Introduction

Customers demand innovative products, making product innovation the lifeblood of any manufacturing business. But innovation alone is not enough. Customers want those products to be built with quality, and delivered exactly when they want them. And, to make a profit, companies need to deliver these same products cost-effectively. For these reasons, manufacturers no longer have the luxury of choosing between excelling at product development or excelling at managing the business of manufacturing. They need to excel at both.

The enterprise systems that manufacturers rely on must also perform effectively in both product innovation and business execution. Research firm Tech-Clarity’s report, Issue in Focus: The Integrated ERP-PLM Strategy, concludes, “The enterprise systems’ ecosystem for manufacturers is beginning to standardize on two primary solutions—ERP and PLM—as the primary infrastructure to drive product profitability.” That mandate means companies can’t choose between ERP and PLM systems. In today’s fiercely competitive environment, world-class manufacturing now requires both ERP and PLM to play important, complementary roles.
ERP/PLM integration is incredibly important to today’s challenging product development landscape. Companies offer broader product portfolios, more customization, and more product variants than ever. At the same time, products have become more complex, in part due to the incorporation of electronic controls and software in traditionally mechanical devices. Global competition demands rapid development and introduction of new product innovations. Integrated, world-class solutions allow manufacturers to overcome these challenges and to develop and deliver product innovation.

PTC’s Windchill software is the single best-selling PLM (Product Lifecycle Management) system on the market. Microsoft’s Dynamics AX ERP (Enterprise Resource Planning) solution is an industry-proven tool used by manufacturers around the world. Integrating these two leading applications allows companies to consistently design and deliver compelling products, and reach higher levels of profitability.

ERP and PLM: Complementary solutions

ERP and PLM systems play synergistic roles in manufacturing. Both play an important part in delivering compelling, high-quality products. Each solution has a distinct purpose, and each is designed to meet the special needs of its area of focus. As leading PLM analyst firm CIMdata explains:

“PLM manages the innovation process—enabling companies to quickly create right-to-market products and to leverage part re-use.

ERP ensures that a quality product is produced according to customer demand, in a timely, cost-controlled manner.”

The following image describes in more detail the business processes and capabilities that ERP and PLM address (Figure 1).
ERP and PLM have different roles and are complementary solutions that help manufacturers achieve their goals. In fact, industry analyst Aberdeen Group’s 2008 benchmark report, Integrating the PLM Ecosystem, noted that leading companies are more likely to be leveraging ERP and PLM together. Specifically, the research states that “Best-in-class companies are 40% more likely than Industry Average companies to have integrated PLM to ERP.”

That same Aberdeen benchmark shows that companies that have integrated their ERP and PLM solutions are achieving better performance on the metrics that drive product profitability. Integrating ERP and PLM offers a number of important benefits to manufacturers. For instance, ERP/PLM integration helps organizations overcome typical challenges emanating from a lack of coordination between Engineering and Manufacturing, a lack of agility in Manufacturing, and time-consuming manual processes. Combining these important solutions allows companies to:

- Improve Product Development Effectiveness
- Lower Product Development Costs
- Speed Product Time-to-Market
- Increase Data Visibility Across the Enterprise
- Reduce Manufacturing Errors

These benefits are realized in part by enabling tighter coordination between functional groups. This integration empowers manufacturing resources to get involved earlier in the design process, which improves manufacturability and compresses the time required to ramp up production. PLM/ERP integration also allows companies to incorporate more downstream knowledge and expertise into their design process in order to encourage the use of common components and the reuse of existing designs, and to design for optimal product cost. Finally, tighter integration allows for a streamlined change management process that can reduce errors and help bring new product innovation to market more rapidly.

PLM-ERP integration: The best of both worlds

A starting point for understanding PLM-ERP integration is the PTC Value Roadmap. The PTC Value Roadmap is a unique and proprietary way of aligning a company’s strategy with the people, systems and resources it takes to launch a great product. Based on extensive product knowledge and research, the PTC Value Roadmap maps business strategies to actionable product development initiatives. One of the core PLM/ERP integration points derived from the Roadmap is the process for releasing products to manufacturing. Here, the PLM/ERP integration ensures that the most current information is made available by the PLM system to the ERP system in order to enable Manufacturing. The PLM/ERP integration also includes an integrated change management process, which helps deliver innovations, quality improvements, cost reductions, and product enhancements to market, quickly and with confidence. The result is an integrated environment that supports both product innovation and execution lifecycles (Figure 2).

