Your PLM Ecosystem:
The Value of Community

Schnitger
Corporation

In Brief

Innovation powers your business. You need to turn new ideas into products and services that your customers want, and you need to do it faster than your competitors.

The Boston Consulting Group[1] found that best-in-class companies innovate effectively and drive business benefit throughout the product life cycle. Average companies see just one successful new product for every 3000 new ideas while best-in-class companies are six times better at getting their new products to market. BCG found that best-in-class companies

- generated more ideas than average companies
- eliminated more bad ideas before investing in full-on development
- discover and systematically re-use best practices to drive innovation processes.

As you might imagine, best-in-class companies also saw much greater business benefits from their innovation investments.

In order to move faster, be more creative and gather the data that proves whether a new idea is good or bad, you need an innovation platform you can rely on, one that is proven, extensible and open. In this brief, we'll examine powerful strategies to help you

- get the most out of your existing investments in technology
- minimize risk and investment while maintaining flexibility
- grow your capabilities, if and when you need to

and suggest five things to consider as you evaluate your engineering software options. But before we begin, a little background.

The Software Ecosystem

Software buyers usually face a choice. Should they buy a reasonably comprehensive suite from one supplier or cobble together best-of-breed point solutions? Suites simplify the business relationship and provide a common architecture but not all solutions may fit the buyer's specific needs. Best-of-breed means developing business relationships with many suppliers and solving integration problems, but may better meet detailed specifications. In reality, most buyers must work with a combination of the two, such as when legacy systems that need to interface to new additions.

A new approach is to look for software ecosystems, where one supplier creates a platform and solutions that are extended by partners. Think Apple iOS, where Apple creates the platform and some apps, but many other partner companies add their own intellectual property to make an iPhone a must-have. Engineering software providers have long relied on ecosystems to provide users with tools outside their technical domain: CAE or CAM for CAD, and visualization technology for CAE are just two examples.

These ecosystems are built on relationships—technical and business. The platform vendor creates the links, interfaces and processes that connect complementary providers. In return, the value of the platform is enhanced with new functionality that multiplies the investment in programming interfaces (APIs) and partner toolkits. Partner point solutions are introduced to a much wider market than the partner could reach on its own. Each company focuses on its core solutions and target customers, bringing to market the sophisticated solutions these customers demand.

Of course, each ecosystem is only as strong as the products it creates. By spreading the load across a larger group of participants, all of the the companies in the network are able to take more risks, explore new technologies and concepts. and work collaboratively on new ideas. The result is greater innovation, more quickly.

The most important attribute, then, of a successful ecosystem is the willingness to let go of "not invented here". Companies must replace closed architectures with open ones to encourage broader participation. Intellectual property (IP) becomes more valuable when it is reused and connected to complementary IP and to services built around that combined IP portfolio.

Today's successful ecosystem partners shift the focus of innovation outward, from their internal R&D to a network that includes external software developers, service partners, competitors and users.

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[1] https://www.bcg.com/documents/file15063.pdf

Ecosystems Create Consistency and Confidence

How many software products does your team use? One company has over 200 separate design, engineering, manufacturing, simulation and PLM products —some because they fill a specialized need and others because of legacy purchases and inertia. This company created (without really planning for it) a best-of-breed solution set and now manually re-keys data from one app to another, and has built or bought interfaces for point-to-point connections in other cases. There's a huge potential to introduce errors and delays in this situation. This doesn't need to be the case — they could be faster and error-free with a more integrated solution.

PLM vendor ecosystems bring together products and services from multiple suppliers. They create more complete solutions for customers, with complementary investments by partners in everything from CAD add-ons to visualization to new hardware platforms. External partners enable PLM software suppliers to quickly respond to new technologies, address new markets and standards, and come up with creative new solutions by cross-pollinating from other industries. It's also possible that these technologies could come to market at a lower R&D cost. Faster, more comprehensive and cheaper.

As might be expected, there are levels of partnership, from press release to true cooperation. From the customer perspective, least valuable is when two companies issue a statement that they are working together. They may coordinate market-facing activities but do no real technical work to integrate their products. At the other end of the spectrum is true collaboration that moves their joint offering forward more comprehensively than either partner could do alone. They share product roadmaps to align how they will meet emerging technologies and customer expectations, standards compliance and operating system changes. They cross-train their teams so that each understands the value proposition of the other's product to best address customer benefits. And they may present a joint face in sales and service situations, where they need to address requirements that span their solutions.

