

How do we transform the process of innovation for the automotive industry?



Siemens PLM Software offers product lifecycle management (PLM) solutions to build the right product and build the product right

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Industry trends



For the first time in history, more people live in cities than in rural areas. In addition, highly diverse populations – with large concentrations at each end of the age spectrum – reflect widely different views, ideas, tastes and preferences. In turn, this diversity forms the basis for many of today’s market segments.

Both megatrends – urban growth and population diversity – have a huge impact on personal mobility. Urban growth is largely responsible for the rising demand for smaller, more fuel efficient cars, as well as for the move toward mass transit and shared vehicle models. Population diversity drives the demand for more personalized vehicles that fit the preferences of individual consumers, vehicles with a distinctive look and feel.

As a result, automakers need to respond with more variation in their product portfolios to meet these market imperatives. In turn, these market demands fuel the need for more innovative solutions and processes to manage this complexity.

Business challenges



Automotive OEMs and suppliers face ever increasing challenges and complexity in bringing vehicles to market. Fuel economy, hazardous substances, safety and CO2 emissions are just a few areas that governments regulate today. Globalized product development, manufacturing and purchasing operations aren't a vision – they're a reality. As consumer tastes rapidly shift, automakers must reduce vehicle development time and align production with demand. And that's just the impact on the business side of the equation.

In addition, software and electronics bring new innovations into the vehicle while driving up complexity exponentially. How well you manage and optimize these complexities enables your company to differentiate itself from the competition.

Siemens PLM Software provides a PLM platform that helps automakers and suppliers manage the complex reality of today's automotive industry, turning complexity from a challenge to a competitive advantage – and enabling you to build the right product and build the product right.



Mastering complexity

Globalization

Today's globalization initiatives create opportunities and challenges for automakers. The opportunity to penetrate new and emerging markets is highly inviting, yet your company has to be able to profitably produce the right vehicle to fit the market. This often requires you to create new or variant vehicles to fit unique market requirements and meet specific government regulations, as well as empower production facilities and supply chains for each market. You must be able to facilitate collaboration across these global entities to ensure consistent quality in execution.

Optimization

Doing more with less is critical in today's automotive industry. This is especially true in today's rapidly changing global economic climate where the industry found itself dealing with substantial overcapacity. Automakers can no longer build a plant to produce just one model. Now you need to design processes and operate plants that can produce all models. Flexible manufacturing across your supply chain is a complex challenge that must be solved if you are to remain profitable in an economy driven by rapidly changing consumer demands and preferences.



Speed

Do you have a vehicle in today's "hottest" market segment? If you start development on that vehicle today, will it still be just as popular when it's ready for production in 18, 24 or even 48 months? Not likely. Today's market windows are very tight. Consumers have many choices and are keeping their cars for shorter time periods. The pressure on vehicle development time will never relent. Automakers and their suppliers must continue to find ways to cut time out of their processes.

Sustainability

"Green" used to be just a color, but not anymore. It now represents anything to do with the environment. But is it enough to be green? What if green is cost-prohibitive? What if green comes at the expense of meeting other vehicle requirements? Being green is not enough – your products also must be sustainable. Today's vehicles need to find the right balance between social, economic and, of course, environmental requirements. Lean too much towards any one consideration, and you'll likely end up with a product that no one will buy.

Product lifecycle management for the automotive industry

Success at creating profitable products and efficient processes requires understanding and effective management of the vehicle lifecycle, as well as enabling your organization to make more effective decisions across all of the lifecycle's stages. Siemens PLM Software helps automakers and suppliers establish coherent, repeatable processes, as well as manage consistent and accurate

information across a product lifecycle from concept ideation to vehicle end-of-life. This comprehensive digital environment enables you to create, develop, manufacture and manage innovation across globally distributed product development and manufacturing teams that include your supply chain and customers.

