Navigating Product Lifecycle Management

Implementing product lifecycle management strategies can be intimidating at first glance, but it's also necessary. Here's why and how you should implement a PLM strategy of your own.

Alex Cannella, News Editor

If you're on the outside looking in, product lifecycle management (PLM), or the process of organizing and directing a product's production from its inception to its disposal, can be a daunting topic. PLM strategies could be as simple as database management software or utilize cutting edge technology from the Industrial Internet of Things (IIoT), but it's all designed to accomplish one task: to give a company an established, coherent plan for designing and manufacturing their products and ensure all elements in a company, from marketing to production to service, are working in tandem to execute that plan.

That can be intimidating. Adopting PLM products alters how you operate as a company. It requires forethought to implement and changes in habit and policy to maintain. And at first glance, it may not seem important for a parts manufacturer, either. It makes sense to organize and coordinate efforts to build a car, which is made up of hundreds of complex parts, but someone might question whether the same is necessary for simpler products.

However, PLM is important for manufacturers of all stripes, and it offers the same advantages for parts manufacturers as it does for those who make finished products: better organization, consistently higher quality and faster turnaround.

"Manufacturers should consider utilizing PLM," Bill Lewis, global marketing director for Teamcenter, Siemens' main suite of PLM solutions, said. "They are generating enormous amounts of information about their product and processes. Digitalization of this intellectual property and the processes that generate and capitalize on it help to increase speed to market, improve risk mitigation and enable informed product decisions. If they are trying to manage things with excel, and email, and on shared drives, it doesn't take long for that to become overwhelming. PLM helps reduce the complexity and ensures the right information is communicated to the right people."

Kevin Wrenn, divisional general manager of PLM and ALM segments at PTC, agrees. "Even if you're not the ultimate company that delivers to the customer, PLM is impor-

tant for seamless collaboration," he said.

Both Siemens and PTC offer comprehensive software packages that allow you to organize your company's data and processes. Both are also starting to come out with IIoT-inspired products. PTC has developed a number of ambitious utility products, while Siemens is developing their MindSphere IIoT operating system.

Adopting PLM products can put a wealth of easily accessible information at your fingertips.

According to Wrenn, the future of product lifecycle management is in data analytics. Specifically, analytics based on data gathered in the field. Up until now, the "lifecycle" part of product lifecycle management ended once the product was shipped out the door, but IIoT technology is giving manufacturers the ability to truly monitor and improve their products for their entire lifetime, and that's changing the game.

"What's happening to [a lot of our customers] now is they're being forced into the field of digital engineering because their products can now be connected throughout their entire lifecycle," Wrenn said. "Where we used to talk about product lifecycle management, just like our competition did, where it starts from ideation and, for all intents and purposes, ends when it ships off the factory floor, now we're saying 'well, you can truly do product lifecycle management throughout the entire life of the product because you can stay connected to it.'"

Wrenn attributes this extension of a product's "lifecycle" largely to one of the many advances that fall under the IIoT umbrella: the advent of sensors that can monitor and transmit product information back from the field. While these sensors are often used to monitor the state of machine and

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provide early detection of any problems with its inner workings, Wrenn sees an opportunity to take that data, gather it, and implement the resulting findings in future products' design iterations.

Sensors are giving manufacturers everywhere unprecedented insight into, and by extension, control over, their products. Just being able to monitor a product in the field while it's being used offers a host of new information that can be turned around and used to improve the product. Manufacturers can discover unexpected weak points that they can shore up in future design iterations, analyze trends in how their customers utilize a particular product and build additional features to support those trends or, in some cases, even discover unexpected uses for their products in the field that open new marketing or design opportunities.

Much like any other company will have to, PTC has adjusted their strategy to incorporate some of the new, increasingly prevalent tech coming out of the Industrial Internet. The business has merged its ALM, PLM and CAD efforts together in a new drive that it's dubbed "The Digital Engineering Journey."

"It's a way to guide clients into the era of digitization now that they can design smart, connected products and systems," Wrenn said.

PTC's Digital Engineering Journey is a model of the direction the PLM industry might move in. Faced with the glut of new information IIoT technology provides, PTC isn't just developing new ways to help other manufacturers implement new PLM techniques, they're using it for tracking their own products, as well, and creating a roadmap for other companies to follow in the process.