For customers, there is no question that a well-integrated solution set provides consistency, predictability and confidence, especially for those without the resources to handle connectivity and data migrations between apps. Partners apps usually meet supplier-set standards for installation, functionality, design architecture and feature support— all to reduce technical support issues and raise the "certainty" bar within the PLM ecosystem. In most programs, partners certify that their products

- enable consistent connections between their app and the platform
- maximize the value of PLM data by serving it consistently to the next apps in the product creation process, and
- protect the value of a PLM platform by extending it beyond one vendor's boundaries.

Customers also benefit from behind-the-scenes business coordination. Partners position their products in the overall offering, which makes it easier to explain them to customers — *that* enables customers to compare offerings against one another. Too, depending on the technologies in question, partners may create new business models to speed adoption and meet customer needs.

Strong partner networks provide both security and room to grow. End-users often evaluate not just the size of a potential vendor's partner network but also its breadth and depth. Are the relationships real or paper? Do they extend into the directions my applications may need to grow in? How many choices are there within the network for these technologies? Prospects look for suppliers that are part of an ecosystem they use or plan to use, and especially if they integrate with current platforms. A thriving ecosystem takes a platform from somewhat static to one that is constantly growing and evolving with new offerings.

So, if a partner network can give customers access to advanced, quality products that extend your power to be innovative, how do you investigate this in your PLM vendor selection process?

By asking your provider these five questions:

1. How will your platform meet our changing needs?
2. How open is your platform?
3. How do you do business with partners?
4. Are companies A,B,C in your partner program today?
5. How is the partner program growing, changing?

We'll elaborate on each question in the following sections and provide examples of partners and technologies that are great examples for each case. Then we showcase one ecosystem, the Siemens PLM Software and Technology Partner Program, that gets much of this right.

#1: How will your platform meet our changing needs?

This is an important baseline question and a strategic criterion for your overall PLM implementation. As your business grows and changes, so will your software needs. Adding more complex or engineered-to-order products, doing more simulation, and working with a larger supply chain will all affect your technology needs and highlight your need for an open and extensible platform.

You should get a sense that the supplier looks at the technological landscape the same way you do, and is building a framework that can adapt.

You want to understand any architectural limitations that may affect future flexibility. You'll want to hear them talk about openness, APIs, toolkits and the technical support they provide partners to ensure that solutions are well integrated.

You may also want to consider how adaptable your supplier is to changing business models. Are they willing to consider subscriptions or other pricing to leverage cloud computing and other emerging models?

You're looking to the future, so be sure your vision and the supplier's are aligned,

Case in Point

Rescale makes a software platform and hardware infrastructure that enables your apps to run in the cloud. The ScaleX platform ensures that customers have access to the latest hardware and software to meet their needs, which may be on-demand simulation compute cores or cloud storage. Rescale tunes and optimizes products like NX Nastran, NX Thermal, and NX Flow for different hardware platforms, to deliver turn-key systems on pre-tested configurations. Rescale work closely with Siemens PLM Software on product planning and strategic roadmaps to create tightly integrated, easy-to-deploy solutions.

But it's more than hardware/software, says Rescale CEO Joris Poort: the partnership also extends to the business model. Cloud computing is often considered to be an extension of a company's on-premise hardware. Need to run a simulation more quickly than your installation can manage? Use extra CPUs in the cloud. Need more storage than you have? Cloud. Want to run a very complex, multi-domain analysis? Cloud.

Cloud solutions require software companies to come up with new business models, so that customers have access to the software licenses they need for these peak demand situations. Mr. Poort says that Siemens was keen to explore how customers could benefit from both the cloud technology and a more innovative business model, and works with Rescale and channel partners to make licenses of its products available on an hourly basis. Rescale does the hard work, metering and invoicing, so that customers get a single bill to cover their hardware and software usage in a period.

The end result? Rescale customers can run more simulations, more quickly and with more flexibility, which leads to dramatically faster product development. And *their* customers get better products because more use cases were simulated.

PLM ecosystems are dynamic and must evolve to keep pace with both new technologies and the changing business models they require.

#2: How open is your platform?

This gets at the heart of interoperability and extensibility for partner solutions. If the platform is open, it offers technology toolkits and adheres to industry standards to make it easier to integrate third party applications and data. At a technical level, this minimizes data translation issues so data moves smoothly between apps. At a business level, it reduces risk —no manual data entry errors, no risk of data that can't be moved forward— and improves visibility into the apps and the process.

