Adaptive Product Lifecycle Management

The story, success, and vision of the HP/Compaq merger

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Executive summary

In companies around the world, executives are seeking fresh management approaches that facilitate positive change and support innovation. In the current economic environment, it's no longer enough to merely cut costs or boost efficiencies. Today's successful companies – from established organizations accommodating changing business conditions to newly merged corporations seeking maximum synergies – need a visionary approach. They need a strategy that not only addresses the market demand for enhanced customer satisfaction, but also prepares business leaders to quickly seize new opportunities. For many corporations, carefully evaluating the organization's product lifecycle management/ collaboration (PLM/PLC) processes and environment is a way to achieve this.

By creating a strategy for success within its own product lifecycle environment, HP overcame many obstacles and made a few technology breakthroughs. As a result, HP is uniquely positioned to share these experiences with other large manufacturing companies facing similar issues, whether they are engaged in mergers or acquisitions, or simply embracing new business models.

A well-designed, well-executed PLM strategy can provide tremendous value to a company. PLM can connect major corporate stakeholders into an integrated environment that enhances the creation of innovative products and services; it supports collaborative relationships within and outside the company; and it delivers cost reductions, quality improvements, and shorter time to market. Carefully planned and executed, PLM can be a catalyst for positive business change.

Understanding this potential for value creation, the executive teams of pre-merger Hewlett-Packard Company and pre-merger Compaq Computer Corporation focused on PLM to help create maximum synergies from the merger of the two companies – synergies that would capture the best of each organization and lay the foundation for an innovative, forward-thinking new company.

More than a year has passed since the HP/Compaq merger, and a refined PLM strategy is already beginning to deliver quantifiable results. This paper discusses the business challenges of merging two PLM strategies, the roadmap created to deliver on the PLM vision, and the value that PLM is delivering to HP. It also discusses how the merger and post-merger PLM expertise developed by HP can be applied to address the business challenges faced by many corporations today.

The goal: Merging two global giants into one market leader

Nearly every corporate merger is marked by difficult challenges and hidden pitfalls. But when the players include two global technology giants, the bar is much higher. The unprecedented merger of Hewlett-Packard Company and Compaq Computer Corporation in 2002 was the largest of its kind – and not everyone was convinced that it would succeed. Unifying these corporate titans into a single, harmonious enterprise meant blending tens of thousands of products, customers, and global supply chain points involving over 100,000 suppliers into one organization – without sacrificing the customer-centric approach that defined them both.

From the start, the management teams of both companies recognized the importance and need for an adaptive product lifecycle management (PLM) environment. Applied globally, this strategy would allow the new company to create consistent business roadmaps for products and services, effectively meeting the needs of its customer base and positioning the enterprise to rapidly seize new market opportunities. From this industry perspective, the importance of an adaptive PLM approach was not just fundamental to the overall merger strategy, but it was also essential to the ongoing success of the new company.

Challenges

Integration of two huge companies with massive, highly complex, global product lines
• Approximately 200,000 products
• Product refresh cycles for:
  – Printers of 3 to 7 months
  – PCs of 4 to 7 months
  – Workstations of less than 12 months
  – Supercomputers of 36 months or less
• 100,000+ suppliers
• More than 60% outsourced manufacturing
• 60% collaborative design content

Need for consistent, accurate product lifecycle data
• Suitable to manage multi-billion dollar business
• Extracted from multiple, highly diverse, legacy systems across multiple business units

Needed strategy to quickly reduce complex infrastructure and high support costs

Solutions

• Senior management support – Master Data Council

• Combined and redesigned PLM strategy initiated through "clean room" and an "adopt-and-go" philosophy

• Standardization to create greatest efficiencies

• Easy adaptability to recognize the unique needs of individual business units or geographies

• One master data instance as a target, achievable through continued deployment of mySAP PLM

"Large manufacturing companies face product data management problems and HP and Compaq were no exception. The merger gave us greater impetus to solve them. We are executing now as one company."
— David Savage, Manager, Global Operations IT, Master Data Group, HP

The challenge: Complexity multiplied

On the surface, it may have appeared that HP and Compaq were highly similar. After all, both manufactured personal computers, high-end servers, printers, storage, and other accessories. Yet there were marked differences in the way each company manufactured, marketed, sold, and serviced its products. To succeed, the new company had to blend these business units and eliminate redundancies, while continuing to deliver superior quality products and services to meet customer needs at competitive prices.

