PLM for automotive suppliers

Digitally transforming the vehicle development and manufacturing process

Siemens PLM Software

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Automotive suppliers can deliver flawless launches and ensure program profitability by implementing product lifecycle management (PLM) across major vehicle development and manufacturing processes.

SIEMENS

Business challenges

The automotive industry has high expectations and demanding requirements for its suppliers. To be a successful supplier in today's global automotive marketplace, you must:

- Manage more and more programs while making certain that each program launches flawlessly
- Manage program change to ensure profitability while rapidly and accurately responding to specific changes
- Integrate other suppliers into your change process
- Capture, protect and retain your intellectual assets for future re-use

OEMs demand flawless program launches. Failure to meet quality, performance – and most importantly, timing requirements – is not an option. You need to be effective in all stages of a program or you could end up absorbing cost associated with fixing last minute launch problems. Even worse, you must avoid problems that arise after the launch deadline has passed. This requirement becomes especially important as your company is faced with managing an ever increasing number of programs.

Change is a way of life in the automotive industry. Your challenge is to manage change in such a way that every change is quoted accurately – and with a level of traceability that mitigates your risk without crippling innovation. If you can capture informal changes early in your development process and implement formal controls after prototype or hard tool release, your company will be able to maintain program profitability.

Quickly and accurately responding to RFQs is essential for suppliers. Every change spawns numerous RFQ events. Your customers require you to respond with quotes within days or even hours. Being able to accurately quote changes on every program can overwhelm your organization unless you have systematic capabilities in place to manage the RFQ process.

Other suppliers can be crucial to delivering accurate RFQ responses. To ensure accuracy and program profitability, you need to rapidly capture supplier input and add it to your quote response. Traditionally, time constraints have made it difficult to involve every supplier in your formal quote requests. However, by digitally transforming your sourcing process, you can accelerate the steps needed to gather supplier input and repeatedly ensure that complete and thorough input is gathered for every customer quote.

You need to capture the collective knowledge that your company has gleaned from its experience and practice. The projected retirement of roughly one-third of the world engineers over the next 10 years places your company's intellectual assets in jeopardy. You must be able to get this knowledge out of your people's heads before attrition or retirement takes its toll. This knowledge must be made available to the rest of your organization so it can be used on new products and new programs.

To enable you to meet the demands of today's customers and regulatory agencies, Siemens PLM Software offers product lifecycle management (PLM) – a systematic approach to business improvement that drives top-line revenue growth while delivering repeatable processes for product innovation.

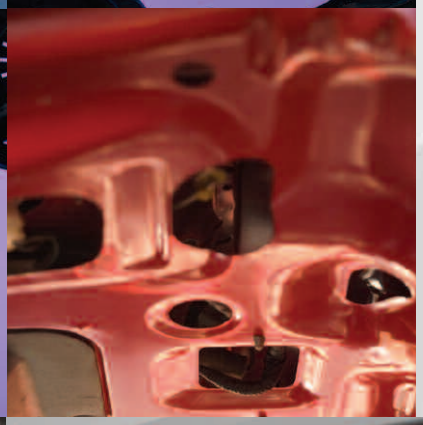
PLM enables you to optimize your business processes by managing your company's intellectual assets and seamlessly weaving both external and internal innovation practices into your product lifecycle.

What PLM means for automotive suppliers













The technology solutions that support a PLM strategy act as an enabler for key business improvement initiatives. By leveraging PLM in your initiatives, your company can excel in today's globally dispersed business environment – where you are required to effectively interact with multiple customers, business partners, other suppliers and subcontractors on an ongoing basis.

Three key attributes distinguish Siemens as the PLM provider of choice for automotive suppliers:

- Siemens' depth of PLM solutions support, which results in a rich set of knowledge management, process management and collaboration capabilities
- Siemens' breadth of process improvement support, which manifests itself in process innovations that run the gamut from requirements management to plant floor simulation to compliance-related disposal
- Siemens' seamless integration capabilities, which deliver PLM solutions that are tightly integrated with each other, as well as with third-party applications

By implementing Siemens technology as your PLM platform, your company can leverage these core strengths in a wide variety of process improvement initiatives.

