

Enhancing Customer Alignment for Complex Manufactured Products

CIMdata Commentary—Sponsored by Infor

Key takeaways:

- *In today's highly competitive landscape, manufacturers must do everything possible to attract new customers and maintain loyalty among existing customers.*
- *Product lifecycle management (PLM) focuses on managing the intellectual assets generated from idea through end of life. Enhanced PLM strategies and enabling solutions can ensure that customer requirements are addressed at every development stage.*
- *Configure-Price-Quote (CPQ) solutions can leverage PLM-managed information to enhance the buying experience, while ensuring that only profitable quotes are put in front of customers.*
- *Empowering digitalization requires enabling end-to-end connectivity and lifecycle optimization, while recognizing that this new approach must consider organizational, cultural, and technological changes.*

Introduction

Life used to be much easier for discrete manufacturers. Their competitors were mostly local, as was their value chain. Their products evolved to meet market requirements but at a more leisurely pace. They could build brand loyalty through superior products, top notch service, or on some other criteria specific to their product and market. Fast forward to today, where competitors can arise from any corner of the globe, as can their value chain partners. Companies have to compete ever more fiercely to keep existing customers and attract new ones. Products change much more frequently and are increasingly tailored for specific market niches. Social media can create brand loyalty and destroy it just as quickly. Companies also have to be more innovative in creating and packaging their offerings to attract new customers and delight existing one. Of course, product innovation is essential, but companies also build brand loyalty by innovating on terms of engagement, like generous shipping and return policies. Clearly free shipping makes Amazon Prime an easy choice for people who like to order online.

The movement toward smart connected products has caught many manufacturers unprepared. CIMdata works with many discrete manufacturers that have product lifecycle management (PLM) strategies and enabling solutions in place. However, companies still struggle with effectively managing product development for their discrete components, let alone adding the electronics and software and/or firmware to make them smart. Getting them connected is somewhat easier, with standardized components readily available, but then what do you do with all the data? Companies need different systems to collect and manage the data and analytics skills to make sense of it. How do you deal with your products now being part of systems where you need to understand their collective behavior? Many companies are turning toward systems engineering, including developing formal requirements and doing complex 0D and 1D systems modeling to support concept development. Based on recent CIMdata research, many discrete manufacturers rely on legacy systems in place for more than 10 years to manage data and processes. These older solutions were just not designed to support this range of capabilities. Their existing processes and systems cannot keep up. Companies need

to expand their PLM vision and look to more up-to-date solutions enabling new processes based on industry best practices.

Leveraging Digitalization to Provide More Value

CIMdata defines PLM as a strategic business approach enabled by a range of technologies which are, in part, a function of the type of product concerned. Discrete manufacturers will use mechanical computer-aided design (MCAD) solutions, often more than one. They may use computer-aided manufacturing (CAM) solutions if they need to cast, form, or machine their components. Simulation and analysis (S&A) tools may help with virtual testing and, increasingly, early concept evaluation using virtual product representations. If you are making smart products you will need electronic design automation (EDA) and/or electronic computer-aided design (ECAD) solutions to design the chips, boards, and interconnections. You will also need product software lifecycle management tools like application lifecycle management (ALM), DevOps tools, software configuration management, etc. If your product has formulated components, like food and beverage, pharmaceuticals, and medical devices, you may need a formulation-centric PLM solution that understands ingredients, recipes, and specifications. The backbone of most PLM implementations is an enterprise-grade data and process management solution or collaborative Product Definition management (cPDm) solution in our PLM definition.

Product lifecycle management (PLM) focuses on managing the intellectual assets generated from idea through life, as illustrated in Figure 1. Different actors in the lifecycle use different tools and collaborate in different ways, all generating different types of information and intellectual property. CIMdata has described this associative data store as the “Bill of Information” (BoI) for decades, almost as long as we have focused on PLM. Today, people use the phrase “digital thread,” an associative data store collaboratively built across the lifecycle, spanning ideation, design, engineering, manufacturing, and deployment. Industrial companies are starting to see the value of the digital thread, particularly to help define and leverage digital twins, virtual representations of physical products or systems, that can be used to support product development and after-sales support. A recent Gartner study claimed that nearly half of companies pursuing an IoT strategy, common for companies selling smart, connected products, are either using or plan to use digital twins in 2018.¹ Respondents planned to collaborate on digital twins across the value chain with the results configuration managed over time.