To do this, the newly merged company needed to coalesce numerous independent, autonomous business units, with varying product charters. These structures were developed in the original companies to enhance financial and operational accountability; over time, however, they created complex relationships between business units and among divisions, contract manufacturers, and distributors. These structures hampered collaboration and communication as well as the ability to take advantage of efficiencies that standardization and sharing of data and information could create. From every aspect, the complexity of the merger challenge was extreme.

The approach: From clean room to board room

To address these challenges, the executive leadership team created "clean rooms" for each of the operating components of the two companies. These virtual work areas were staffed by employees from each company – domain-specific experts charged with developing strategies and plans, choosing tools, and outlining the execution of those plans throughout the merger and beyond. Supporting these teams was an "adopt-and-go" philosophy that fast-tracked the approval and implementation process for new approaches, as well as a Master Data Council that helped to streamline any changes.

One of the clean room teams was assigned responsibility for formulating a merged PLM strategy. PLM clean room team members were selected in equal proportion from their expertise domains within each of the companies – bringing together the finest talent, best-in-class practices, critical experience, and recognized histories of the two organizations. "When you assess or review a product lifecycle environment, you must rethink the traditional structure of both the business and IT operations through the view of a new business model, and this can be very challenging," says Cynthia Boresch, Director of Information Management for HP. "The representation in the clean room gave us a great opportunity to streamline and expedite this approach."

The vision: Collaboration as a catalyst

The PLM team began by outlining its vision for an effective product lifecycle environment – one that would adapt and respond to business needs quickly and allow HP to:

- Design and build anywhere

- Realize real-time collaboration across the virtual enterprise

- Retrieve product information quickly and easily

- Leverage business knowledge internally throughout the product lifecycle

- Link the product development and lifecycle management process to the supply chain

- Reduce the time needed to develop new products

The PLM team then considered the business challenges that could impede the success of the PLM initiative. The team realized that the merged PLM strategy would require a modified business that would support the effective management of collaborative data across engineering, procurement, production, marketing, sales, and services. Effective data management would play a key role.

The team knew there would be several obstacles to this objective, including:

- Inconsistently defined responsibilities for data ownership

- Inadequate product data integrity

- Multiple processes being used by multiple business units

- A need for a new point of view; not just getting product out – but drawing existing customers back and new customers in

Thus, the PLM team determined that a critical and immediate need for the new company was to organize and define responsibilities and conditions for data ownership and management across the enterprise.

In addition, the execution of the PLM strategy demanded an effective, integrated IT environment. Creating this required:

- Elimination or minimization of numerous disparate, non-integrated IT systems within both companies that were creating roadblocks to data consistency, integration, and availability

- Simplification of the IT infrastructure, which was complex, fragmented, and costly

With these goals and challenges in mind, the PLM team designed a plan for transformation.

