

Four key strategies for enabling innovation in the age of smart

Using insight and product innovation capabilities from IBM



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Executive summary

On a smarter planet, intelligence is infused into the products, systems and processes that comprise the modern world. These include the delivery of services; the development, manufacturing, buying and selling of physical goods; and the way people actually work and live. Nowhere may this transformation be more evident than in the creation of smarter products.

Smarter products are the building blocks for a smarter planet. Embedded with increasingly sophisticated software and instrumentation, they can connect and communicate with other devices and respond intelligently to user needs. Smarter products need to address the needs of a wide variety of different users, whether the differences are a result of unique geographical requirements or unique user preferences. Smarter products are

transforming the way the world works in new ways virtually every day. This is true not only in the way products are used but also in the way they are built.

Product innovation has certainly evolved over the past few years. Historically it relied primarily on advancements in hardware and electronics; it is now much more dependent on software. It has also evolved from being primarily managed within a single company to a more collaborative model involving design partners and suppliers. As a result, innovative product development requires an approach that supports tight collaboration and increasingly complex value chains—an approach IBM calls *insight and product innovation* (IPI).

Smarter products are intelligent, interconnected and instrumented—creating high-value integrated systems, such as:

- Smart electric grid systems.
 - Online navigation systems.
 - Traffic management systems.
 - Fleet management systems.
 - Healthcare management systems.
 - Integrated defense systems.
 - Border control systems.
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IPI for collaborative, comprehensive development

To help organizations design and deliver increasingly complex products and manage their lifecycles, IBM created within IPI an approach that combines capabilities, tools and best practices from across IBM and IBM Business Partner organizations. This strategy can address some of the most prominent product development and delivery goals and challenges today, including:

- Global optimization of product, process and organization
- Designing, delivering and managing product value and differentiation
- Closing the loop between design and support
- Automating processes across the ecosystem of system contributors

By integrating and managing a product's lifecycle across development domains, IPI streamlines innovative product development and accelerates time to market for new products. In turn, IPI facilitates greater marketplace penetration and the creation of "the next big thing." Because much of innovation may be derived from the software component of smarter products, manufacturers can address competitive threats faster and quickly deliver on consumer demands for a portfolio of products that offer personalization and customization.

Moreover, IPI can help organizations maintain product quality, demonstrate regulatory compliance and pass audits. It helps keep costs under control by decreasing the number of warranty claims

and better managing the product supply chain and product development—thus lowering the cost of end products and boosting the bottom line.

As a leading product development technology provider, IBM offers integrated solutions and services for demanding product engineering disciplines—including mechanical, electronic and software lifecycle management. This paper will discuss four key IPI strategies from IBM, which help organizations design, deliver and manage smarter products designed to offer the highest value and quickest return on investment (ROI):

1. **Business planning and transformation**—Strategically transform business processes to build new capabilities, save costs, accelerate product introduction and create new market segments.
2. **Product and systems development**—Adopt an advanced systems engineering approach to manage all product dependencies across engineering disciplines and build a strong competency in software development and delivery.
3. **Product support**—Close the feedback and communications loop between design and support to enable continuous product improvement while ensuring that the product can be profitably supported and maintained over its lifetime.
4. **Lifecycle collaboration**—Extend the enterprise beyond its traditional four walls to include partners in the product planning, development and support activities.