Develop

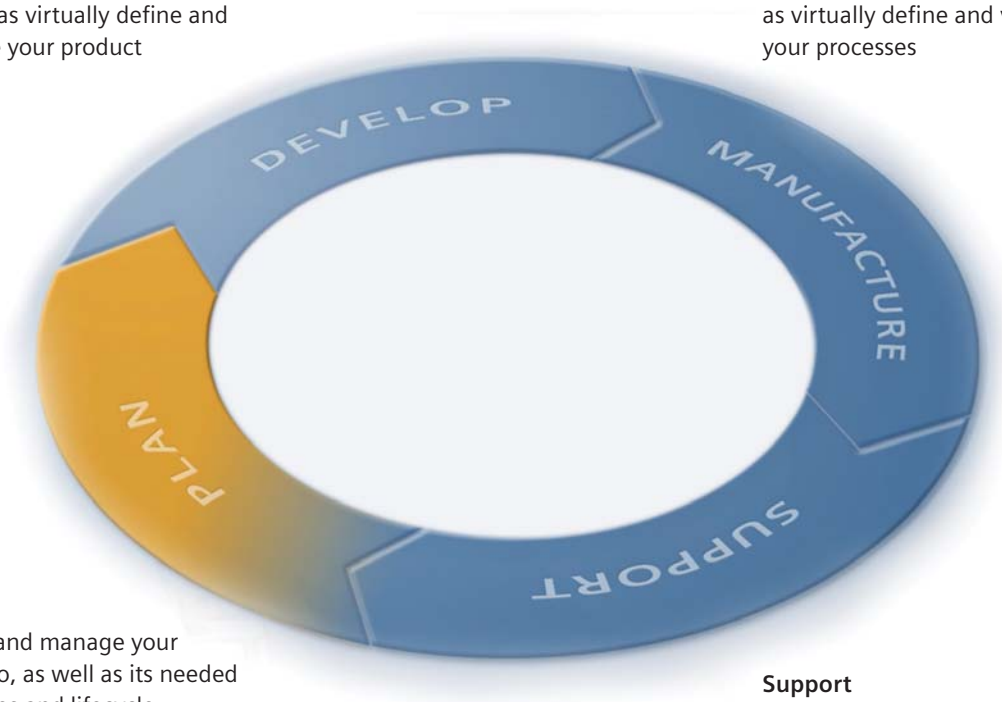
Allocate requirements to the BOM, as well as virtually define and validate your product

Manufacture

Integrate the BOM and BOP, as well as virtually define and validate your processes

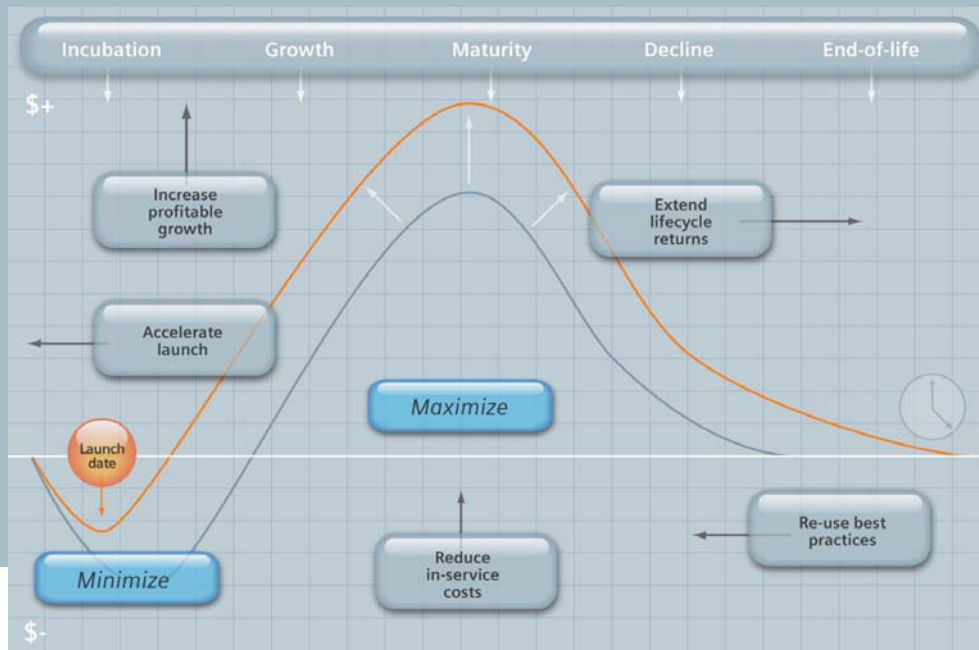
Plan

Define and manage your portfolio, as well as its needed resources and lifecycle requirements



Support

Plan, configure, integrate and install technology/business processes to deliver desired business value, as well as define and manage product delivery, service and end-of-life



PLM benefits for automotive industry

Accelerate launch

Getting a new vehicle to market first or even early in the market window can dramatically improve overall program profitability.

One customer reduced its vehicle development time to 10.5 months by driving knowledge into the PLM toolset, which resulted in knowledge automation.

Increase profitable growth

Global platforms with local variants enable OEMs to maximize re-use while facilitating innovative variation with little incremental cost.

Multiple customers use a global platform strategy that leverages PLM to facilitate global product and process collaboration, resulting in new market penetration and more consumer choices.

