

Siemens PLM Software: Building Automotive Leadership

CIMdata Commentary

Key takeaways:

- *In the automotive industry, PLM is a critical, extended-enterprise business solution*
- *Siemens PLM Software has extensive automotive domain expertise and embeds much of that within their solutions tailored for both OEMs and suppliers*
- *Siemens PLM Software is the enterprise PLM backbone for many major OEMs, providing comprehensive, scalable, and mission-critical solutions that help automotive manufacturers realize innovation*

PLM in the Automotive Industry

The effective use of Product Lifecycle Management (PLM) has become a key success factor for manufacturers in all industries. CIMdata defines PLM as a strategic business strategy enabled by information technology. It spans activities from product ideation, requirements definition, conceptual and detailed design, manufacturing process planning, quality and compliance, to in-service operations and maintenance, through end-of-life recycling, reuse and re-manufacturing. PLM supports collaboration across the extended enterprise.

As an early adopter of PLM concepts and technologies, the automotive industry has helped shape the commercially available technologies and solutions that have evolved over the past 30 plus years. Many of the largest and most comprehensive (and complex) PLM deployments are for the automotive OEMs and their extended enterprise value and supply chains. Meeting the needs of automotive manufacturers has both driven and helped many PLM solution providers expand their PLM capabilities and the breadth of use throughout the industry.

In the automotive industry, the two major factors driving PLM solution expansion are the increasing complexity of automobiles (e.g., new propulsion technologies, lightweight designs for emissions, and the expanding use of electronics and software in systems from powertrain through entertainment) and the continually increasing pressure to start and ramp up production more quickly. As a result, automotive manufacturers are often on the leading edge of PLM deployments. They require solutions that span large extended enterprises to manage the complex sub-systems of evolving vehicles and that seamlessly integrate multiple business functions—including designers, engineers, managers, and production and service personnel who need to collaborate and do their jobs more effectively.

The use of simulation and analysis (S&A) continues to grow beyond structures and crash to include thermal, vibration and noise, and system-to-system interactions, as in advanced driving assistance systems, while also simulating the user interaction and experience. Further, S&A is being more tightly integrated within the overall product development lifecycle to help drive early design optimization and related decisions, such as evaluating vehicle lightweighting options to help meet overall emissions, fuel economy, and durability targets. This requires systems level simulation encompassing all vehicle sub-systems as well as the external environment in which those systems operate. As simulation models expand to encompass both mechanical and mechatronic systems, model-based S&A will become more

important in designing and validating the complex control systems of automotive products and the manufacturing systems used to produce them.

PLM integration and interaction with and across the supply chain continues to expand and grow in importance as supply partners become more embedded in the development process to shorten time to market. In a similar manner, the integration of product design and development solutions with manufacturing systems and feedback of manufacturing shop floor information is expanding in scope and importance. Integration of manufacturing input early in the design cycle helps eliminate downstream production issues for OEMs and suppliers. The result is a clear trend to shift manufacturing decisions to earlier in the design process.

There is also a trend toward increased digitalization of manufacturing. This includes smart models (a product model that sets the objectives needed to produce itself); the digital twin (a full digital product definition that simulates reality); and optimized, distributed production (autonomous production with embedded intelligence). PLM environments of the future will need to support these capabilities as well as those already supported.

Finally, for many, PLM is becoming an innovation platform for the enterprise that enables and cultivates creativity to yield continuous improvements in products and processes. CIMdata expects this PLM innovation platform of the future to become the foundation upon which PLM functionality is delivered, information is exchanged and used, and integration with other business systems is facilitated. The PLM platform is also a key component for supporting the aforementioned digitalization of manufacturing and enabling more product-related innovation.

Key Factors in Selecting a PLM Solution Partner

With PLM being a critically important part of an automotive manufacturer's success, decisions about PLM investments need to be undertaken carefully. Several factors should be considered when selecting PLM technologies and a solution partner. These include:

- What are the capabilities and completeness of the potential partner's solutions—do they meet both current and future needs?
- Are the offered solutions tailored for the automotive industry and do they address functional capabilities and business processes from design through manufacturing in an integrated manner?
- Are automotive industry best practices embedded within the offered solutions—workflows, terminology, standards, etc.?
- What is the partner's track record on delivering their technology and solutions to automotive industry manufacturers—have they met their delivery schedules and scope of functionality with quality releases that can be easily and quickly deployed into production?
- Are the offered solutions designed and architected to enable a company to more quickly deploy, operate, expand, and upgrade their PLM environments—protecting and leveraging their PLM investment to maximum benefit?

Siemens PLM Software's Support for the Automotive Industry

Siemens PLM Software (Siemens) has a long history of investing in and providing PLM technologies and solutions tailored to all levels of automotive manufacturers. For over 44 years, Siemens has delivered comprehensive PLM solutions including CAD, S&A, CAM, PDM, manufacturing planning and visualization, to name a few. Because of their sustained

commitment to the industry, Siemens has become the PLM solution provider of choice for many automotive manufacturers.

A review of Siemens' extensive automotive PLM offerings reveals a systems-driven product development approach to product design, engineering, and manufacturing and a set of solutions tailored for automotive manufacturers that address a significant portion of their most critical design, manufacturing, and service needs. Key to their approach is integrating all aspects of the automotive product lifecycle from conceptual design through production and service.