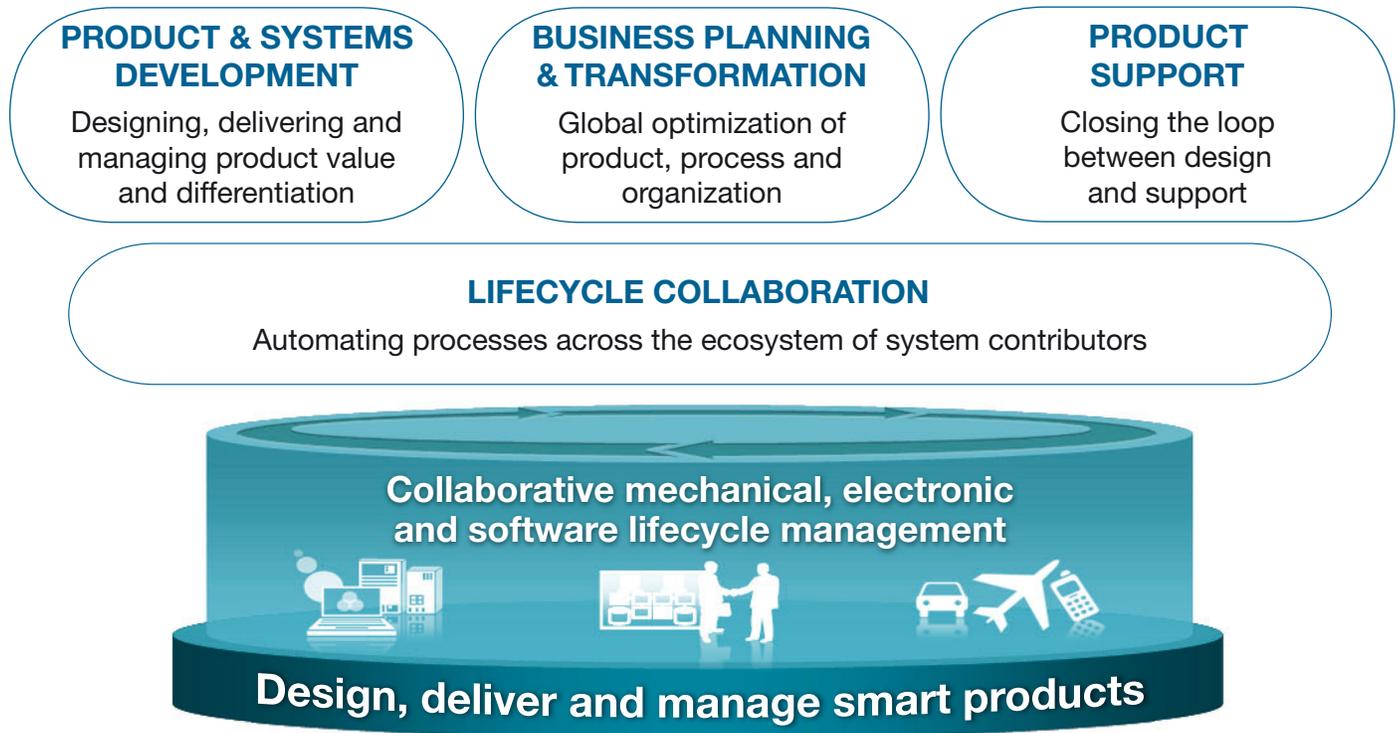


Figure 1: Insight and product innovation: Design, deliver and manage the development of smarter products

Business planning and transformation

The marketplace is generally in flux with dynamic customer needs, quick-moving competitors and industry-changing new technologies. Consequently, companies must regularly monitor their product development practices to ensure that they are responsive and collaborative and to identify and remove redundant or low-value activities.

Furthermore, business models are evolving at a rapid pace. Innovative companies are changing their strategies from developing products to delivering solutions in order to keep their products from becoming commoditized and less competitive. Much of this innovation comes from digital elements—for example software—but even media such as music or video is being incorporated into new products to make them smarter and more interconnected.

Strategy 1: Strategically transform business processes and leverage market analytics to build new capabilities, save costs, accelerate product introduction and create new market segments.

Proper business planning and continual improvement can help organizations make certain that business processes are as relevant and value-driven as the products they build. A strategy may include:

- Bridging business, development and operations processes.
- Collaboratively defining and managing the entire portfolio of products.
- Clarifying and documenting business priorities and approach.
- Utilizing best practices to optimize process effectiveness and eliminate waste.

By using proven approaches and tools designed for business planning and transformation, organizations can align their business and technology investment strategies and manage ever-evolving project priorities and resources. IBM offers business transformation frameworks and services, product portfolio management tools, and enterprise architecture solutions to help organizations optimize their business strategies.

IBM helps businesses establish a technology foundation on which virtually all enterprise applications can operate synchronously—sharing and reusing processes and information to foster interoperability across the enterprise.