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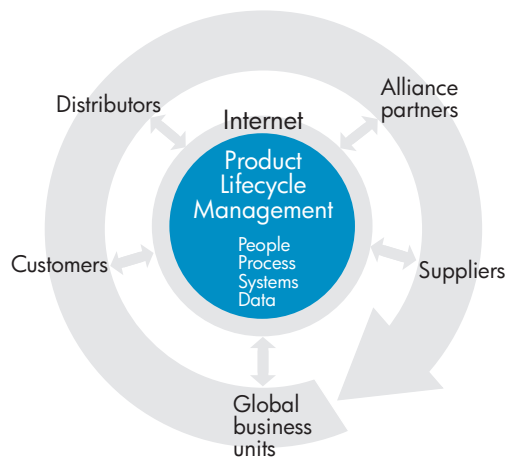
The plan: Designing a product lifecycle roadmap

From the beginning, it was clear that the new company would implement the PLM strategy horizontally, across the global enterprise, so that it created efficiencies throughout all business units and delivered universal value. Defining this approach led the PLM team to evaluate the product lifecycle roadmap from several business process considerations, including:

- *Commonality:* Where did both pre-merger companies have the same or similar processes in place to perform similar tasks?

- *Differences:* Where did each organization take different approaches to perform similar tasks? What are these approaches?

- *Uniqueness:* Where did each company perform tasks that were not addressed by the other organization? What are those tasks?

- *Best practices:* Which practices work better for each business task?

- *Best-in-class:* Would each practice play and integrate in a best-in-class product lifecycle environment?

With this review complete, the team focused more extensively on three areas: commonality, differences, and product data management.

Commonality: Develop and apply standards
To optimize commonality across the new enterprise and support collaborative networks of global HP employees, customers, and suppliers, the PLM team and the Master Data Council determined that it was crucial to reduce the number of repositories for product data and to integrate or eliminate certain IT systems. In addition, the team recognized that, in some cases, standards needed to be

developed and applied if the new company were to leverage consistency, streamline the integration efforts, and reduce the extreme complexity across the enterprise.

This was a lofty goal. Few companies, especially those with highly distributed operations like HP, use a single set of design data formats, approvals, and processes for collaborating across their internal design teams, let alone for standardizing across their global enterprise of operation. But with the aspiration of creating one central data instance, HP raised the bar for building a business in which product definition information traversed organizational and geographical boundaries.

Differences: Recognize unique needs
Despite the desire to achieve commonality wherever possible, the PLM team also recognized that a "one-size-fits-all" plan is unrealistic. Each of the global business units within HP – including the Personal Systems Group, Enterprise Systems Group, Imaging and Printing Group, and HP Services – had different business drivers, including target markets, number of products, and product complexity.

The PLM environment also had to manage the unique business requirements of the different sales regions. From including the appropriate power cord, to far more complex configuration issues mandated by local regulatory agencies, the PLM environment needed to allow flexibility and integration at key points throughout the many business unit value chains.

In addition, the PLM solution had to support a variety of product generation applications used by different businesses, including legacy systems that would not immediately migrate to the new PLM solution. For example, the Imaging and Printing Group wanted to preserve its successful investment in PTC's Windchill™ solution, because this technology worked well for their business unit's manufacturing and collaboration model.

The review process revealed that the two organizations handled product variations differently. Compaq employed a stock-keeping unit (SKU) based system, with each variation of a product assigned a unique SKU number. To order a product with specific features, customers used a specific SKU number. In contrast, HP customers entered a base model number and then specified associated feature kits. For new products, the team selected the base model approach to avoid the proliferation of SKU numbers, a problem Compaq had faced, and because the base model approach would more optimally meet the product lifecycle management business objectives. The PLM solution had to be able to address both product formats until the change-over to the base model approach could be completed.

The roadmap cornerstone: Product Data Management
Having defined the obstacles to effective data management and the need to adapt to unique business requirements, the PLM team then determined that a cornerstone of the product lifecycle management roadmap had to be a global product data management (PDM) initiative. PDM would address commonality, standardization, and unique integration needs that would not only reduce complexity but also create consistency and efficiencies across HP business units and their operations.

Therefore, one key decision in the PDM initiative was to implement a single data management repository; this repository would serve as a central resource for critical corporate data, but it would be accessible to legacy applications at business units around the world. Using this approach, the PDM initiative would standardize the data, but continue to support the individual business needs of different regions, divisions, and business units. By structuring the PDM approach this way, the team could leverage the existing investments made by the two pre-merger organizations while paving the way for ongoing efficiencies and savings.