"[Say] we designed some features into our products," Wrenn said. "Is anyone using them at all? Are they using them in a tighter range than we designed for, so we have a value engineering opportunity? Or are they using it out of range, therefore we have kind of a quality problem? So it's the idea of en masse, can we analyze product performance data to figure out value engineering opportunities or sniff out quality issues we have in the field."

Now, obviously, software lends itself a bit more readily to a PLM strategy than a motor might. These days, all you need to do to get a new, better version of your software out there is to upload it and let everyone download it overnight. But don't let that dis-

suade you; you can still incrementally improve and reiterate upon old designs as you get new information. While old customers may not line up to get your tweaked bearing or your updated motor, those extra iterations improve overall product quality and bring additional value and functionality to entice new customers with.

Outside of their more data-driven IIoT products, PTC is also offering other Industrial Internet-inspired solutions that take a normal design review into an environment where people can be immersed in that design whether or not they are in the same room. For example, they're working on a product that utilizes augmented reality (AR) technology (stuff like Google Glass) to give workers out of the office more information during conference calls. The idea is that when one member of the team can't be there in person or two teams in separate facilities need to put their heads together, they can still use PTC's AR product to see digital avatars of others in the conference room and even inspect and interact with virtual blueprints of a physical product, which allows them to highlight and focus on individual systems or parts of the model. It's not entirely unlike a one-way version of Star Wars' holograms. Just don't expect to pop up in the room as a blue mote of light.

Of course, somebody has to make those blueprints before they can be interacted with, and that's what PTC's Digital Twin feature is for. The idea behind the Digital Twin concept is to make a purely electronic version of a product. For example, you sell a motor. That specific motor gets a digitized version that essentially acts as a record of everything that has happened to that individual model. If it breaks down and gets repaired in the field, or it gets sent in to be rewound, that gets marked in the digital twin. It serves as blueprint, case file and, when looked at alongside other twins, another form of data analysis all in one.

Meanwhile, Siemens is developing MindSphere, a cloud-based IIoT system that brings Siemens' high-end analytics and applications to bear.

"MindSphere is Siemens' open IIoT operating system that
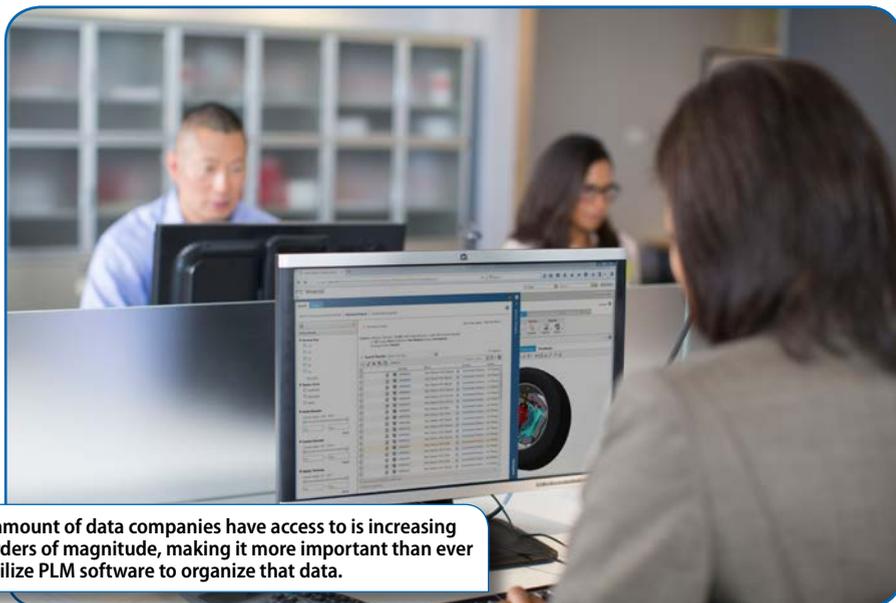
The amount of data companies have access to is increasing by orders of magnitude, making it more important than ever to utilize PLM software to organize that data.

is used to bring real world product performance data back to be merged with the digital twin to support predictive analytics to improve products and support," Lewis said.