IBM Global Business Services offers strategy and transformation capabilities that can help improve product development processes and optimize, integrate and operate product management environments. And to accelerate the drive to efficiency, IBM can also deliver business strategy alignment assessments and the following business value accelerators:

- Maturity assessment and strategic planning
- Electronics design accelerators
- Cloud services for design
- Embedded software assessment and strategic planning
- Design and testing services for software development
- Environmental compliance and strategic planning
- Product cost visibility diagnostics

IBM also offers leading portfolio, product and project management solutions to help gather and evaluate input, prioritize investments and maintain visibility into performance across the project, application and product lifecycles. IBM Marketing Analytics capabilities can improve decision making by providing insight into the opinions and preferences of key customers and stakeholders. This helps researchers and organizations proactively bring data about people's attitudes and preferences into their analytical decision making. Extracting deeper insight from various sources of customer preferences helps drive improved product quality and performance as well as deliver more effective return on marketing spend.

Leading electronics device manufacturer improves performance with IBM Global Business Services

To remain a leader in the electronic device industry a company must be capable of innovative and timely new product development. This electronics company wanted to implement a fast, responsive and quality-focused design and development process. In so doing, it would need to implement large-scale software development efforts focusing on large-scale product changes and new development.

This transformation meant launching a new business model that would include service development in addition to hardware and software development. The company wanted to implement best practices and tools in design and project management to help improve product development capability, productivity and time to market, while reducing development costs.

IBM Global Business Services provided practices and tools to help improve product development capability, productivity and time to market while reducing development costs by managing the entire design, development and implementation of embedded systems and software. This solution provided the capability to synchronize design and change activities across disciplines, integrate and manage the complex interdependencies and optimize embedded software and electronics as a strategic asset.

The company achieved the following results:

- Improved quality control and time to market of new products, removing 95 percent of “bugs” before the testing process
 - On target to increase the business unit’s revenue by 25 percent in 2015
 - Lowered overall development costs by enabling the reuse of software assets through the use of model-driven methodology
 - Improved customer satisfaction through higher quality products, and by meeting projected launch and shipping dates of new product lines and models
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Product and systems development

Software has infused smarter products with intelligence, leading to an exponential leap in product capabilities—and a commensurate increase in risk and complexity. As if designing and building smart products weren’t hard enough, many of them, such as cars, planes and smart phones, are systems of systems. Features are no longer isolated within individual products—instead, they are delivered through integration with other systems and back-office business processes. For example, a patient who suffers from congestive heart failure has an implanted cardiac medical device that monitors and regulates his or her heart. If the patient has a cardiac event, the implanted device senses it and wirelessly communicates that occurrence to the cardiac center, which can remotely monitor the patient and gather data for diagnosis.

Strategy 2: Adopt an advanced systems engineering approach to manage all product dependencies across engineering disciplines and build a strong competency in software development and delivery.

These complex, smart products and systems present opportunities and challenges. Software is the invisible thread that links components to form an intelligent and coordinated structure—and it is software that offers differentiating functionalities and delivers the real value of smarter products. Organizations that build a strong competency in software delivery will be able to rapidly respond to changes in the marketplace and deliver innovative services much more quickly. Plus, it may be more cost-effective for manufacturers to offer a broad portfolio of products by just changing the software. For example, manufacturers can address different target market segments by releasing products with similar hardware and electronics while using software to provide varying capabilities for the end user.

However, the challenges of developing smarter products run deep because a system of systems has many layers of complexity among the electrical, mechanical and software domains. To help manage and validate these complex interrelationships, organizations can implement or improve systems modeling and enhance requirements engineering, traceability and quality.

Leverage a comprehensive, integrated systems engineering platform for IPI

A holistic, integrated approach to systems engineering and software development is needed to rapidly deliver high-quality products and systems. An IPI approach connects four key disciplines that span the systems and software development lifecycle:

- **Requirements management**—Manages systems and software requirements, tracks conformance to those requirements and compliance to regulations
- **Architecture and design**—Graphically explores the requirements and builds out the behavior and functionality of systems and software
- **Collaboration, planning and change management**—Provides a central communication point and workflow support for diverse, distributed teams across the lifecycle to efficiently work together—continually and iteratively
- **Quality management**—Establishes a collaborative, customizable quality management hub that can unite teams and provide an enforceable process workflow

The IBM Rational® Solution for systems and software engineering is composed of a combination of technology, tools, best practices, templates and industry accelerators, delivering a comprehensive lifecycle management approach for product and systems development.

Enhance requirements management, traceability and quality

Because of scope creep and the widespread effects of changing requirements, it can be difficult to efficiently and effectively design and build products and product lines that meet customer

specifications. Requirements verification—either through engineering analysis or physical part and assembly testing—must be performed not only at the end of the development process but also throughout. That helps ensure that requirements are being met. Moreover, it is far less expensive to discover and solve problems and design issues earlier in the development process than later.