The foundation of the PDM approach was based on mySAP™ Product Lifecycle Management (mySAP™ PLM). mySAP PLM was implemented to serve as the repository for HP product data. mySAP PLM is a collaborative design and engineering solution that can handle changes to the structure of existing products, new products, service, delivery, and repair on a global scale. The solution allows concurrent, collaborative activities across real-time points in the product lifecycle environment, and helps increase HP's profitability requirements and satisfy customer and supplier interaction and expectations.

SAP was not new to either HP or Compaq. In several business divisions, both companies had already invested significantly in SAP® solutions, both in terms of license dollars and deployment value. HP and SAP have a long history of joint development. For example, many of the software upgrades to SAP applications for the high tech industry have been based on feedback from HP. "HP and SAP enjoy an exceptionally strong partnership," says Eric Harper, Director of SAP Center for Expertise, Information Technology Office, Hewlett-Packard. "This benefits our customers through joint development of industry-specific offerings, which can then help solve the problems that many other global manufacturing companies face today."

The implementation of mySAP PLM to support the PDM initiative was well-received throughout the enterprise. "Using this technology is helping us consolidate engineering data into one collaborative environment," explains Don Borgal, Director, Global Operations IT, Master Data Group HP. "mySAP PLM will have a huge impact on our bills of material, change management, and product design – saving millions of dollars across the organization. And it will support many of our goals, including being able to design and build products anywhere."

With the merger of HP and Compaq still in the early stages, it is clear that the PDM approach – based on mySAP PLM – is helping the going-forward company to unify product and service offerings and streamline business processes. As the company continues to evolve, HP will use mySAP PLM to tightly couple design and engineering, which will help HP serve its customers with unprecedented responsiveness. Looking forward, the adaptive PDM approach will allow all divisions within HP the interoperability to create and support the unique solutions they need to satisfy customer demand.

One group of HP users estimates that the PDM initiative has reduced their setup time for parts by 94%, an excellent return on investment.

The value: Dynamic business advantage

With the core PLM strategy defined, and the merger just over one year old, the benefits provided by the adaptive PLM strategy are becoming clear. For HP's customers, suppliers, contract manufacturers, and stakeholders, PLM is paving the way for new efficiencies – such as cost savings through decreased IT systems costs and reduced inventory exposure, as well as enhanced visibility across business units and regions for faster market responsiveness. The sections that follow describe the explicit benefits delivered by or expected soon from the PLM solution.

Key benefits: Customers

Maintaining a customer focus throughout the merger process and strengthening the company's customer-centric approach was critical to HP. Therefore, the ultimate goal of the PLM strategy was to make it easier for the customer to do business with HP and to make HP an even more customer-centric organization.

From the customer point-of-view, anticipated benefits of the PLM strategy include:

- Reduced delivery times

- Improved accuracy and reliability of order delivery

- Enhanced operational cost savings that could be passed on to the customer

- Improved product value for the same cost

- Increased responsiveness to warranty service issues

- More compelling buying experience enabled by demand shaping and product offerings that attract customers

To date, two measurable results of the PLM effort include nearly eliminating pricing errors as well as enhancing the accuracy of bills of materials. Customer satisfaction is increasing because buyers receive exactly what was ordered, accompanied by a bill of material that can be used to accurately audit the deliverables. Additional customer benefits include a significant reduction in incomplete and incorrect orders. Over time, HP's PLM strategy will effectively eliminate this problem by ensuring that only fully configured and fulfilled orders are shipped. Together, these benefits are helping HP enhance customer satisfaction, which is the only focus on the customer that really counts.