PLM-driven process improvement initiatives

Initiative	PLM's value
Information exchange, synchronization and interoperability	*Business goal:* Meeting customer requirements while retaining your autonomy *Challenge:* Every customer wants its suppliers to immerse themselves in the customer's design environment In this way, you and your customer can eliminate waste and lost time otherwise caused by erroneous assumptions and wrong information. But how do you – as a supplier – maintain your own identity and optimize your own business when you need to participate in processes managed by multiple customers? *Siemens PLM Software's advantage:* Siemens' approach to PLM enables you to comply with your customers asynchronously. Siemens' PLM solutions allow you to optimize your own business processes while still supporting your customers' information exchange and immersive design requirements.
Commonization and re-use	*Business goal:* Lowering cost and accelerating program delivery *Challenge:* Each time your engineers modify an existing product or process – or create new products/processes that do not add customer value, they generate costs and timing risks that ripple through the vehicle development program. These changes require you to re-run your test and validation processes, modify and re-validate your manufacturing processes and update all documentation associated with your production approval processes. *Siemens PLM Software's advantage:* Siemens' approach to PLM enables you to design products for commonality. The PLM environment provides the information that you will need to quickly evaluate previous designs and their associated manufacturing processes against current requirements – and thereby determine and facilitate re-usability. The goal is the re-use of all the information that defines your product's design, as well as information about how the product is manufactured, how it performed during testing and how it complies with appropriate regulations and standards.
Systematic and repeatable change processes	*Business goal:* Sustaining program profitability by managing change *Challenge:* Product changes are introduced from many sources, including from your customers, suppliers and your own organization. Being able to quickly and accurately discern the impact of proposed changes enables your company to understand how the change will ripple through your program, how you should quote it and how you can manage it along with thousands of other changes that affect your programs each and every year. *Siemens PLM Software's advantage:* Siemens' approach to PLM facilitates comprehensive change management by enabling you to understand where product change originates and what you can do to recover your change-related cost. PLM provides you with visibility into everything that defines the component being changed, as well as how it will be produced – thereby enabling you to quickly assess the impact of any proposed change.



Strategic sourcing	*Business goal:* Reducing sourcing cycle time and improving traceability *Challenge:* Disconnects often materialize between the systems that you use to manage change and the systems that manage your sourcing process. This disconnect leads to significant delays in processing and responding to changes. In addition, globalization has led to poor communications between product teams and suppliers that manifests itself in a lack of visibility to supplier activities. *Siemens PLM Software's advantage:* Siemens' approach to PLM ties your sourcing, product data management (PDM) and collaboration systems together to provide a single point of access that you can use to deliver sourcing knowledge and product knowledge to every stakeholder in your supply chain. This integration enables you to use the information that you collect during the change process and track change all the way through supplier response and award recommendation. Siemens' approach significantly increases sourcing productivity, improves both RFQ response time and RFQ accuracy and facilitates early supplier involvement in the product lifecycle – thereby enabling you to "design-out" product cost.
Knowledge-driven design and manufacturing	*Business goal:* Perfecting your components *Challenge:* Like many suppliers, you probably have been in the automotive business for years and have accumulated a significant amount of knowledge about how best to design and manufacture your products. This knowledge is what makes you a valuable partner to your customers. Equally important, you need to apply this knowledge every time you create a new product. *Siemens PLM Software's advantage:* Siemens' approach to PLM enables you to capture your product and process knowledge and proactively facilitate its re-use on every new design. This best-practice "library" ensures that past mistakes are avoided and that value and quality are driven into each new product design.



Information exchange, synchronization and interoperability

Issue: Managing the product development processes from design through manufacturing is a considerable task. Incorporating sub-tier support and low cost country operations makes the task more challenging still. Doing so effectively – across multiple global programs for multiple customers – is the "profit testing" situation today's automotive supplier faces every day.

You – as a supplier – are often required to completely immerse yourself in your customers' processes and technology infrastructures. When it comes to product design, you are obliged to use your customer's design solution and connect your design data into the customer's data management and release systems.

On the other hand, you also need to differentiate yourself from the competition and optimize your business processes so that you can manage complexity and ensure your profitability.

You need to effectively balance *both* of these requirements to excel in today's marketplace. To remain compliant with your customers' requirements, you need to facilitate seamless information exchange. To stay autonomous enough to innovate, you need tools and capabilities that drive your own business improvement initiatives.

Solution: Facilitating information exchange, synchronization and interoperability in a PLM environment delivers the following advantages.

- Ensures that your designers and engineers are working with up-to-date information
- Secures and protects your intellectual assets while enabling your program teams to innovate freely
- Enables you to locate your operations and choose your suppliers without regard to geographic considerations
- Allows you to share common components and participate in common processes across multiple customer programs
- Ensures that you will remain compliant with your customers' information requirements