Reduce build costs

Effective change management, virtual prototyping and virtual creation/re-use of manufacturing processes reduce overall operational costs and improve product profitability.

A Spanish automaker accelerated digitalization of its manufacturing processes, which eliminated one entire phase of physical prototypes and reduced time-to-market by 20 percent.

Extend lifecycle returns

Effective management of service planning and execution reduces repair, warranty and recall costs, while minimizing the erosion of automakers' vehicle lifetime profitability.

One automaker used PLM to reduce warranty cost by \$100 million by more effectively managing software repair/upgrade at its dealerships

Re-use best practices

You can jump start new programs, products and manufacturing projects by more effectively capturing and re-using knowledge, information and proven methods across your enterprise.

Many customers achieve double digit productivity improvements by capturing and managing knowledge in a collaborative PLM environment that facilitates access to product designs, manufacturing processes and other content that can be re-used in future vehicle programs.



Build the right product and build the product right

There are many requirements from multiple sources that need to be captured, managed, evaluated, and continuously balanced to ensure that you have a clear understanding of what the “right” product is. Once these requirements are defined, you need to address several issues. How do you ensure that your vehicle development process creates a product that meets or exceeds these defined requirements? And if you design/develop the right product, how do you produce it in the most effective and efficient manner possible?

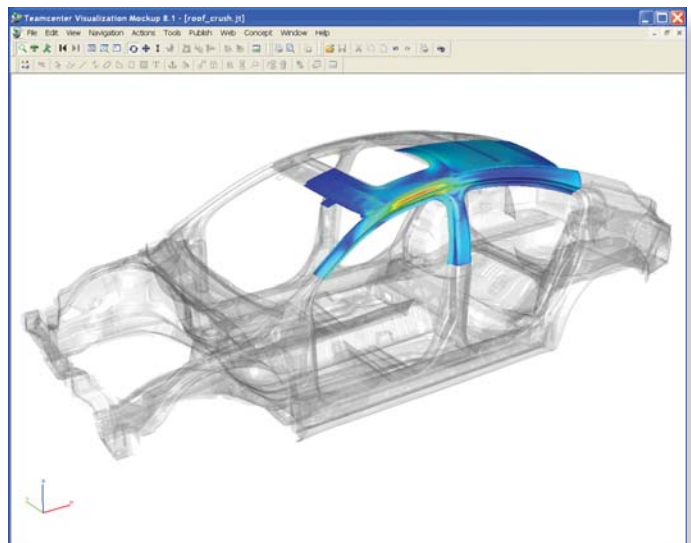
PLM enables you to capture all of the many requirements that pertain to today's vehicles. PLM is especially adept at making these requirements visible at every key decision point throughout your vehicle development process. As a result, when product decisions are made, their impact can clearly be understood in context with every requirement and all appropriate tradeoffs. PLM helps ensure that you build the product right by virtually defining and refining your production processes before you produce a single part. These concepts are key to building the right product and building the product right.



Transforming your process of innovation

Ideas are everywhere. They can come from suppliers, partners and customers – as well as from within your own organization. But how do you capture these ideas, evaluate them and ensure the best ones find their way into your products and processes? Successful innovation requires you to facilitate open collaboration both inside and outside your organizational boundaries, while instilling discipline across your vehicle development process.

Siemens PLM Software provides an innovation platform designed to work across today's inter-organizational boundaries, allowing OEMs and their suppliers, partners and joint ventures to effectively collaborate throughout the product development and manufacturing lifecycle. Our software helps you improve process efficiency and turn more ideas into market-driven products.





Solutions for the automotive industry

Global engineering platform

Consumer demands for a more personalized vehicle and individual buying experience are motivating automakers to introduce more variety in their product portfolios. When you couple this with the need to leverage global resources and meet consumer requirements on a global scale, you've defined a significant challenge for today's automotive industry. To respond, automotive companies are investing in common, global platforms that can yield multiple variants per platform. In many instances, these platforms and variants are being developed by global design and engineering teams and manufactured at multiple locations around the world.

Automakers and their suppliers are turning to PLM solutions to establish global collaboration environments that facilitate global engineering and flexible manufacturing. PLM enables automotive manufacturers to connect all of the different functions within their own organizations – as well as their suppliers and partners – into one common, collaborative environment.

