Increasing Organizational Agility to Match Market Velocity

CIMdata Commentary—Sponsored by Infor

Key takeaways:

- *Manufacturers are facing both increasing market velocity and product complexity.*
- *The trend toward smart, connected products requires new skills, tools, and workflows to ensure market success.*
- *Product Lifecycle Management (PLM) strategies and enabling solutions must evolve to meet these challenges.*

Introduction

The pace of change in product realization today is staggering and increasing at an exponential rate. Many product categories have evolved from simple to complex, smart, and connected. Computerized components, sensors, digital displays, speakers, voice activation, and blue-tooth capabilities are being added to a wide selection of products, from toys to appliances. Today, customers in both the business-to-business (B2B) and business-to-consumer (B2C) spaces expect frequent new product releases and new products that embrace the latest technology. Competing in a global market requires extended value chains that provide more than just components. Many companies rely on their value chain partners to co-innovate to bring new products and services to market. Much of this technology adoption is enabled by embedded software and electronics.

The pace of new product introduction for most companies needs to be faster than ever to keep up to market and competitive demands. Keeping pace with this high-tech boom is a challenge for many manufacturers. Engineering, manufacturing, and supporting smart, connected products requires a whole set of tools and skills that are new and foreign to many discrete manufacturers. Software development and electronic design use different tools and processes than mechanical design, often on drastically different timelines. Companies need to be able to orchestrate all of these processes and manage the intellectual property they create across the full lifecycle for the benefit of the extended enterprise. Making the problem that much harder, B2B and B2C customers are increasingly expecting their own product, configured and even manufactured their way. This is one reason that additive manufacturing is so hot in today's market. It can provide the flexibility needed to be profitable serving markets of one.

To achieve these goals, many companies are looking to digitalization strategies. CIMdata has been promoting the digitalization of the product lifecycle for a couple of decades and is happy that the rest of the business world is now actively adopting digitalization themselves.

Leveraging Digitalization to Provide More Value

The impacts of smart connected products ripple through the organization and value chain. If companies really want to become digital and manage the full lifecycle, they need to start with formal requirements. Requirements management is a discipline that came out of the aerospace and defense (A&D) industry, where customers of major systems needed to ensure they could trace their original intentions through the product lifecycle, with validation and verification steps built in along the way. This practice is spreading to other industrial segments as a response to the need for smart, connected products. For example, in some recent CIMdata industrial consulting projects companies in regulated industries, such as medical devices, see formal

requirements management and traceability as critical to meeting their company's compliance requirements. These firms also provide a good model for how feedback from the field must come full circle, informing the development of next generation products. This is one of the greatest benefits of smart, connected products for discrete manufacturers. Companies relied on complaints, warranty claims, and returns to try to understand how their products were used in the field. Today, those products are gathering extensive real world data ready for analysis.

If your products are constantly changing, it can be a challenge to optimize your component supply chain and inventories of key components. Identifying and qualifying new suppliers can be time consuming, time that many companies increasingly do not have. Once they do have the suppliers on board, they also have to strategically manage their component purchasing and inventory to ensure they optimize the value of those components.

Evolving products so rapidly also creates pressure on the engineering processes, specifically engineering change management and the associated changes to the product configuration. This is where some companies see digitalization as a huge advantage. Being able to dynamically configure products to meet specific needs requires underlying configuration tools and processes that ensure as-designed, as-built, and as-maintained bills of material remain accurate through every stage of the lifecycle. This is also important to create kits for product assembly and maintenance. Poorly assembled kits are the bane of consumers everywhere when they get their products home lacking some key components or instructions. It is essential for maintenance, particularly for companies that rely on after-sales service to high margin businesses. Of course, this becomes even more important as companies move to product-as-a-service business models that some see as the logical end-state for digitalization initiatives. Even tracking warranties and service agreements for specialized components can add to the intricacy of new product introductions today.

Digitalization may be a buzzword—but it is a real trend that demands a real response. Technology is disrupting the industry, but in CIMdata's experience, many discrete manufacturers are not ready. They are trying to re-invent processes and workflows throughout the organization, but many legacy systems are not agile enough to support these changes.

CIMdata believes that product lifecycle management (PLM) strategies and enabling solutions are a central part of manufacturers' response to digitalization. No matter what product you make, achieving the agility that digitalization strategies seek requires a solid PLM foundation. That is where you manage your digital assets from idea though end of product life. How else will you be able to associate all this information, providing context to review past decisions and to optimally make new ones?