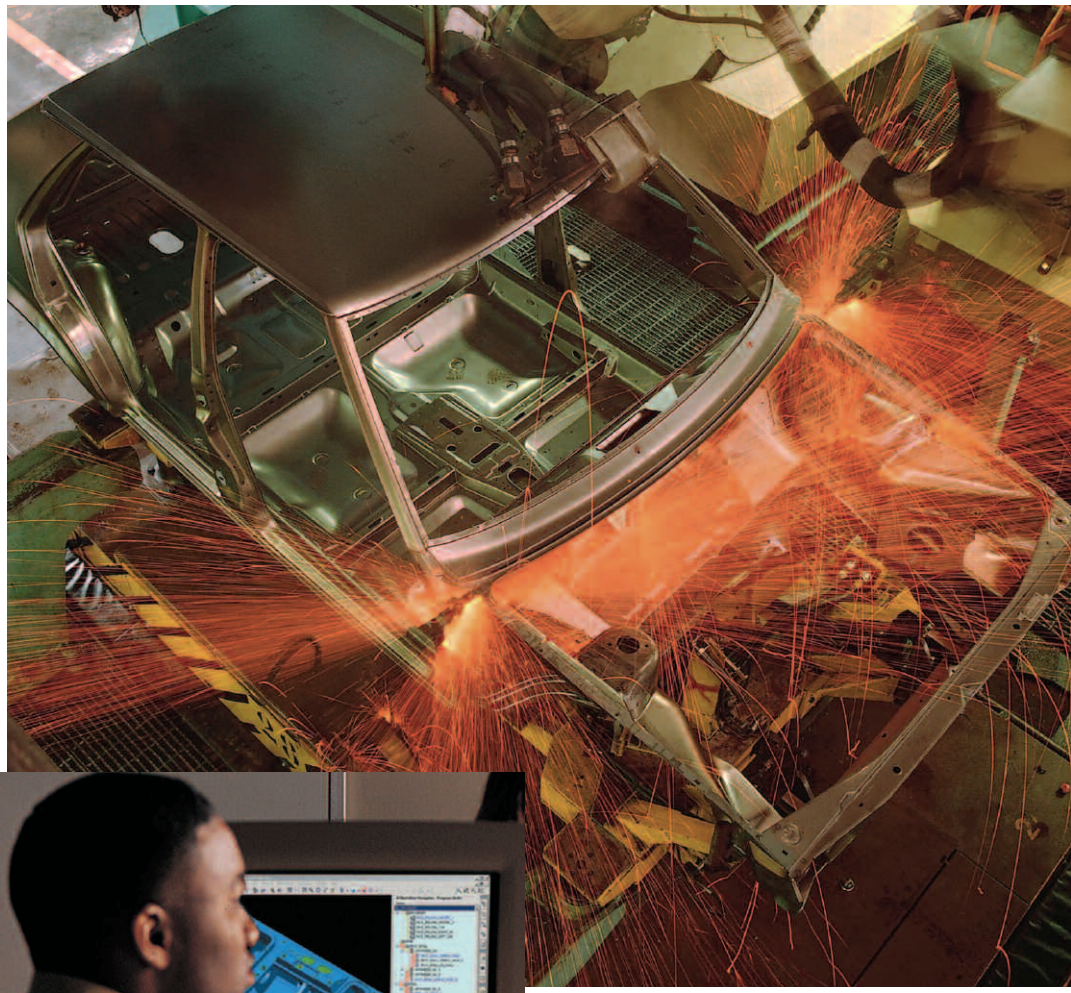


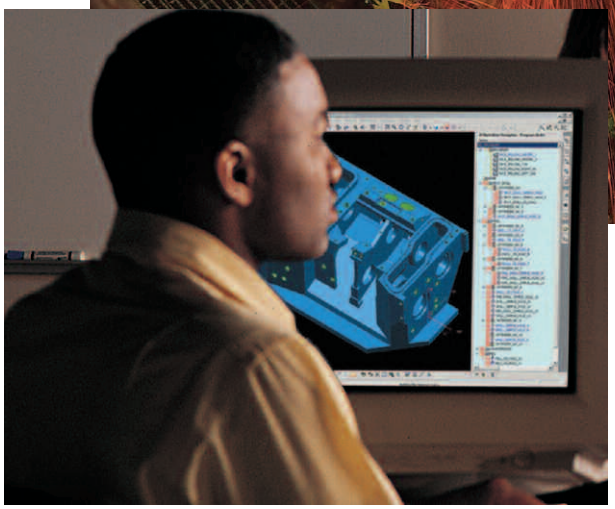
The Siemens PLM Software advantage: Siemens technology provides a PLM platform for launching an information exchange, synchronization and interoperability initiative. Key elements of the PLM platform that support this initiative include an unmatched understanding of the information exchange problem, current production-proven solutions and evolving interoperability solutions.

Unmatched understanding of the information exchange problem: Seventeen of the top 25 automotive OEMs in the world have implemented global data management solutions. Fifteen have done so on Siemens technology. The difficulty suppliers have with information exchange is a direct result of OEM process differences and the supporting technologies within these implementations. The resolution to those difficulties lies in what those processes have in common: their underlying Siemens technology.