According to Wrenn, most companies wait until they "start to see problems in product development, in cost of goods sold, or in quality." But the flood of fresh data that many manufacturers now have access to is impossible to go through by hand. In order to take advantage of all that information, a strong PLM program that can sort through it all is more imperative to remaining competitive than ever.

"We say that the Internet of Things is going to cause a lot of manufacturers to start to clean up their digital life. This is the time for people to really take their digital strategy, inclusive of CAD, ALM and PLM, more seriously," Wrenn said. "The requirement for winning in the world of IoT is being digital."

So let's say you're convinced; it's time to start a PLM program. What are your options? Where do you start? According to Wrenn, you've got a number of options. You could go wild and go for the full makeover, which has worked for some companies in the past, but is also expensive and most likely disruptive. The safer route is to incrementally implement PLM strategies into your business.

"Probably the most common one is for people to wade their way in functionally," Wrenn said.

Working this way, manufacturers often start with one step of their process, be it developing their CAD program, managing bill materials, or something else entirely, then implement PLM best practices and technology across the entire company for just that single step. Once you've comfortably implemented one step, you can look elsewhere and slowly go through your entire process one function at a time.

Another way is to use the same incremental implementation, but go by product instead of manufacturing step. Pick a single product line and utilize PLM in every step of that line's manufacturing process. Then, after you've seen the results, think about doing the same with other products until you've covered your full portfolio.

Each process has worked for other companies in the past, but according to Wrenn, the best path forward is usually self-evident once you sit down and take at a look at your business. Look for pain points or areas in your process where you struggle or, alternatively, opportunities you want to follow up on. Once you've established your strengths and weaknesses, figure out which you want to address first, then find the PLM solution that fulfills that need.

Lewis also feels that most companies can find one or two obvious places to start if they focus on where they're struggling, looking for processes that need shoring up. But if you're still coming up short after some soul searching, Siemens can probably point you in the right direction as you strategically plan your transition into the digital world. They have experience working with businesses in the energy, transportation and industrial machinery sectors to implement PLM strategies and have a good idea of what's worked and what hasn't.

"We've worked with a lot of companies, and realistically, we can point to where they can probably find problems, inefficiencies, and so on...This is a guided adoption because we've developed best practices based on how hundreds of companies have achieved success," Lewis said. "So, with guidance, we can point out where we can improve processes, where we can expect savings, etc.

"There are some logical places with which it makes sense to begin. Getting processes and key data under control. You know, some of the primary IP for a product is the product's bill of materials, the engineering documentation, the CAD definitions, and so on. Getting that under control gives companies a great starting point to begin extending the value of their PLM system upstream and downstream.This is exactly how we envision people adopting Teamcenter, starting with getting some key things under control, and expanding from there. With the

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With a PLM database centralizing your data, it's easier to make sure that everyone in your company is on the same page.

digital backbone in place, you can build on to it with deeper domain solutions such as systems engineering, ALM, cost management, product validation and verification, etc., or extend the lifecycle with service lifecycle management expanding the knowledge in your digital twin as makes sense for your company."

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Getting your company's data sorted out first makes sense. Having a single, centralized knowledge base that the entire company can access creates a foundation that makes it easier to implement other, more complex PLM products such as some of the ones PTC offers. One challenge that manufacturers might wrestle with, however, is what to do with their legacy data. When putting together a PLM program, it might be difficult to sort through all the unorganized data you already might have lying around, but both Wrenn and Lewis agree that it's worth it to use legacy data.

"What we probably see more of now is a migrate-on-demand scenario," Lewis said. "So, leave the legacy data where it is. New programs or projects start in PLM. Then, when some legacy data is identified as being needed, it gets migrated and carried forward in the new PLM system. This way, we are only spending resources on migrating what we need."

The most important thing to remember is that your PLM program can always be expanded. Even after establishing a solid base and some best practices, there will always be more opportunities to seize and more capabilities to invest in.

"Many use [PLM] already, but often they are only using portions of it," Lewis said. "There is a lot of opportunity out there to leverage PLM both upstream and downstream in their processes."

And if the new implementations at PTC are anything to go by, those opportunities will only multiply. How much you take advantage of PLM products is entirely dependent on how far down the rabbit hole you decide to go. Once you get started, there will always be a breadcrumb trail to follow, and the question will eventually become: how far will you pursue it? **PTE**

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