You'll want to hear about APIs, service oriented architectures (SOAs), published data models and specific integration to products you know you need (like office or enterprise apps).

You're also looking for terms like open data and open architecture, which are IT design methodologies that mean that data that can be re-used by apps other than the creating one, and infrastructure that is designed to make it easy to add, upgrade and swap components.

"Open" isn't easy to define but you will know it when you see it. "Open" enables you to integrate solutions that meet your needs, on a standard platform. Its opposite, "closed" can generally be seen when a vendor wants to sell you a complete solution that is difficult to customize to your needs by adding components from other vendors. You're looking for "open".

Case in Point

ANSYS Inc., the engineering simulation company, aims to help customers derive insight into their most complex design challenges, and predict how their products will function in the real world. ANSYS's comprehensive platform of multi-physics and systems simulation tools help create some of the most complex and innovative products in the world — many of which are managed using Siemens PLM Software products.

ANSYS has been a Siemens PLM Software partner for many years, even though they offer competing products in certain areas of product design. The relationship speaks to the reality that many customers cannot rely on one vendor to meet every design and engineering need. Companies use ANSYS simulation technology alongside Siemens PLM NX, Solid Edge or Teamcenter, and the suppliers work together to maximize the value customers derive from the combined assets.

Stig Panduro, Director of Partner Ecosystem at ANSYS, says that the most important element of the two companies' relationship is to pursue good interoperability between products to our mutual customers benefit: "Our interfaces with Solid Edge and NX work well because both companies have an interoperability mindset and an open platform that allows it to be done. Through the partner program, we get API access to Solid Edge and NX that allow us to develop an integration of our products with those CAD platforms. The quality of the joint solution that ANSYS is developing with technical support from Siemens is meeting the needs of the customer base."

#3: How do you do business with partners?

Here, you're looking for an indication that the vendor is interested in doing business with third parties. You want to see a culture that welcomes innovation from outside the corporation, values joint successes and, as we just saw, offers platform access to competitors.

You also want to learn how the companies work together. For example, do the partners have access to platform product road maps so that they can coordinate R&D efforts? Are their enhancement requests expedited? How far ahead of release do they get a version to test for compatibility and to start training?

Try also to understand how healthy this ecosystem is. Are the individual companies thriving? Are they releasing new products or milking legacies? Are new companies entering the ecosystem? You want a partner network that has a strong platform provider, but you also want the smaller partners to be doing well.

The software and technology partner program should be vibrant, and it should be big enough to cover the technology you use now and what you see yourself being interested in implementing in the next few years. You should recognize many of the names and at least some should cover the current buzzwords, like cloud and 3D printing.

Case in Point

CADENAS's software is used to strategically manage parts in an enterprise—optimizing purchasing and engineering to reduce duplication and cut cost. CADENAS has been in the Siemens PLM Software & Technology Partner Program for years, tightly coupling its Strategic Parts Management product, PARTsolutions, with Siemens' CAD and PLM solutions. PARTsolutions offers direct access to millions of parts from more than 600 certified standard parts catalogs, with CAD models available in JT, Solid Edge and NX formats.

To understand how PARTsolutions is integrated into the Siemens PLM platform, consider this: Designers select components from the part families identified for the project from within NX. Once selected, native CAD geometry is generated on the fly for use in the assembly. If the project is managed with Teamcenter, PARTsolutions is embedded within Teamcenter for part naming and numbering and other defined workflows. Design work happens in NX; searching and selecting vendor parts in PARTsolutions with an NX/Solid Edge look and feel, and overall management in Teamcenter.

This level of integration and interoperability can't happen without strong and continuous collaboration between Siemens and CADENAS. Walter Leder, Sr. Vice President, CADENAS, says the two companies work well together: "Each partner plays out his own particular strength. If the partners are well-networked at a technological level, the individual puzzle pieces result in an overall solution which is 100% coherent. A very close, cooperative partnership is a win-win situation for the suppliers and the customer because we can offer an optimal solution, which in turn is decisive for customer satisfaction. In the best case, the customer will not even notice that there are different solution providers. He gets a solution from one mold, making his every day working life a lot easier."

This is an example of a partnership that continues to evolve, based on a strong technical foundation.

#4: Are companies A,B,C in your partner program today?