Production-proven solutions: OEMs and suppliers exchange and synchronize information on a daily basis. Siemens is the only PLM company with information exchange solutions for the automotive supply chain in place today. Our solution portfolio enables a broad spectrum of potential customer interaction models: from fully automated product structure synchronization to simple "mailbox" CAD file transfers. In most cases, it is based on the very Siemens technology that your customers are requiring you to use in support of their vehicle development process.

Evolving interoperability solutions: Siemens solutions facilitate OEM-to-supplier design collaboration at many levels. The blending of bill of material (BOM) management with CAD data management facilitates robust design collaboration. Siemens solutions also foster true design interoperability between heterogeneous design and data management systems allowing the automotive industry to move from simple information exchange and synchronization to comprehensive design interoperability.





Commonization and re-use

Issue: Cost reduction is critical to your success as a supplier in a business where cost competitiveness plays a major role in determining who gets sourced on today's highly prized vehicle programs. Time reduction is strategic to your ability to provide program deliverables in timeframes that carry penalties for slippage and lost work.

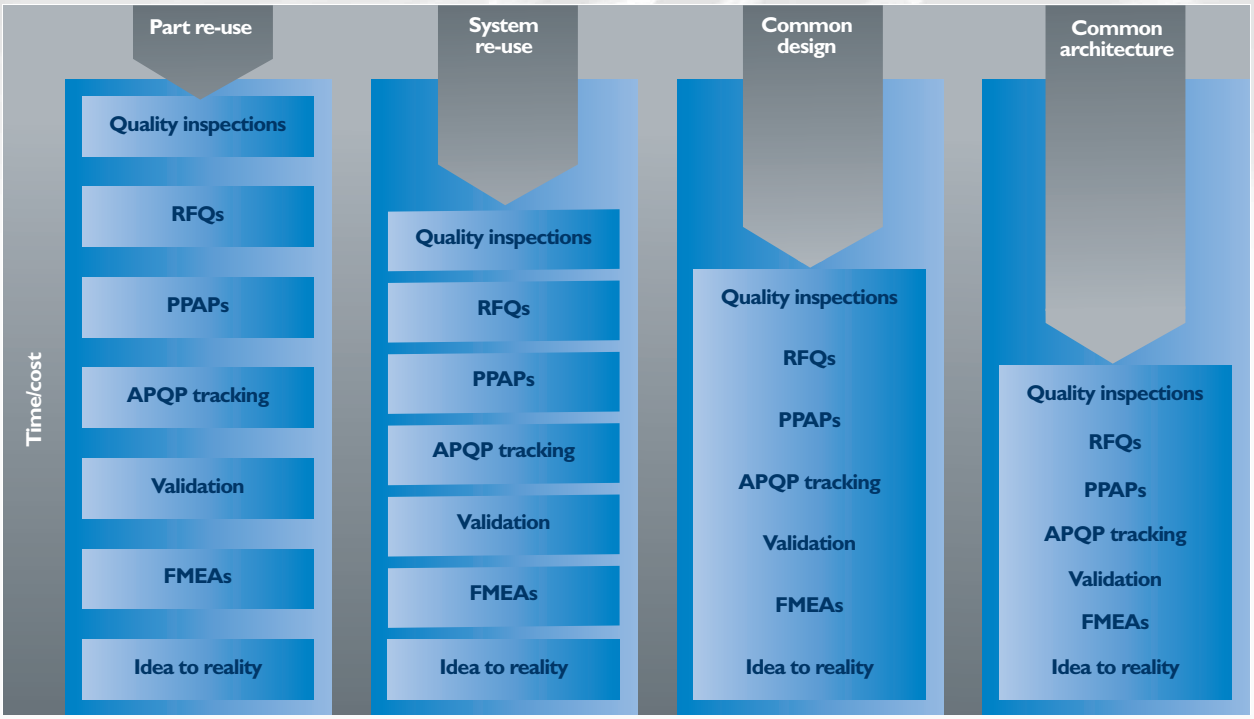
Solution: Commonization and re-use is a PLM-based initiative that improves your ability to define and implement common components and common processes throughout your vehicle programs and across multiple customers. Many companies establish a hierarchical approach to commonization and re-use, such as common architectures, common designs, system re-use and part re-use. Each of these levels has a different timeframe, target value, cost and return that requires comprehensive processes and support tools.

Some companies view commonization and re-use as a way to accelerate their ability to behave as a single global company. These organizations must be able to set proper re-use targets and measure their progress. But reports showing a high percentage of re-use do not necessarily mean that a company is able to realize significant business value from this strategy. For example, while re-using fasteners may provide a high re-use percentage, re-using electrical components may drive real value.