Key benefits: Suppliers and contract manufacturers

HP suppliers and contract manufacturers dealt with a huge diversity of parts and products from the pre-merger HP and Compaq organizations. These partners navigated a complex set of mappings to HP and Compaq part numbers that were in some cases unique to each of the company's units and regions.
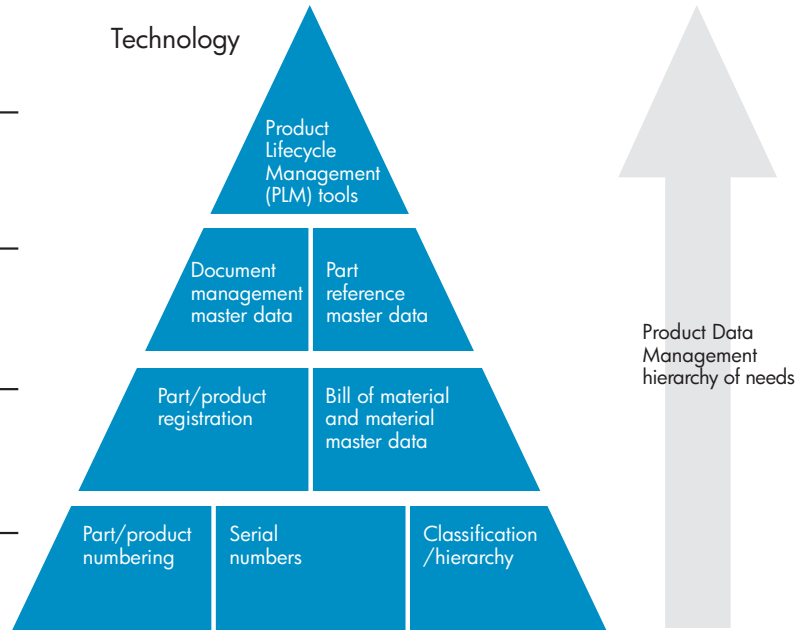
With the standardization of product data and the elimination of duplicate data repositories, HP can now minimize unnecessary duplication. Suppliers and contract manufacturers benefit because they no longer have to maintain these complex sets of product number mappings. In addition, the PLM initiative provides additional benefits to suppliers and contract manufacturers by consolidating the visibility of parts needed and consumed during the product lifecycle, and by streamlining engineering change orders.

Business benefits enabled by HP's Product Lifecycle Management environment include:
- Faster time-to-market
- More productive sales force
- More efficient service and support
- Elimination of duplicate parts
- Coordination of new product introduction and product discontinuation
- Market pricing of components
- Opportunity for IT system consolidation
- Consistency of interaction with customers and partners (service, ordering, parts, delivery, repair)

Business

	Technology	Data
Customer needs management	• Part/product numbering • Serial numbers • Part/product registration	• Products • Serial numbers • Manufacturing bill of materials
Component and supplier management	• Part reference master data • Material master data • Part numbering • Part registration • Classification	• Parts • Part parametric data • Product and part costs • Approved manufacturer lists and approved vendor lists
Supply chain collaboration	• Bill of material/material master data • Product Lifecycle Management tools • Document management • Part numbering	• Parts • Manufacturing bill of materials • Engineering change data • Technical documents
Business performance management	• Classification • Product hierarchy	• Product hierarchy • Marketing hierarchy

Technology

Product Lifecycle Management (PLM) tools

Document management master data | Part reference master data

Part/product registration | Bill of material and material master data

Part/product numbering | Serial numbers | Classification/hierarchy

Product Data Management hierarchy of needs
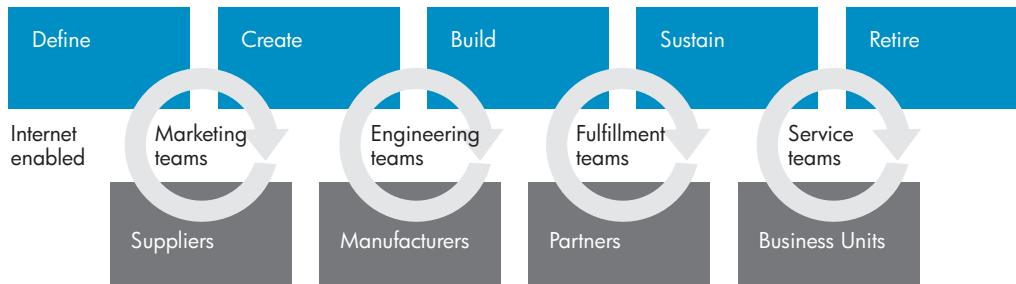
Key benefits: Stakeholders