Using traceability tools to link tests to requirements throughout the process can improve quality by helping to ensure that the right tests are run and can save time and money by reducing unnecessary tests. Moreover, organizations can perform trade studies when designing a product to not only satisfy the product requirements but also optimally address the design constraints.

In most instances where a Product Lifecycle Management (PLM) system is deployed, product complexity is exploding and a simple requirements solution is insufficient to manage that complexity and avoid the costs of rework and late delivery. IBM requirements management is tightly integrated with other lifecycle disciplines and can work within a PLM environment to manage any level of complexity of systems and software delivery. IBM requirements management provides:

- Traceability views that help enable powerful coverage and impact analysis across multiple documents and projects.
- A comprehensive requirements engineering environment allowing all stakeholders to contribute to the full lifecycle of requirements while remaining connected to other lifecycle data and processes.
- A proven environment that can handle the rate of change and fidelity required by software intensive products.
- Integrations with other Rational solutions to allow tight linking of requirements and architecture while enabling a requirements-driven testing approach to product quality.
- A proven common requirements solution across multiple PLM systems and across the supply chain.



Figure 2: The Rational development tools work together to provide a comprehensive, integrated development environment.

Implement or improve systems architecture modeling to manage and validate interrelationships

A focus on architecture and design, involving collaboration across disciplines and key stakeholders is critical to delivering increasingly complex systems on time, with the right capabilities and quality. Organizations need to model their systems' architecture prior to investing time and resources into the full product design. Modeling and simulation are also important when a business wants to address a new market segment or revise a product early in its development lifecycle—when change is still relatively inexpensive. Modeling facilitates innovation through controlled experimentation and helps organizations assess the technical and commercial feasibility of those changes by showing how the changes to specific aspects of the design can affect product performance, cost and delivery schedule.

Using models, systems and software engineers can more clearly understand and analyze requirements, define design specifications, and test system concepts using simulation. Systems level designs can be reviewed by key stakeholders and handed off to the mechanical, electronic and software teams to elaborate and integrate into the final product, based on a common understanding of the architecture and the desired behavior of the system. As a result, engineers and developers can deliver more simplified, extensible, robust designs for the most complex and intelligent systems in much less time. Systems and software engineering teams benefit from the following practices:

- Involve cross-discipline and extended team of subject matter experts in collaboration on the architecture and design.
- Provide visual representations and points of view of product requirements to build architecture and design.
- Progressively refine marketplace demands and systems requirements into executable designs.
- Reduce the cost of producing high-quality systems by identifying system errors early, when they are less expensive to correct.

- Predict system behaviors and perform trade-off analysis to determine which design choices make the most sense.
- Iterate through the production of a set of reusable components to help improve both the artifacts themselves and the system that is the end product.

Manage, share and validate product and systems processes and information across teams

Complex systems are developed by teams of people distributed across the lifecycle in different engineering disciplines, different specialties, different geographies and different suppliers. Building collaboration into the day-to-day processes and enabling collaboration for every contributor is critical to succeeding in faster paced, highly competitive and more complex product delivery today. Responding to change appropriately requires a structure that enables communication, rapid and complete impact analysis and end-to-end “round trip” traceability. Planning must be highly visible, responsive to change and capable of engaging all contributors.

IBM Rational collaboration, planning and change management solutions help ensure that changes are shared and managed among global teams and across engineering disciplines. Manufacturers can bring together systems designers, software developers and product engineers in a common collaboration environment. This platform manages change in the various disciplines—software, electronics and mechanical—and uses workflow views and project management dashboards to track the impact of change wherever and whenever it occurs. As a result, companies may:

- Reduce the time it takes to propagate changes throughout the design team.
- Speed turnaround time in design and defect resolution.
- Lower the number of “missed” changes that are discovered late in the project.

- Improve the management of multiple engineering disciplines.
- Increase the visibility of schedules, including the impact of requirement and product changes.
- Manage project costs better.
- Reduce costs by leveraging existing process investments.