Ask here about your most critical innovation tools. You'll want to understand whether they are part of the program and try to gauge how the relationship works — is it name-checking, a partnership on paper alone, or is it real, with shared work?

At best, all of the companies on your list will be valued partners, at the highest level of cooperation. More realistically, you'll need to decide if the companies that are not currently formally partnered have an informal relationship that can help keep them up-to-date on technology develop-ments, while you do any necessary integrations. Not all companies can partner but you should be able to find a workable solution.

Try to ensure that your most-critical partners are in the network, but also look at your wishlist, the technologies you're thinking about implementing in the next few years. Are they part of the program? Does that create an advantage to you? Might you move up your deployment of these solutions because the advantages are so strong?

Case in Point

Lattice Technology makes it possible to spread engineering data into the rest of the enterprise, to people who don't do CAD. The company is perhaps best known for its tools to create 2D and 3D technical illustrations, Lattice3D Studio, which converts CAD files into a compressed visual format, from which animations, exploded views, cross-sections, spare parts catalogs and other views can be created. Downstream, Lattice3D Players let users view 3D data files as well as measure distance between components, do cross sectioning, and play animations and other data visualizations.

These derivatives from CAD need to be managed, and kept in synch with the CAD models. The Lattice3D Studio Connector for Teamcenter and the Lattice3D Publisher Connector for Teamcenter allow users to create, update and publish technical documents based on an NX 3D CAD model, Lattice's XVL format or the JT data standard, along with business data stored in Teamcenter. The Connectors are accessed from Teamcenter, letting users easily move back and forth between Teamcenter and Lattice3D environments.

Bill Barnes, General Manager of Lattice Technology, says that these solutions simplify making work instructions but have the biggest impact on companies that make large, complex products. "Lattice3D Studio Connector for Teamcenter lets users create step-by-step work instructions that are easy to understand because they include detailed illustrations or interactive 3D directly from the CAD model. Even when a work instruction is hundreds of steps—say for a very large assembly of hundreds or thousands of parts— it is ultra lightweight and accurate, so loads very, very quickly." How light? Often 1/2 of 1% of the size of the CAD model, according to Mr. Barnes.

This kind of fidelity and interconnection can't be done without close cooperation between the partners. Lattice Technology leverages Open toolkits, published data models, API access and other technology to create tightly integrated solutions that enable concurrent workflows, so that the visual model remains linked to the native CAD mode. This means illustrators can easily update their work when the design, the CAD model, is updated.

Mr. Barnes says that these interactions need to be transparent, invisible to users. Opening a visual version of an NX model is now the same as opening the NX model. He gives a pat on the back to Siemens: "The great integration tools for the Teamcenter environment removed any confusion between file formats environment. We've had great help from the top down within Siemens to make sure that we got the Connectors right."

Lightweight work instructions may not have been on your radar until now. Perhaps it's time to take a look? The ecosystem opens up many new possibilities!

#5: How is the partner program growing, changing?

Your business isn't static, and your engineering software and technology platform shouldn't be, either. There are two areas to consider here, technology and business.

Ask about how broad and deep the program is, for when you need to expand in a specific domain. Understand which competitors you have to choose from in specific categories—especially in those categories that would allow your business to explore new opportunities.

At the business level, ask about how open the supplier is to new licensing and service models. Has the platform supplier added options at the request of a partner? Is that easy or near-impossible? What services can the partner offer, and what does that platform provider hold close?

You're looking here for a flexible, open, curious partner program. They should welcome new ideas from outside their typical structure and welcome partners both large and small.

Siemens PLM Software: A Partner Network that Works

We've just seen a series of examples of partners and an ecosystem that's thriving. Siemens PLM Software, one of the world's largest PLM providers and a significant player in CAD, CAM, CAE and other engineering technologies, works with over 700 companies in its Software & Technology Partner network. These partnerships span a wide range of technologies, including computer and other IT hardware, to electronics, computational fluid dynamics and other types of simulation, to documentation and enterprise systems, to name a few. All bring their industry-specific knowledge to the Siemens PLM platform. From strategic partners such as IBM, Microsoft and HP, to established companies in other niches like AMD, to exciting new technologies that bring cloud and other capabilities — all bring innovative tools that enhance productivity and protect the investment in the platform overall.