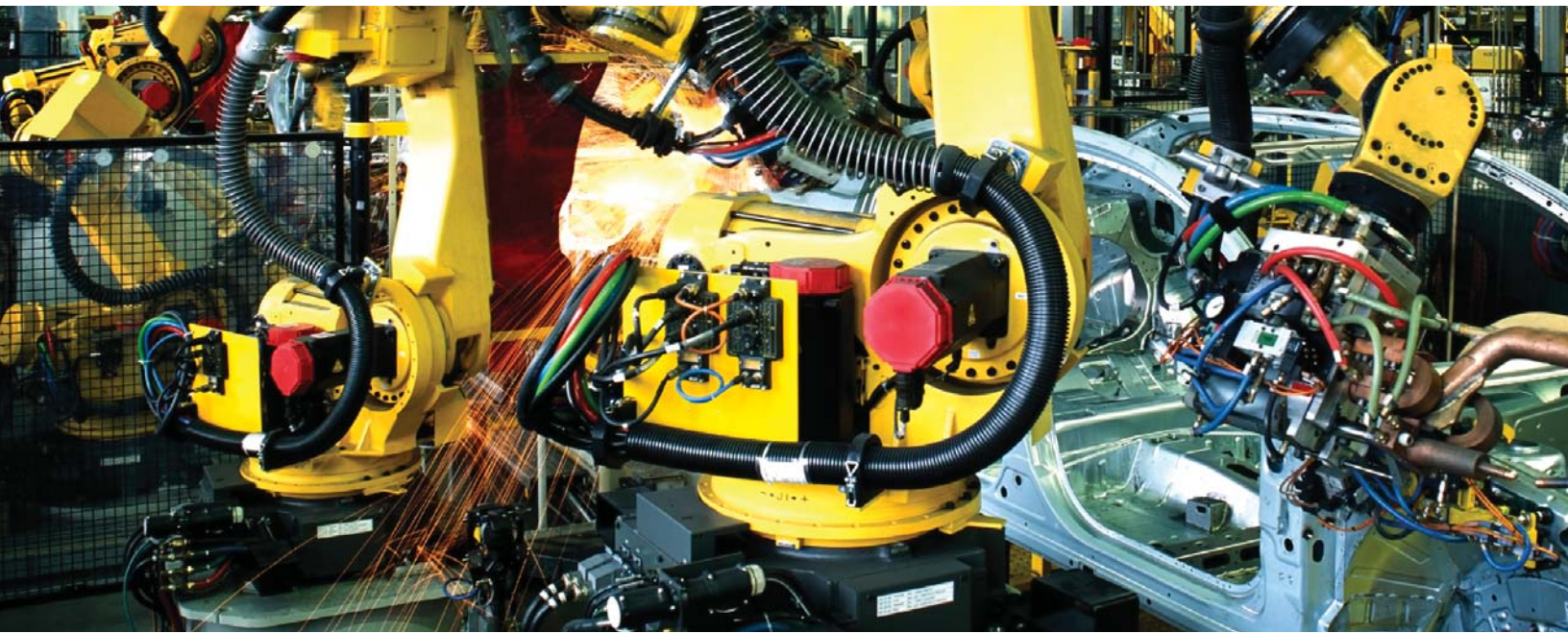
Mechatronics

Today's vehicles are differentiated by intelligent features that integrate mechanical functions connected by physical wiring with software-enabled electronic controls. Today, these embedded software systems comprise 70 to 90 percent of automotive innovations with another 30 to 40 percent growth expected over the next three years. Companies that use traditional tools and processes often find it overwhelming to manage, integrate, and synchronize the domain-specific activities and product information of their globally distributed development teams and supply chains.

Siemens PLM Software's mechatronics solution provides a rich, integrated environment for developing and managing mechanical, electrical, electronic and embedded software content in a single

source of product, process, and service knowledge. Using this integrated, single source of knowledge, engineering teams can retain their domain focus, while working in each other's context to jointly meet their overall development goals. This single source ensures a clear understanding of the product's requirements and design intent and provides visibility into continuous change impact across the entire vehicle. As a result, automakers are able to minimize warranty issues and improve cross-domain collaboration, which further fuels innovation.





Solutions for automotive industry

Sustainability

Producing a sustainable product and process requires automakers to find the right balance between social, economic and environmental requirements. But finding a balance is not easy. Siemens PLM Software's sustainability solution can help ensure that you produce a sustainable product by enabling you to make the right decisions throughout the product lifecycle, including during:

- Product planning, where you can leverage PLM to establish environmental objectives along with your other performance and cost targets.
- Design, where you can use PLM to perform weight and materials management, thereby ensuring that regulatory, fuel economy and emissions requirements – and cost targets – are actually achieved.
- Manufacturing, where PLM enables you to virtually optimize your manufacturing processes, thereby ensuring environmentally friendly plant

asset usage and maintenance. You can also leverage PLM to simulate/analyze human ergonomic and safety impact and minimize safety issues.