Figure 1—Siemens' Approach for Systems-Driven Product Development

This approach is designed to help companies solve the challenges of complexity, innovation, and risk in today's automotive products and encompasses solutions for model-based systems engineering (MBSE) including software and requirements management.

To fully realize innovation, automotive manufacturers need to have an integrated, systems-driven strategy coupled with supporting technologies that address all aspects of product development and production. Siemens is providing a broad portfolio of solutions architected to work together that supports this need.

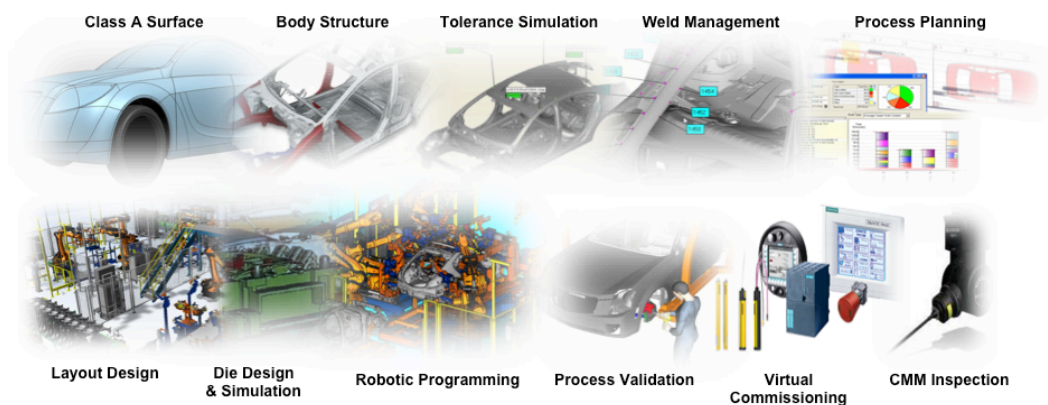


Figure 2—Siemens Integrated Solutions for Automotive Manufacturers

Major components of Siemens' strategy are their systems-driven approach and solutions designed to address business needs, not just functional issues. The objective is to help customers cost effectively realize innovation throughout their business—both in their products and the processes used to develop and support them—as their products continue to evolve and grow more complex to meet customer and regulatory requirements.

To address increasing product complexity Siemens has developed broad BOM and configuration management functionality to better support the management of automotive

products, and the fast growing number of options and variants needed to address customer desires for product personalization. Siemens has also integrated S&A process and data management, and test management within their PLM solution suite to enable digital simulation and physical test information to be used early in the design process to validate these options.

Increasing digitalization is generating significantly more product data and users need to more quickly find, access, and use the information they need. Siemens has developed Active Workspace to provide improved information visibility, facilitate individual and organizational collaboration, and enable enhanced decision making for personnel at all levels of an organization. Synchronous Technology provides the ability to support better heterogeneous multi-CAD environments and improve design productivity within and across internal and external organizations and partners.

One of the areas where Siemens is making significant investments in support of automotive manufacturers is integrated manufacturing solutions. Siemens' objective is to provide greater visibility to manufacturing requirements for product engineering during design phases to reduce iterations and eliminate costly production problems and delays at launch. Providing an integrated PLM environment supports concurrent engineering, helping different disciplines such as design and manufacturing to collaborate during all phases of the vehicle development process that can extend through to production.

To help companies more quickly realize innovation in their products and services, and support increased manufacturing digitalization, Siemens provides the systems-driven product development approach in a Smart Innovation Platform. Elements of this Smart Platform are:

- Engaged Users—right information, right time, right context
- Intelligent Models—representing reality, understanding connectedness
- Realized Products—virtual product definition, real production environment
- Open Systems—easy deployment today, flexibility for tomorrow

The Smart Innovation Platform is designed to support the digitalization of manufacturing as described above. Teamcenter, the core of Siemens' Smart Innovation Platform, has a scalable architecture designed to support automotive manufacturers of all sizes from small component providers, through larger sub-systems suppliers, to the largest, multi-enterprise, heterogeneous environments typical in automotive OEMs. Many of the largest automotive PLM production environments solutions run on Teamcenter.

A major focus for Siemens is to deliver value while future-proofing a company's PLM investments. A good example of this focus is their Automotive Catalysts. These include automotive industry best practices that are designed to enable a company to more quickly and easily deploy their PLM solutions and achieve faster time to value on their PLM investment. The Catalysts are tailored to meet the needs of different manufacturers, e.g., OEMs versus component suppliers.

Summary

The automotive industry continues to be a driver of PLM development and use—pushing the envelope on the use of PLM enabling technologies and processes throughout extended enterprises. PLM is now embedded in how automotive manufacturers of all levels work and it is a critical factor in their ability to achieve and maintain business competitiveness and success in the global economy.

Siemens has a long, rich history of working with and providing PLM solutions to the automotive industry—delivering industry focused solutions and offering a deep and broad solution set. They are investing in solutions to bring together all the elements needed to define and create a complete digital factory—from ideation through manufacturing and support. They are a trusted partner and provider of PLM enabling technologies that can help all levels—OEM through supply chain—realize innovation throughout the product development lifecycle. Siemens has demonstrated a sustained commitment to the automotive industry to help enable their clients' near-, mid-, and long-term success.

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.