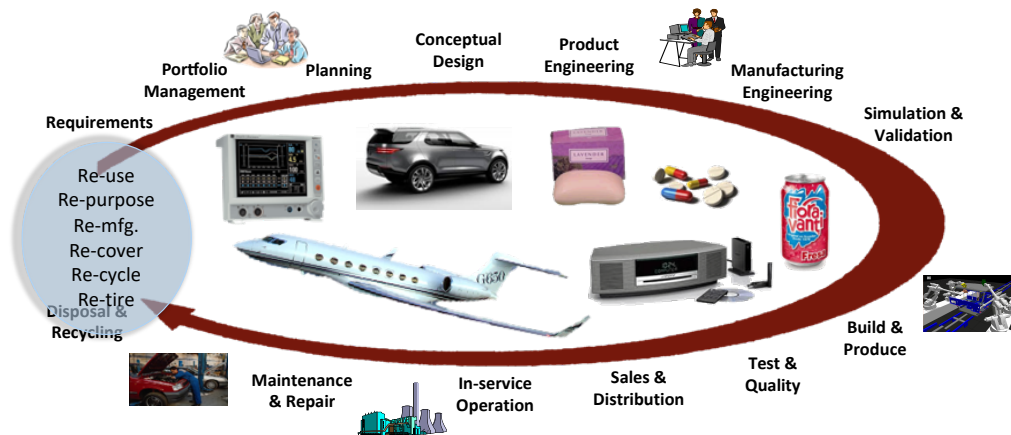


Figure 1 – The Digital Thread Spans the Product Lifecycle

¹ <https://www.gartner.com/newsroom/id/3868363>

CIMdata and many others have advocated for the adoption of PLM strategies and enabling solutions for many years, looking to support digital assets that can be quickly leveraged by product companies. Increasing speed and agility through digitalization is today's hot buzzword that promotes digitalizing business processes across the board, supporting new products and business models. Digitalization strategies for product companies must leverage this digital thread to help speed development of today's smart, connected products and help ensure they surpass customer expectations.

How are companies leveraging PLM and digitalization to provide more value? With advanced PLM solutions to help manage their processes, manufacturers can better manage the entire development cycle, helping to ensure customer satisfaction. Many companies are looking to get more agile in their product development process, looking for opportunities to rapidly evolve products to meet specific market needs, often to localize products for new markets. One way to update products is through technology insertion, that is, planned integration of a set of related technologies. An easy example is adding technology to make something connected, adding that product to the Internet of Things (IoT). The devices needed to achieve this feat are inexpensive and often packaged together as a module or building block that can be easily added to existing products. How do you find the right supplier? In today's global economy, global commerce networks can provide one part of that agile solution, helping to rapidly integrate value chain partners and their products into your companies processes and products.

Another key area is configuration management. Companies are looking to profitably tailor products to niche markets. This requires tools to help your product experts define your products and buildable variants. The conversion of the "as-designed" engineering bill of material (EBOM) to multiple variant "as-built" manufacturing bills of material (MBOMs) is a non-trivial problem but an essential part of ensuring you are building profitable variants of products. People want it their way, and many will pay extra for it, and stay with you because you can meet their specific need.

Some product companies are looking to a new class of enterprise system, configure-price-quote (CPQ) solutions, to help ensure that new business is both feasible and profitable, while helping to better align with customer requirements. Recent Gartner research claimed that the CPQ segment averaged 20% growth in the last few years and that rate is expected to continue until 2020.² Having strong configuration management practices are a prerequisite to leveraging CPQ solutions that go beyond just building configurations to employ engineering and enterprise data to quickly develop profitable bids. The goals are both to speed and simplify the buying experience as well as to ensure bids are profitable. Rapidly producing quotes can also result in higher sales productivity. These systems also make it easy to put special pricing and offers in front of the customer at the point of decision. The associativity of intellectual property is a common PLM mantra, and quotes need to be configured just like the products. Quickly delivering higher quality quotes can lead to higher close rates and increased revenues. This can improve sales productivity and reduce the need for deep expertise in product configuration to develop quotes. Many companies have to iterate between sales and engineering to produce a final bid, so doing much of this work automatically can be a benefit. In addition, only processing valid orders reduces back office overhead staff and costs. Depending on the solution these bids can be delivered in multiple media, including mobile, which can be a boon to the sales team. All part of building a good relationship with customers.

There are other ways of using managed data to enhance the user experience. Visualization has long been a part of most companies PLM implementations. They are now looking beyond

² <https://www.gartner.com/technology/media-products/newsletters/fpx/1-3JR0N84/gartner.html>

just visualizing virtual products during development to deploy virtual reality/augmented reality (VR/AR) technology to let prospective customers experience their new car, plane, building, or furniture before they buy (or often before it is fully designed). How better to align with what your customer wants than letting them experience it for themselves? Companies like Mercedes are applying their PLM managed data far downstream, creating applications for first responders. They can use their mobile devices to augment an accident scene with the internal components of a Mercedes car, helping to reduce the risk that first responders cut or pry in locations that might be dangerous.³ Efforts like these can give customers peace of mind, one part of Mercedes brand identity.

Conclusion

In today's highly competitive landscape, manufacturers must do everything possible to attract new customers and maintain loyalty among existing customers. Part of acquiring customers and keeping them is continuing to delight them with your bundle of products and services. Your offerings are defined, in part, using PLM strategies and enabling solutions that manage the intellectual assets generated from idea through life. CIMdata's market research, confirmed in our consulting engagements, suggests that a large percentage of industrial companies rely on legacy solutions 10 or more years old to power their product development processes. New requirements, like for smart connected products, require more up to date, enhanced solutions that can help ensure that customer requirements are addressed at every development stage.

CIMdata is already seeing the benefits of PLM-enabled digitalization in a range of industries. One current success story is the application of CPQ solutions that can enhance the buying experience while ensuring that only profitable quotes are put in front of customers. Companies are also leveraging managed information to apply AR/VR to business problems like virtual market research to 3D work instructions. We believe this is just the beginning. As companies become more skilled in the new PLM capabilities needed to create and leverage smart connected products, CIMdata expects to see more use cases and business models that will help delight customers and ensure their continued loyalty.

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.

³ <https://techcrunch.com/2016/07/27/ar-in-mercedes-benzs-rescue-assist-app-gives-first-responders-an-inside-look/>