- Service and end-of-life, where PLM enables you to optimize material selection, as well as evaluate the ergonomic and resource demands of assembly/disassembly alternatives.
- Governance, compliance and reporting, where PLM provides total visibility to compliance and sustainability status, thereby reducing overall cost





Body in white design

Body in white design has long been more of a black art than a process. This has made it extremely difficult to implement process improvements that make body in white design more efficient across a globally distributed team. But new technology improvements now enable body structures to be parameterized, thereby facilitating a modular approach to body in white. By breaking up the process into its major components, companies can optimize each module of the process, then integrate the modules together into a more streamlined and flexible overall process. This modular approach enables companies to respond more rapidly to changing market demands, function more efficiently while being geographically dispersed, and more effectively engage their suppliers in the design process.

Siemens PLM Software's body in white solution provides an environment that supports a modular design process and helps companies achieve a much higher level of efficiency in the design and manufacture of body in white structures.



Industry advantages with Siemens PLM Software

Scalable

Large global companies need a collaborative platform that can scale to tens of thousands of users in a single software instance without losing performance. Siemens PLM Software's enterprise PLM platform is designed for massive, scalable use and quick information retrieval regardless of global location.

One of the world's largest automotive companies enables its global homeroom strategy for product development with Siemens PLM Software's technology. The company's environment includes 28,000 users at 29 sites in 16 countries; it synchronizes over 10,000 Teamcenter® software items daily.

Open

Open systems is a fundamental philosophy of Siemens PLM Software. The creation of JT Open as an industry forum to drive visualization and collaboration resulted in publishing the JT file specification. Today, ISO recognizes JT as an ISO standard and accepts the JT file format reference as a publically available specification, reinforcing JT as the "benchmark for Openness in the PLM Domain."

With JT as an ISO publically available specification, the automotive industry can move away from 2-D drawings as the standard for long term data retention and leverage the 3-D JT format.

Proven

The automotive business is highly complex. To be successful you need a partner who understands the complexities of your industry and delivers focused software solutions that get to the core of your problems.

Siemens PLM Software touches the development and production of more vehicles than any other PLM software vendor in the world. We know auto.

Flexible

Every automotive company has a unique approach to running its global product development and manufacturing operations. For many companies, this approach constitutes a key competitive advantage. A one-size-fits-all approach to PLM would force these companies to compromise their processes. That's why so many automotive OEMs have standardized on Siemens PLM Software's technology – because it enables their strategy the way they want it to work.

One of Europe's largest automotive group's has standardized on Teamcenter to allow all of its brands to leverage a single source of truth across the entire corporation – while at the same time providing each brand with the autonomy it needs to operate the way it feels is best.





Answers for automotive industry

Siemens is one of the world’s largest and most respected companies with 427,000 employees working in more than 190 countries around the globe. This scope and experience affords Siemens a unique understanding of global business requirements. Siemens’ technologies help bring together product and production lifecycles, facilitating unprecedented speed-to-market for industry-leading companies around the world.

Siemens PLM Software is helping the automotive industry manage ever increasing complexity driven by globalization, government regulation and the rapid expansion of software and electronics-based vehicle innovation. Complexity can be turned from a problem into a

competitive advantage by managing it with PLM. PLM ensures that companies can stay focused on continuous innovation as they build the right products and build their products right.

Let Siemens PLM Software transform your process of innovation and turn more ideas into successful products.

About Siemens PLM Software

Siemens PLM Software, a business unit of the Siemens Industry Automation Division, is a leading global provider of product lifecycle management (PLM) software and services with nearly 6.7 million licensed seats and 63,000 customers worldwide. Headquartered in Plano, Texas, Siemens PLM Software works collaboratively with companies to deliver open solutions that help them turn more ideas into successful products. For more information on Siemens PLM Software products and services, visit www.siemens.com/plm.

Siemens PLM Software

Headquarters

Granite Park One
5800 Granite Parkway
Suite 600
Plano, TX 75024
USA
972 987 3000
Fax 972 987 3398

Americas

Granite Park One
5800 Granite Parkway
Suite 600
Plano, TX 75024
USA
800 498 5351
Fax 972 987 3398

Europe

3 Knoll Road
Camberley
Surrey GU15 3SY
United Kingdom
44 (0) 1276 702000
Fax 44 (0) 1276 702130

Asia-Pacific

Suites 6804-8, 68/F
Central Plaza
18 Harbour Road
WanChai
Hong Kong
852 2230 3333
Fax 852 2230 3210

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