The PLM strategy contributes to increased stakeholder value in several ways. By retiring legacy and duplicate IT systems and eliminating duplicate data repositories, HP achieves tangible new cost savings that not only enhance the efficiency and effectiveness of resource usage but also pass directly to the bottom line.

The PLM initiative also contributes to reduced labor and production costs as well as improved production accuracy and timeliness. In addition, a flexible product offering that is not SKU-based will offer customers more choice – without the administrative and systems overhead required to manage data for thousands of SKUs. With these enhancements, HP expects customer satisfaction and retention to increase, and the time and cost devoted to addressing customer delivery and service issues to shrink. The intangible benefits of customer satisfaction and improved supplier relationships will also contribute to HP stakeholder value.

Looking ahead: Long-term benefits

By implementing an adaptable and flexible product lifecycle environment, HP not only generates benefits today, but also has set the stage for an integrated, responsive IT environment that will create significant value over the long term. The PLM strategy introduces flexibility into the enterprise, allowing it to adapt to continually changing business needs. Over time, this flexibility will help HP:

• Improve customer intimacy

• Achieve operational excellence

• Foster continued product leadership

• Make it easier for customers and partners to do business with HP

Define	Create	Build	Sustain	Retire

Internet enabled

Marketing teams	Engineering teams	Fulfillment teams	Service teams
Suppliers	Manufacturers	Partners	Business Units