Implementing a commonization and re-use initiative requires the use of many attributes and values that must be measured, communicated and made readily accessible. In addition, the choice for a particular re-use candidate part can be multidimensional.

For example, when searching for a part with certain attributes, the decision to re-use that part can be based on cost, timing, warranty, performance, piece cost, tooling investment, supplier capacity, volume forecasts, material specifications, sourcing, location or any number of attributes. For every item that you re-use, you can also re-use the validation of that item, all of the APQP documentation that went with the component and the manufacturing processes, tooling and fixtures that produced the item.

The Siemens PLM Software advantage: Siemens technology provides a PLM platform for launching a commonization and re-use initiative. Key elements of the PLM platform that support this initiative are process and information integration, interoperable design and a single instance of all product data.



Process and information integration: By having all product lifecycle information integrated in a single PLM system, your product teams are able to understand – and manage – the relationships between all of the requirements, components, products, manufacturing processes and service knowledge that you use to support your programs. This single source of knowledge provides you with a complete picture as to how this information is interrelated, as well as how this information collectively defines your products. This foundation is essential to a commonization and re-use initiative because it provides the visibility needed for making decisions about re-using specific components in a new program.



Interoperable design: To be successful at commonization and re-use, you must be able to re-use components regardless of where the geometry was created. Interoperable design enables you to select, modify or design a component to meet multiple requirements and conditions regardless of the component's originating CAD system. Siemens leverages the JT format to enable your engineers to reference geometry from multiple CAD systems while creating new designs. Interoperable design directly facilitates re-use by allowing you to employ existing designs in new assemblies without having to re-author these designs.

Single instance: To harness the power of globally dispersed program teams, you have to make certain that everyone on the team is working from a single instance of all data. It is extremely important in commonization and re-use initiatives to see how a change against a re-used component affects the places where it is used. If there is only one master definition of a component and change becomes necessary, you can change it once and immediately reflect that change everywhere the affected component was used.



Change management

Issue: Change is a critical element in any supplier's profit-making strategy. Mastering change requires you to effectively manage and track changes across your operations without inhibiting the innovative processes you apply in product development and manufacturing. Your ability to manage and respond to change effectively and quickly directly impacts your strategy for winning future programs and ensuring their financial success.

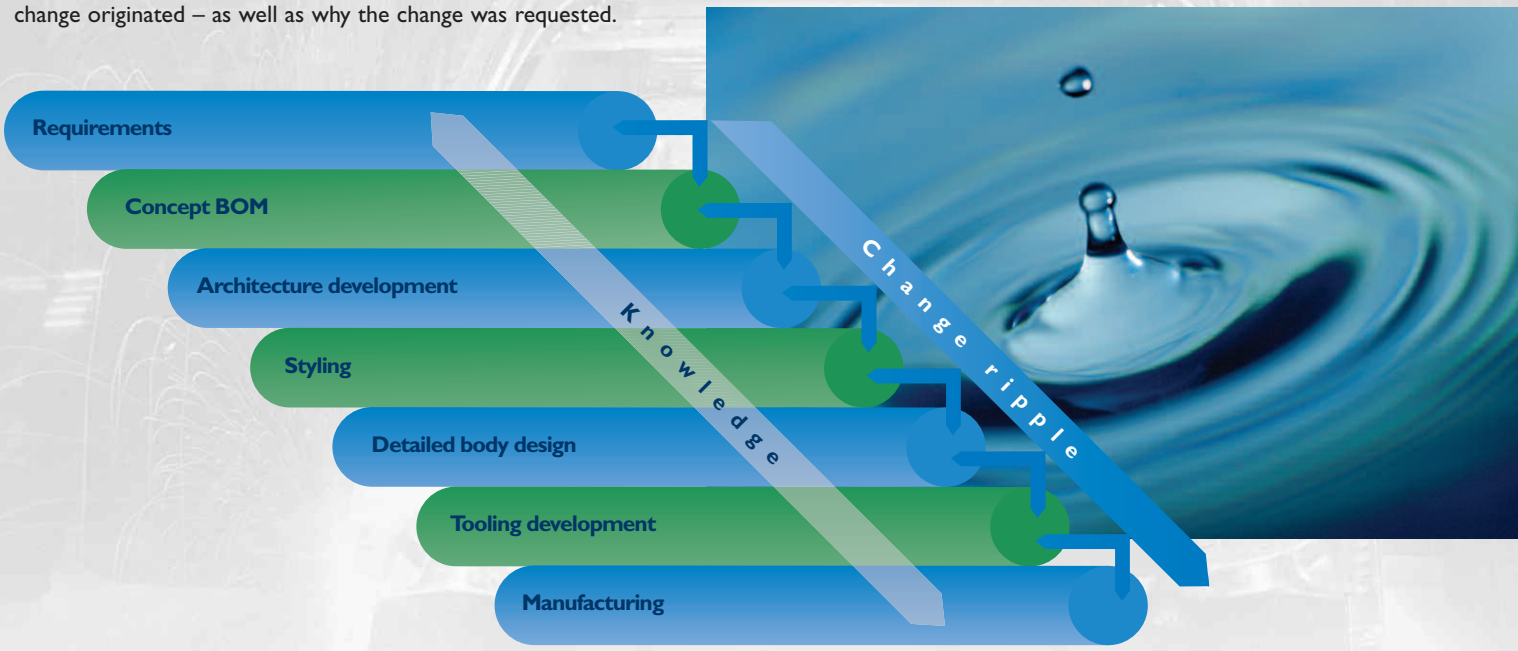
Solution: Change management is a PLM-based initiative that enables you to manage both formal and informal aspects of change, including processes that range from generating sourcing-related quotes to implementing design changes. PLM-enabled change processes deliver all of the information that process participants need to accurately complete their implementation tasks, as well as to make informed decisions in accelerated time frames.