Improve product quality while minimizing test and verification costs

In many industries, large sums of money, the entire success of organizations—and in some cases lives—can hinge on consistently getting complex things right. Yet the success and brand image cultivated over many years can evaporate quickly when something goes wrong. As the pace of innovation and the need for differentiation within smart products drives increasing complexity, quality management demands collaboration across development organizations and across the development lifecycle.

To ensure that product quality meets customer expectations, organizations need a collaborative, role-based business-driven software quality environment. IBM Rational Quality Manager software helps organizations of all sizes and levels of complexity to optimize organizational quality by introducing quality early in development and by coordinating quality processes and teams throughout the lifecycle. It is designed for test planning, workflow control, tracking and metrics reporting that is capable of quantifying how project decisions and deliverables impact and align with business objectives and outcomes.

This solution can help you deliver greater quality software products, improve operational efficiency and continuously lower risk by helping teams to:

- Improve project management through efficient test planning.
- Improve delivered quality through early defect detection.
- Cut costs and development time through test automation.
- Collect process and quality metrics to manage risk and improve process maturity.
- Achieve and demonstrate regulatory compliance.

Accelerate product development with best practices, templates and industry accelerators

Practices and integrated process guidance are provided for both systems engineering and embedded software development to accelerate adoption of collaborative best practices that unify the development lifecycle.

- **Practice library**—The practice library provides an online step-by-step guide to systems engineering and embedded software practices formed from the well proven IBM experience with product and systems development.
- **Tool mentors**—Tool mentors illustrate practice steps for execution using a core set of IBM Rational tools and guide engineers to more effectively apply tools and integrations.
- **Templates**—Execution templates provide an initial set of tasks for a practice. Configuration templates and profiles provide initial tool configurations for IBM products.
- **Auto generation of work items**—Practice work items can be automatically created using templates matching the practice tasks. Work items are assignable to team members, are visible in dashboards, and support alerts and feeds.
- **Dashboards**—Dashboards provide summaries of the state of activities of individuals or teams, on the application of practices and other desired views.

Industry accelerators extend the Rational solution for systems and software engineering with support for meeting specific standards and safety critical compliance requirements. Each industry accelerator provides process and practice guidance and tooling that supports industry specific needs.

- **Aerospace and defense**—Aerospace and defense accelerators support describing large scale “System of Systems” with architecture frameworks using the industry standard unified profile for DoDAF and MODAF (UPDM). Process, practice guidance and tooling are provided to support developing software under DO-178B

- **Automotive**—Automotive accelerators extend the solution with AUTOSAR for ECU software implementation. Process, practice guidance, tooling and tool qualification kits are provided to support developing automotive systems under the Automotive Functional Safety standard ISO 26262
- **Electronics**—Electronics accelerators provide process, practice guidance and tooling that helps to bring hardware and software development together for more efficient, higher quality results. The solution also helps meet compliance with safety standards and audit requirements in medical devices.

Continental Automotive streamlines development, cuts costs and improves quality

The design of in-vehicle electronic systems is a complex process requiring the coordinated efforts of multiple teams developing components that must ultimately work together. By implementing an integrated, model-driven development environment, members of the development team can better understand complex product requirements. The solution connects all developers engaged in the process and provides them with a unified view of all relevant information, data, pieces and parts in the development process. The result is vastly improved time to market, which enhanced the company's ability to compete in a highly competitive market.

To meet its business challenges, Continental Automotive implemented an integrated developer environment based on IBM Rational Rhapsody® software, which is particularly well-suited to systems engineers and software developers who create real-time or embedded systems and software. The company uses Rational Rhapsody software as a central entry point for development projects and as an integration framework to support a model-driven systems and software development paradigm.

Product support

Manufacturers today know the product development lifecycle does not stop when the product leaves the facility and is launched to market. Today's smarter products include software, sensors and other technology which must be supported and updated after products are in the hands of clients. Yet few companies design products with support requirements and asset longevity in mind. Furthermore, lessons learned in the field aren't always communicated back to design to support continuous product improvement or to business planning for consideration of future direction and strategy.

Strategy 3: Close the feedback and communications loop between design and support to enable continuous product improvement while ensuring that the product can be profitably supported and maintained over its lifetime.

Product support capabilities from IBM offer feedback and communications streams for insight into the production and after-sales health of products to accelerate and improve product design, deployment, maintenance, after-sales service, and problem resolution. This allows companies to create new service offerings to the customer, improve their product and ultimately to make for a happier customer. Maintenance teams can use bill-of-materials information, manuals and three-dimensional views of "as designed" and "as built" products to accelerate product deployment, maintenance and problem resolution.