HP Product Lifecycle Management solutions

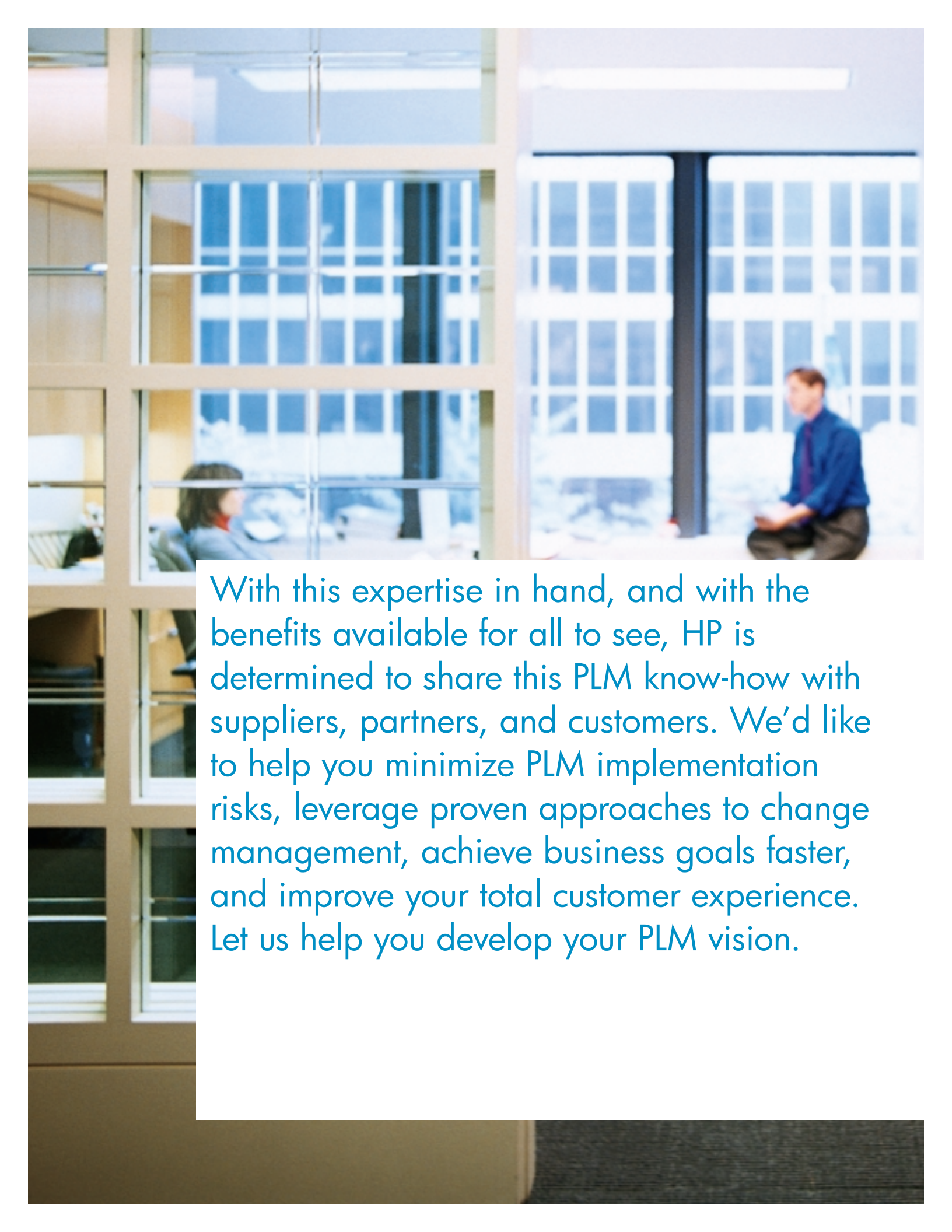**Proven results:** World-class high tech manufacturing facilities
Performance leadership: Global business practitioner of product lifecycle management strategies and solutions
Complete, integrated solutions: Complete set of end-to-end solutions, technology and services
• Address industry-specific business issues
• Create rapid benefits from establishing common product information processes within an organization's distributed design and supply chains
Continual improvement for maximum ROI:
• Processes designed for re-use across the enterprise
• Reduced duplication of applications, data, and technology

Moreover, HP's integrated PLM environment lends focus to operating efficiencies, which reduce costs as well as the time necessary to deliver high-quality products. "HP's experience in creating an integrated PLM environment will enable the vision of continued customer-centric collaboration," says Amine Tarhini, Global Operations, Customer Operations, PDM Data Services. "It will help us to invent the right products at the right time and capture new markets."

In the future, Hewlett-Packard envisions a seamless pipeline of consistent product lifecycle data and integrated processes across the entire enterprise. Ultimately, the PLM solution will help HP create a collaborative business environment in which vendors, suppliers, and customers all participate in the success of the organization. "The true value of our PLM efforts can already be seen in the way HP connects processes and data to bring solutions to the real world – solutions that help our customers and stakeholders achieve maximum benefit from their investment in HP," says Mary Ellen Smith, Global Operations, Customer Operations, PDM.

Let Us Help You
HP's impressive merger experience – including the effort to create a consolidated, collaborative, customer-centric PLM strategy – provides a clear understanding of how PLM can be used to generate extensive corporate business value. For HP, the demanding challenge of product lifecycle management became an opportunity to reshape the organization in an effort to develop new competitive advantage. Only a short time after the merger, HP is already beginning to realize the benefits of following through on its PLM vision.

For more information visit:
www.hp.com/go/manufacturing

With this expertise in hand, and with the benefits available for all to see, HP is determined to share this PLM know-how with suppliers, partners, and customers. We'd like to help you minimize PLM implementation risks, leverage proven approaches to change management, achieve business goals faster, and improve your total customer experience. Let us help you develop your PLM vision.

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