In addition to its well-known brands, such as Teamcenter for PLM, NX and Solid Edge for CAD/CAM/CAE and Tecnomatix for digital manufacturing, Siemens brings to market component technology that underpins many other suppliers' products in design, engineering and manufacturing. PLM Component adopters build their own apps using many of the following component technologies:

- Parasolid, a solid modeling kernel that's used in CAD, CAM, CAE, AEC and GIS applications, with an installed base of over 3.5 million seats
- D-Cubed's 2D and 3D geometric constraint solvers that are used in a variety of CAD, CAM, CAE and PLM applications and is, according to Siemens, the leading market provider
- Rulestream, an Engineer-to-Order solution that's CAD neutral and is used for sales quote generation through to manufacturing engineering for many configurable products
- Geolus Search, a 3D geometry search engine that allows users to quickly find and reuse previously designed parts based on their geometry alone
- Kineo CAM, which simulates robotic movement for part assembly and disassembly
- PLM Vis, component technology for collaborative view and markup that's used to develop custom visualization applications and
- JT, the ISO standard lightweight 3D file format and developer toolkit for interoperability, visualization and archiving.

If we add together the 100 members of the JT Open Program who build commercial solutions using JT, the 700 Software & Technology Partners, the 60 consulting and system integrator partners and the 750 channel partners, we can see that Siemens has built a large, powerful ecosystem of over 1600 companies, all working together to advance customer investment in PLM infrastructure. From the Software & Technology angle alone, that's thousands of developers, advancing the state of the ecosystem every day.

Andy Swiecki, senior director of partner strategy with Siemens PLM Software says that a healthy software and technology partner ecosystem enables customers to benefit from application interoperability, infrastructure compatibility, and technology integrations. Companies join the Siemens Solution Partner Program to extend Siemens solutions and expand the value of a customer's PLM investment. Siemens supports partners by providing software, training, and a committed relationship manager. In addition to membership in the Siemens partner program Siemens PLM Software also offers software vendors PLM Component technology. PLM Components are available to all and allow for developers to quickly integrate Siemens technology components in their products.

This partner program meets many of our criteria: they firmly believe in openness and support partners both technologically and through business model innovations, as we saw with Rescale. They walk the talk, actively engaging with customers and partners, and with friendly competitors as seen in the Lattice Technology and ANSYS examples. Their component software and development toolkits support and promote partner solutions, as with CADENAS.

The Last Word

Still not sure how much partner ecosystems matter? Here are a couple of outtakes from this research, and comments from customers:

"We run NX Nastran on Rescale because our jobs are big, and our models double in size and complexity almost every year. Our computing power doesn't, so we were hitting a wall. Rescale is great because I don't have to have a cluster in the office —or the IT guys to support it— and these guys know a lot about NX Nastran, too. They really work with Siemens to make sure the application works at its peak on their system. Both technologies are good, and when you mix them together, it's a winning combination." — William Villers, Director of Engineering, TEN TECH LLC,

"The decision for a PLM system is simultaneously a decision for the add-on solutions available for it. Only PLM solutions that have the right partners can offer an attractive solution concept tailored to the customers' specific needs." — Walter Leder, CADENAS

"For us to grow, to get to that next level, we needed to be part of something bigger. We believed that for our customer base, in planes, trains, cars and ships, Siemens is the right partner." — Bill Barnes, Lattice Technology

"A vendor who is part of a partner network has credibility. We know that their product will be better integrated, make possible faster workflows, minus errors and so on — it's huge factor in our decision." — Transportation industry PLM buyer

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Leveraging Your PLM Ecosystem

When you bought your last cell phone, did you make sure that your favorite game or productivity app would work on the new phone? If so, you brought the cellphone's ecosystem into your purchasing decision.

Your PLM implementation deserves that same consideration. The first big issue is how open the platform is; a closed platform limits its future potential to what the developer can provide and makes it difficult for you to customize what you do get. An open approach, on the other hand, is an important indicator of how the company you're considering does business: it's interested in new technologies that it may not invent in-house and welcomes partners into its ecosystem.

The second concern is about that ecosystem. A strong, vibrant ecosystem on an open and well-architected platform will

- ensure the integrity of your data, enabling you to make better decisions, more quickly
- enable you to be more responsive and innovative by removing IT constraints
- future-proof your technology investment by giving you the ability to grow and adapt

To be best-in-class, you need to generate more ideas, cull the bad ones so you can focus on the good, and craft a repeatable innovation process. You can't do any of that if you're worried about whether your design, engineering and manufacturing infrastructure can support you five or ten years from now. Hop on the partner bandwagon, and learn what's out there!