Conversely, the solution can collect information from the field and automatically route it back to the design teams that need it for fixes and design planning. This information could include:

- Common configuration problems.
- After-market parts that may cause issues.
- Fixes that can be used by maintenance teams.

Consideration of the service desk within the product lifecycle can boost customer service by unifying the management of field requests, customer problems and workflows. It can help ensure problems are routed to the design or the maintenance teams that own the problem, helping manufacturers continually improve the quality of their products—including their reliability, compliance and application. This feedback loop between design and support has become particularly important as products increasingly include firmware and software that must be maintained.

This same information can be fed back to the business planning and portfolio and product management teams so that they can decide if a product should be sunset or if a new product should be added to the line. These teams can also use product support information to discover new market opportunities and to continually improve business processes.

Also, the documentation of a product once it is released must live as long (or longer) than the product itself. The IBM solution for product support helps companies leverage their critical business information to manage and integrate data across the entire design, build, operate and maintain cycle; manage their supply chains more effectively, and optimize operations to take advantage of new technologies in both new construction and upgrades to older facilities.

The IBM solution for product support has capabilities that include:

- Technical document management and data retention.
- In-service feedback.
- Service incident and fix-tracking back into planning and design.

Rolls Royce powers forward with IBM solutions

Rolls Royce not only builds engines, but it must ensure they are serviced and maintained to ensure their highest level of safety and availability for its customers. When one small part wears down or fails prematurely, it affects not only the engine, but the customer's business. The client needed to improve service to its customers through preventive service and better engineering.

Rolls-Royce selected IBM solutions to provide its customers with full-lifecycle service to improve the asset utilization/availability of engines, and to capture details on asset history and failures that can lead to earlier diagnosis of potential failures and improved design and engineering of new products.

As a result, Rolls Royce was able to achieve improved visibility, control, and automation, improved maintenance planning, accurate event based forecasting—all contributing to increased revenues and profitability and better service to customers, while reducing costs.

Lifecycle collaboration

Disconnected product development applications and processes hinder collaborative development among an extended design chain of departmental, partner and supplier teams. Organizations need ways to include their design and supply partners in a unified process for product development. Specifically, product, project, portfolio and performance information needs to be available and shared efficiently among all the design stakeholders in real-time, while being managed by an overarching process.

Strategy 4: Extend the enterprise beyond its traditional four walls to include partners in the product planning, development and support activities.

Lifecycle collaboration helps manufacturers effectively distribute the product design and development process across the extended value chain. And it improves product development, providing increased business performance and executive-level decision support. It drives opportunities for:

- Product cost reductions and quality improvements.
- Faster cycle times and ROI.
- Development costs savings.

Facilitate collaboration across the extended enterprise

All of the teams and partners that contribute to the overall product design comprise the design chain. A company—such as an original equipment manufacturer (OEM)—may manage the entire design chain process, or a company—such as an embedded software developer—may participate in only a small portion

of the process. In either case, it is critical that organizations follow a coordinated design process and have access to all relevant data—even if design chain partners are in different companies or geographies.

Product change originates from a variety of stakeholders throughout the design chain. Changes come from every part of the enterprise—including marketing, customer support, development teams uncovering issues and managers concerned with keeping pace with competitors. When a product's hardware, electrical and software components are built in parallel, changes that occur within one discipline can have a cascading effect on the other disciplines. Therefore it is critical to efficiently communicate changes across the design chain.

Every service and interaction that happens within the multiple systems needs to be managed, monitored and maintained so that the engineers in the different disciplines and participants all along the design chain are on the same page. Methods for managing and validating the interrelationships that occur among the three disciplines and design chain must be found to help ensure that products meet requirements and to support regulatory compliance.

An integrated product and systems development approach helps organizations better collaborate and manage complexities by breaking down the silos among engineering disciplines and managing change across domains. This approach helps ensure product quality by assembling and tracing requirements throughout the product lifecycle and across the design chain. It also balances scarce resources across profitable product lines and helps avoid rework and redundancy by leveraging product and architecture commonality.

Leverage existing investments with IBM solutions for lifecycle collaboration

Organizations that want to improve collaboration shouldn't need to rip out and replace existing resources to implement new tools or process improvements. Ideally, businesses should be able to build on the value of existing tools and processes. To do so, they need to integrate tools across the design chain and federate information from existing and new sources.