Traditionally, manual processes track change during a program's formal stages (i.e., after selected elements of the product are released for design intent or hard tooling). However, the early stages of most programs are extremely important in determining program success. For every proposed change, suppliers should be able to develop an accurate quote and understand where the change originated – as well as why the change was requested.

Change management also provides visibility into all information that describes the change and its related implementation strategies. Implementing a change management initiative allows you to:

- Develop more accurate responses to change-driven RFQs
- Evaluate the impact of individual product changes
- Audit the execution and completion of assigned change-related work tasks
- Maintain a complete history of change executed during the product lifecycle
- Verify conformance to documented requirements
- Track planned and actual impact to both product and manufacturing content associated with proposed changes

The Siemens PLM Software advantage: Siemens technology provides a PLM platform for launching a change management initiative. Key elements of the PLM platform that support this initiative are process and information integration, best practice-based process management and program dashboards.



Change process and information integration: By having change integrated with other lifecycle processes, your program teams are able to rapidly assess the work and cost-related impact of proposed changes. Teams are able to quickly analyze information about a product's function, aesthetics, performance, cost, assembly process, tooling, project schedule, program milestones and packaging. Lessons learned and best practices from prior engineering changes are always available, thereby enabling you to apply this experience to both current and future programs.

Best practice-based change processes: Basing your change process on a best practice like APQP ensures that your change-related workflow leverages the most cost-effective, industry-proven change routing. Equally important, decision makers have total visibility to the entire change process, including views to current status and task execution – thereby enabling them to monitor progress and catch mistakes early in the change process.

Program dashboards: Program managers can use program dashboards to account for change across an entire program and evaluate the impact of proposed changes on program cost, timing and overall program milestones. Program teams can use these dashboards to view a specific change within the context of other program changes. This holistic approach enables you to determine how a single change can be combined with other changes to deliver aggregate benefit for any given program.





Strategic sourcing

Issue: Two industry trends combine to place significant pressures on today's sourcing-related processes. Increased outsourcing makes suppliers more dependent than ever on their supply chains. Rapidly shifting market demands are driving increased change volumes which suppliers must quote in very short timeframes. Both trends challenge your ability to quickly and accurately prepare quote packages for your suppliers and incorporate their responses into the response you provide to your customer.

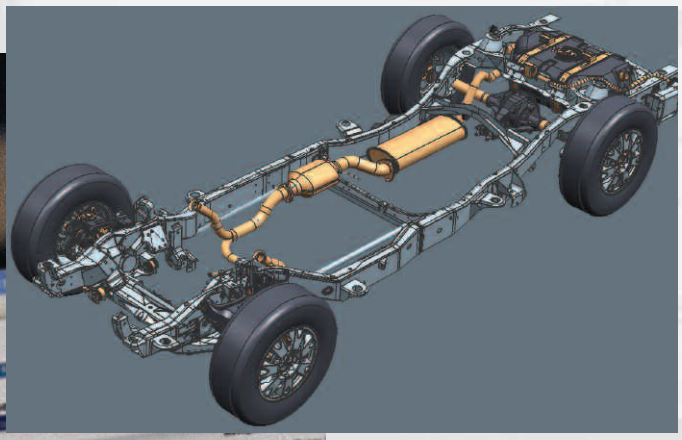
Solution: Strategic sourcing is a PLM-based initiative that ties your sourcing process with your design, engineering and manufacturing processes. By providing a single point of access that all of the stakeholders in your supply chain can use to locate sourcing, product and manufacturing information, strategic sourcing:

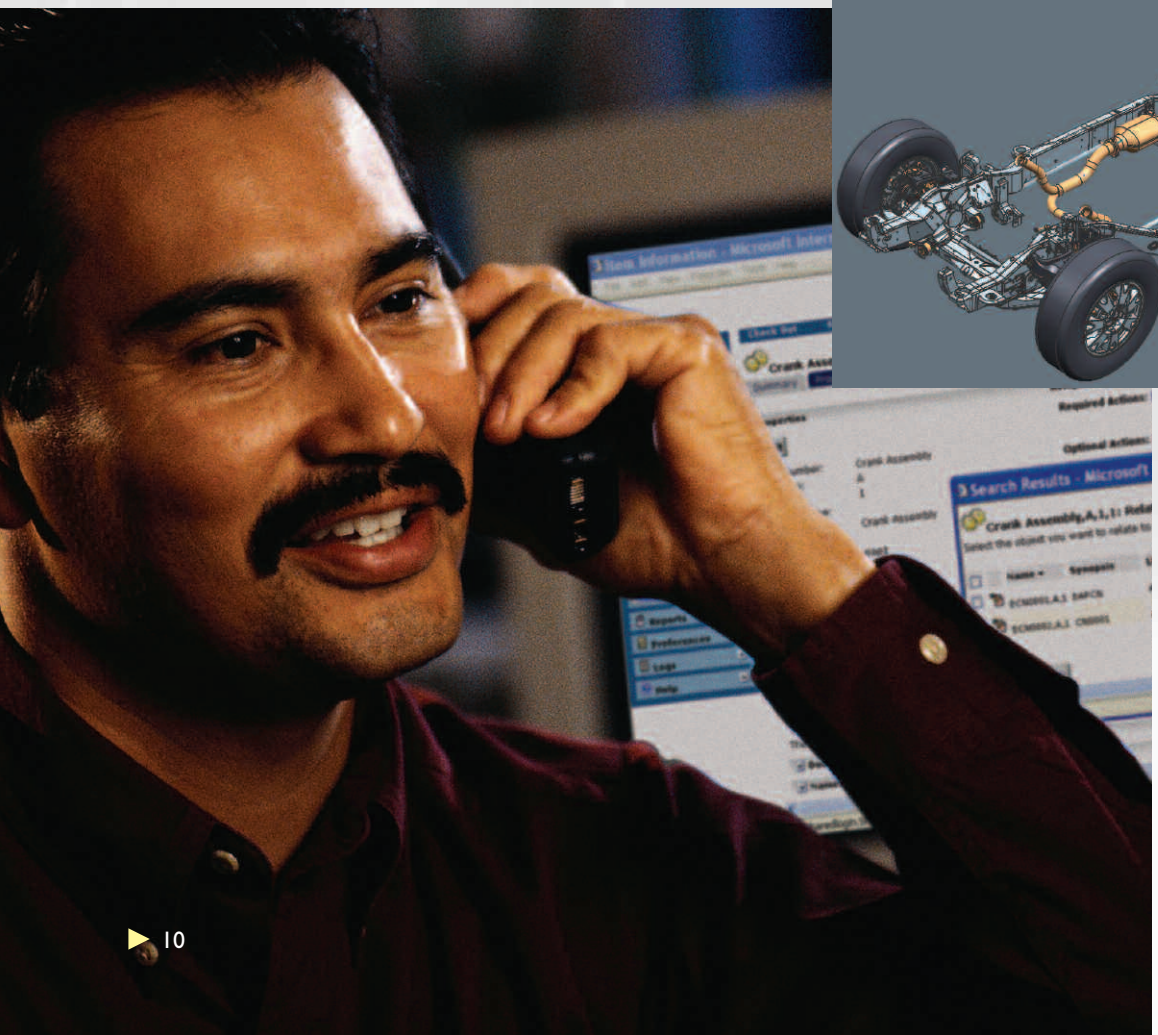
- Enhances productivity across your entire sourcing process
- Improves RFI, RFQ and RFP response time while simultaneously ensuring a high level of accuracy
- Facilitates early supply chain involvement in your sourcing process that helps drive out program cost

Instead of relying on estimates from your supply chain, your company can leverage strategic sourcing to quickly create quote packages directly based on design/manufacturing information. Equally important, strategic sourcing enables you to closely collaborate with your suppliers by enabling them to quickly understand your requirements.

The Siemens PLM Software advantage: Siemens technology provides a PLM platform for launching a strategic sourcing initiative. Key elements of the PLM platform that support this initiative are process and information integration, real-time collaboration and robust sourcing applications.