How are companies leveraging PLM and digitalization to provide more value? There are many answers to this question. Today's PLM offerings provide a flexible data and process management backbone that is essential to enable the "turn on a dime" agility needed. Manufacturers can simplify processes while maintaining the governance necessary to keep the business aligned. Ideas can be captured and managed, elaborated by defining and successively refining the requirements as development alternatives are defined and assessed. Integration with 3D, electrical, and software design and analysis tools in the product development process can shorten development time as alternatives can be evaluated virtually, saving time and cost while reducing risk.

Today's PLM offerings also are much better at integrating with other enterprise systems, like enterprise resource planning, (ERP), supply chain management (SCM), and customer relationship management (CRM), to name a few. This enhanced integration capability is essential to agility. These other systems manage key relationships and processes that feed

product development. As those relationships get more dynamic the systems—PLM and enterprise—must collectively respond, something that was much harder to do in previous generation solutions. Integrations were often a failure point in PLM implementations because they were too brittle to handle rapid business and technology changes. With products changing constantly, PLM will levy new demands for enhanced supplier management as new product features require new value chain participants. It will also require better interaction with ERP to balance inventories and supply chains with product changes.

Just as requirements management evolved out of A&D, many companies are looking toward agile development processes, originated in the software development domain, to help them meet their speed to market requirements. Of course, it can be much easier to define and configure software components than physical components. The supply chain becomes your software development team that can define the architecture and populate it with code. Getting to a minimum viable product (MVP) is still mainly a mental exercise. Defining a discrete product architecture and populating it with components and subsystems means defining and then making or acquiring those components for assembly.

When compared to historical product development processes the actual timelines are often vastly different. Companies can speed up the process in a number of ways. Historically using standard parts purchased from a catalog was one approach that still has value. Modern PLM solutions often make these parts catalogs readily available. Virtual assembly and testing, as discussed above, is one way to shorten the lead time. But sometimes only a physical product will do. To support the agility needed, companies are turning to global commerce networks like GT-Nexus or Ariba to short circuit supply chain management issues. This can support more complex supplier relationships than parts catalogs and can be a first step toward reconfiguring value networks with “App Store simplicity” as described in the vision for Industry 4.0, an initiative that started in Germany that is being adopted in many countries around the world. The German government saw this trend towards markets of one and wanted to maintain or even expand upon their strengths in complex manufacturing. While their vision did not call it “agile” that was clearly their intent. You cannot profitably serve markets of one without supporting the dynamic changes necessary to evolve your products to respond to market requirements. At the same time, your PLM solutions and strategies must also support this dynamism. That is why, based on CIMdata’s research and consulting engagements, many companies are looking to update their legacy PLM solutions with up-to-date offerings so they can meet these challenges.

Conclusion

CIMdata is already seeing the benefits of PLM-enabled digitalization in a range of industries. The trend towards smart, connected products is driving a lot of these changes. Companies need new processes and tools and their existing PLM solutions are not up to the challenge. These old systems focused on CAD data management of mainly discrete products. These legacy systems must give way to solutions that can truly support the product from idea through life. This means orchestrating data and processes that span discrete components, electrical/electronics, and software. Requirements management can benefit firms in a wide range of industries, but it is an “acquired taste” that must be nurtured and supported with solid tools. Configuration management becomes even more important as product complexity increases. Using standard components can help but dynamically changing products require dynamism in the supply chain. It must be easy to tie global commerce networks into product development and procurement processes that span PLM and ERP. Companies that had difficulty transforming their engineering Bill of Material (EBOM) into a manufacturing BOM (MBOM) now have to worry about following products through their useful life, keeping their as-

maintained BOM current to maximize the profitability of their after-sales part supply and services businesses.

This is just the beginning. Enabling digitalization requires enabling end-to-end connectivity and lifecycle optimization across different disciplines and spanning the value chain. As companies become more skilled in the new capabilities needed to create and leverage smart, connected products, more use cases and business models will emerge. Of course, technology itself is not the whole answer. Our consulting experience proves that any new approach must simultaneously consider organizational goals, corporate culture and work processes, as well as technological changes.

But companies' must be prepared to evolve their PLM solutions and strategies. CIMdata believes that modern PLM solutions and strategies are essential to meet these market challenges. Unfortunately, many companies rely on an aging PLM infrastructure that is just not up to the task. A recent CIMdata survey confirmed what CIMdata sees in our consulting engagements all of the time. The vast majority of discrete manufacturers have PLM solutions in place that are over 10 years old. These solutions were not designed to support today's requirements. If companies want their organizational agility to match the ever increasing market velocity a new approach is required, one based on modern PLM solutions and practices.

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.