Lifecycle collaboration solutions from IBM enable line-of-business employees to participate and collaborate in the development process by giving them access to engineering data that may currently be siloed in multiple design and management systems. IBM utilizes open industry standards such as Open Services for Lifecycle Collaboration (OSLC) and SOA strategies. IBM WebSphere® solutions can help organizations rapidly deploy composite IPI applications on existing tools and data repositories. And IBM Lotus® solutions offer dashboards and collaboration hubs to facilitate teaming both inside and outside a company's four walls.

Plus, IBM Global Business Services offers reengineering services that consider client-unique situations to help manufacturers maximize existing investments and integrate them with new applications, systems and infrastructure. The group can provide services such as:

- Enterprise application integration.
- Business process management.
- Partner ecosystem management.

Japan Aerospace Exploration Agency blasts forward in rocket development

Rocket development requires some of the most advanced, complex and meticulous engineering knowledge and capabilities in the world. It is often difficult to capture and maintain this expertise in a systematic manner, for use in future projects. JAXA saw the opportunity to gain technological advantage by enabling its engineers and developers to share the most complex design information and exchange critical data with each other, to design, develop and test rockets more quickly, and at a lower cost than its competitors.

Using solutions from IBM, Japan Aerospace Exploration Agency can now leverage maximum knowledge from both current and future projects to accelerate rocket development. A Product and Service Framework (PSF) solution allows secure sharing and management of very complex engineering data, enabling engineers and developers to efficiently share and build upon their knowledge as they develop and build new rockets. More importantly, the solution allows the injection of historical trial and error into current development effort, giving development teams critical insight to leverage upon in new development. With this capability, JAXA can efficiently drive current development projects fully inheriting Japan's solid propellant rocket experiences in the past.

As a result, Japan Aerospace Exploration Agency was able to design, develop, and test rockets more efficiently and cost-effectively. Engineers and developers can leverage long-accumulated knowledge and expertise about the success or failure of previous rocket designs, tests and simulations, ensuring that past expertise and knowledge is used for future efforts, and not lost if an engineer leaves the agency.

Support for designing, delivering and managing smarter products

As products become more complex, interconnected and intelligent, innovation is derived increasingly from a collaborative model among design partners and suppliers. Consequently, IPI needs to be approached in a strategic way to help organizations deliver high-quality, innovative products to the marketplace faster and more frequently. Manufacturers can apply four key strategies—spanning business planning and transformation, product and systems development, product support and lifecycle collaboration—to support an IPI approach to product design, manufacturing and support.

IPI from IBM is delivered as part of the Product and Service Framework, which delivers an integrated set of capabilities designed to help manufacturers to:

- Create more innovative products and services that are intuitive to the end user
- Build dynamic value chains with suppliers and partners to design and deliver products in a more efficient and cost effective way
- Facilitate continuous product improvement throughout the lifecycle—from planning through support
- Identify new business models that surround smarter products
- Leverage IBM best practices to reduce risk based on our extensive experience managing complex value chains

The Product and Service Framework addresses the unique needs of manufacturers by offering capabilities built on open standards, including OSLC. IBM continually strengthens the integrations among its framework capabilities and adds new components to help keep the framework relevant to the needs of specific industries, including automotive, aerospace and defense, and high-tech and electronics.

Organizations that incorporate IPI solutions into strategic business processes can achieve the process flexibility and performance needed to address the demands of today's—and prepare for tomorrow's—complex, interconnected world. Specifically, IBM offers:

- **Applications**—leading software and technology from IBM and global IBM Business Partners.
- **Advanced architectures**—innovation such as cloud computing, security and application modernization.
- **IPI research**—collaborating with clients and industries to further advance the science of IPI.
- **Methodology, skills and global delivery**—core IPI strategy and offerings, supported by IBM global centers and delivery resources.

With consultants and technical staff in 160 countries, IBM delivers systems, solutions and services to more than 20,000 clients worldwide. IBM offers a proven track record of delivering advanced solutions in a variety of industries and market segments.

For more information

To learn more about the comprehensive insight and product innovation offerings and strategies from IBM, please contact your IBM representative or IBM Business Partner, or visit: ibm.com/IPI

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