fragmented, especially when a product is misused and abused.*
- *Sturdier links to the sensors and actuators of the Internet of Things (IoT), predictive analytics, big data, and high-performance computing (HPC); the more data that can be crunched, the more dots can be connected as part of ideation and decision making.*
- *Greater visibility into enterprise resource planning (ERP) and the financial management of production throughout the enterprise. Although it too is a platform, ERP is primarily a platform for execution while PLM is primarily for ideation and innovation.*

These links are essential as end-to-end lifecycle-management and ideation migrate to the enterprise level from departments and projects. Without platformization, users often work with cumbersome and disconnected information flows. The consequences include longer response times for users, more frustrating searches for information, more system downtime, and ever-rising IT support costs.

Solution providers are hearing this message loud and clear.

Use and Misuse of the Term ‘Platformization’

Marketers throughout industry, and not just in the software business, have taken to labeling just about anything a platform. Not that this is exactly unheard of as political parties have always had platforms.

The resulting confusion threatens the understanding of what platformization is and does. Primarily, platforms reside at the enterprise level and from there they enable the enterprise as a whole with all its extensions, as noted.

A quick sampling of credible uses of the term platformization:

- ERP with its bills of materials (BOMs), change management, costing, manufacturing execution systems (MES) and manufacturing operations management (MOM), supervisory control and data acquisition (SCADA), workflows, dashboards, etc.
- Operating systems in smartphones, which are now everyone's platform for 24/7 social communication and work-from-anywhere mobility
- Application development platforms that evolved from scripting languages such as Java for hosting, rolling out, and scaling up software
- Business strategies as articulated by CEOs
- Computer systems broadly defined, at least in the IT world, starting with mainframes and dumb terminals; followed by client/server architectures, Ethernet, and local area networks (LANs); then "grid" or "platform" computing; and the Cloud amalgam of mobility, social media, big data, and analytics
- Microsoft Office tools—ubiquitous, long-lived, and familiar to everyone working in an office

Abuses of the term platform are manifold. Among them: backbone, digital workbenches and workspaces, document-based data exchanges, ecosystems and ecologies, frameworks, incubators, initiatives, portfolios, process management templates, software architectures, and toolboxes or toolsets. None of these is a true platform since none is implemented at the enterprise level.

In its own sphere, each of these is strategic for its users but with rare exceptions those users are in departments and business units. To the enterprise, however, they are merely tactical; they support the enterprise in its objectives—sales goals and profit margins spring to mind—but they do not enable the enterprise's ultimate goal, which is to sustain itself.

The same is true of solutions developed and marketed as "vertical" (e.g., customer relationship management or CRM, and supply chain management or SCM) and "horizontal" (e.g., quality management). Platforms must be both.

In its ongoing evolution as a business strategy, PLM is approaching—and in some cases already achieving—the status of a business platform. PLM has always been a core enabler for innovation as part of a business strategy. Now PLM-as-a-platform, or the "platformization" of PLM, is morphing into new ways of going about the business of innovation.

Dealing with the Matrix

To bring our story full circle, it is axiomatic that anything impacting one part of a matrix impacts every other part. A corollary of these impacts is that every matrix decision or action has unintended consequences, as do indecision and inaction. Users tell us that some of these consequences turn out for the best but most do not. And unfortunately, many consequences are obvious only in the rearview mirror of hindsight.

We'd like to get out in front of that rearview mirror, figuratively speaking, with two thoughtful authors on the crucial importance of innovation:

Judith Estrin, author of *Closing the Innovation Gap* (2008), observes that innovation is the breath of enterprise life. "Biological ecosystems that sustain life are models for the organizations, people, and forces that enable innovation," as we have noted above. "Life flourishes because of a dynamic interaction between communities of living organisms and

their environment," she continues. "In Innovation Ecosystems [such as platformization], the collaborative organisms include scientists, product developers, businesspeople, service providers, and customers, all of whom participate" throughout the lifecycle. Relevant to the lifecycle, Estrin notes that prior enterprise initiatives are ignored at the peril of the enterprise. Fostering innovation is all well and good, but not for its own sake, she adds; profitability can never take a back seat lest the enterprise suffer financially.

Estrin should know. She cofounded seven technology companies and was chief technology officer at Cisco Systems, whose routers are the digital backbone of the Internet. She is on the Disney and FedEx boards of directors and on the technology advisory board of Stanford University's School of Engineering.

Geoffrey A. Moore has written a series of books on high tech over nearly three decades including *Crossing the Chasm, Inside the Tornado, The Gorilla Game, Escape Velocity,* and *Dealing with Darwin*. As with Estrin, Moore doesn't laud innovation for its own sake; it must be tied to real-world business needs.

Moore is a veteran of the Regis McKenna public-relations powerhouse. Among his suggestions is to avoid Commodity Hell, where products (and services and systems) are nearly identical, with price and delivery the sole distinguishing criteria. Only through innovation can companies differentiate products from those of competitors, Moore adds. He notes that as change increases exponentially, understanding and dealing with it successfully becomes increasingly difficult.

Estrin and Moore make a fundamental point for innovators. Amid the matrix of 21st century business challenges, innovation in the forms of ideation and end-to-end lifecycle management is not an option.

Platformization of the product lifecycle must accommodate ideation as the heart of innovation. Without them, global competitiveness and the extended enterprise cannot be sustained for long; market disruptions will make new products obsolete before they are out of the factory. Likewise, if a system, process, or strategy cannot morph into a platform, in the sense of something powerful on which to innovate, it's probably destined to become just one more out-of-touch legacy system.

Only with creativity, innovation, ingenuity, and resourcefulness can we overcome 21st century disruptions and competitive challenges. If ideation weakens, market shares shrink, profitability dwindles, and the sustainability of the enterprise is placed at risk.

Thus CIMdata is certain that platformization is coming to product lifecycle management. No enterprise, small or sprawling, can afford to miss this opportunity.

To Be Continued In Position Paper Part 3 of 3: *How platformization impacts the PLM marketplace as end-to-end lifecycle management becomes increasingly about sustaining the enterprise, and not just enabling better, faster, and cheaper products.*

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.