Process and information integration: Integrating sourcing with your other product lifecycle processes provides your sourcing teams with immediate access to comprehensive information about your products, cost, previous sourcing responses and bid packages. This will significantly improve your ability to deliver accurate responses to all of your RFIs, RFQs and RFPs. You are able to quickly make decisions about how to quote current and future requests by eliminating past mistakes and drawing on past





successes. You also are able to understand the relationships between a current request, its related change orders, components affected by these change orders, the manufacturing processes that have to be modified to accommodate the change and the requirements against which the change must be validated.

Real-time collaboration: Being able to communicate with suppliers regardless of their geographic location will allow you to choose the best partners based on their ability to meet your delivery requirements. Real-time collaboration capabilities allow you to:

- Assess the design and manufacturing capabilities of widely distributed subcontractors
- Distribute a proposed BOM to multiple partners
- Capture partner-generated design input regardless of the partner's authoring system
- Incorporate partner input into a fully costed BOM that addresses all of your customer's requirements

Robust sourcing applications: A sourcing solution integrated into PLM can only help if it includes the critical capabilities that purchasing organizations need to manage their entire sourcing process. Buyers can create, view and monitor RFQ, RFI and RFP events in conjunction with your partners – without having to hunt down part specifications from multiple sources. Siemens e-sourcing applications can provide a view into what you spend with your suppliers on a global basis – thereby providing your buyers with leverage they can use when negotiating contracts. After contracts have been awarded, buyers can monitor supplier performance to make sure that it complies with the customer's quality, reliability and delivery goals.



Knowledge-driven design and manufacturing

Issue: Developing the best product for a customer requires an experienced team that can evaluate earlier programs, examine proven designs and create new ideas while making certain to consider the real-world manufacturability of each of these possibilities. Given the number of programs that most suppliers have in house at any one time, this daunting challenge can stretch the limited resources available to any single program.

Solution: Knowledge-driven design and manufacturing is a PLM-enabled initiative that allows you to capture the collective knowledge that your people have created and acquired across your company's entire history – and incorporate these intellectual assets into new programs for your current customer base. Knowledge-driven design and manufacturing enables junior members of your teams to re-use the knowledge gleaned from senior members.

Implementing a knowledge-driven design and manufacturing initiative results in:

- Reduced lost-time penalties that otherwise result from late product launches
- Reduced overall manufacturing costs and improved production readiness (facilitated by simulating and validating your manufacturing processes and tooling)
- Assurance that your products will comply with your customers' most recent requirements
- Increased ability to work with multiple customers who have different design processes and development environments
- Reduced launch costs associated with "things gone wrong" (TGW)
- Reduced scrap, rework and warranty costs
- Ability to apply best practices to every new and changed design



The Siemens PLM Software advantage: Siemens technology provides a PLM platform for launching a knowledge-driven design and manufacturing initiative. Key elements of the PLM platform that support this initiative are process and information integration, knowledge capture capabilities and high-speed relational intelligence.

Process and information integration: Having customer requirements integrated into your development process enables you to link documented requirements to constraints that determine whether a product meets its performance, safety, reliability, maintainability and ergonomics metrics – as well as its manufacturability, program cost and delivery schedules. Your engineers are able to leverage information to suggest design changes and validate these changes against a complete vehicle for packaging, CAE, process simulation, manufacturability, test, serviceability, cost and function. In turn, the engineers can compare these validation results against other design alternatives.

Knowledge capture capabilities: Being able to capture the knowledge in your engineers' heads allows you to make that information available to other engineers on every program. You can use this knowledge to create generic architecture templates (e.g., to represent your manufacturing processes, plants and resources) and re-use these templates from one program to the next. You also can establish common design processes that can be repeatedly used. For example, you can create an automated process to swap out different vehicle models, conduct a given study or generate a specific kind of geometry (e.g., for an engine roll envelope).

High-speed relational intelligence: Maintaining relationships between all geometric elements that define your products enables engineering and manufacturing teams to create product and tooling at the same time. Since all of the geometry is intelligently connected, updates on either side of engineering/manufacturing are immediately reflected in each other's definitions. You also can incorporate constraints right into the product model, thereby enabling program teams to assess plant-related issues – such as the capabilities of a remote manufacturing plant or the comparative abilities of different plants to meets a program's manufacturing requirements.





Join with us today

Don't let the opportunity to learn more about Siemens proven automotive supplier solutions pass you by. Contact your Siemens PLM Software client representative today for more information about Siemens' ability to improve your initiatives for information exchange and synchronization, commonization and re-use, change management, strategic sourcing and knowledge-driven design and manufacturing.

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 six million licensed seats and 56,000 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*.

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