Figure 2: Integrating the Innovation and Execution Cycles
Source: Tech-Clarity, Inc.
Most importantly, integrating business processes across ERP and PLM helps to remove barriers between Engineering and Manufacturing. This process-integration helps to reduce cost and improve efficiency, and helps prevent errors either from having to perform manual Engineering/Manufacturing integration, or from a lack of visibility into the right information.

Integrating processes can be enabled by sharing relevant information back and forth between Windchill and Dynamics AX. For example, access to cost and inventory in Windchill helps engineers understand the supply chain impacts of their design choices, so they can make better decisions. Access to BOM and CAD information from Windchill in Dynamics AX, ensures synchronization between Engineering and Manufacturing and prevents errors.

Perhaps the most compelling benefits of the integration are described by a customer, the CEO of an engineering company specializing in the design and construction of industrial farm equipment. He outlines the value his company received from integrating Windchill with Dynamics AX: “Efficiency has been increased both inside and outside of the Engineering department, as resources can access viewables from multiple systems, retrieve information on parts more quickly, and exchange information more easily. In addition, resources outside the Engineering department can view technical details for machine production or assembly with no interruption for the designers.”

This business-process integration requires a trusted architecture to ensure that processes are stable and available when needed. Closed-loop transaction processing and real-time integration ensures that users have accurate, current information at hand. Data should be presented in the system of choice for Engineering or Manufacturing, and provide a common interface for product information.

**Benefits of the Windchill and Microsoft Dynamics AX Solution**

**Increases Data Visibility**

One of the major benefits of an effective ERP/PLM integration is that it optimizes overall product development effectiveness. For instance, integrating of Windchill and Dynamics AX supports the automatic publishing not only of BOMs, but also product changes and revisions. By automating these processes, and by eliminating the need to enter this information manually, manufacturers ensure that all resources are working from a single, accurate, up-to-date BOM. Not only does this automation save time, but it eliminates costly and non-productive rework caused by human error and miscommunication/non-communication of product changes.

**Lowers development costs**

By providing PLM users with a view into cost and inventory data being managed in the ERP system, an effective integration allows engineers to optimize their designs for manufacturing. Reusing common components and enabling cost-effective bulk sourcing, as well as choosing low-priced components, keeps total product cost to a minimum.

At the same time, by providing Manufacturing with easy access to CAD data, manufacturers can ensure consistency and reduced product-manufacturing costs. As well, allowing manufacturing resources in the ERP system access to CAD viewables stored in the PLM system ensures consistency between Engineering and Manufacturing, while eliminating resource costs, rework and scrap caused by Manufacturing and Assembly using out-of-date BOM information.
Speeds product time-to-market

Another key area of improvement delivered by a PLM/ERP integration is derived from automatic, bi-directional publishing of product data, and the establishment of a clear, consistent success/fail notification process. Because these triggers happen automatically, the systems do not need to be synchronized manually, saving considerable time.

In addition, the automation of processes means that notifications happen more quickly, and that Engineering and Manufacturing data is updated in real-time, shortening cycle time and reducing time-consuming rework.

Integrating Windchill and Dynamics AX can also accelerate product time-to-market by supporting component reuse and by shortening development time. Because engineers have access to component data stored in the ERP system, they can more easily reuse common components and existing designs, which reduces engineering time. And, a clear view into engineering designs from the earliest stages of development, allows the component-sourcing process to begin earlier, providing more time to negotiate favorable rates and to evaluate suppliers. And lastly, when engineering is complete, the ability for manufacturing to access CAD viewables and drawings stored in the PLM system eliminates both the need for paper-based shop-floor drawings, and the time-consuming process of creating them.

Increases data visibility across the enterprise

An integration not only improves user access to the data that they need—regardless of its system of origin—but it allows users to access this data through a very familiar interface. Engineering users can now access relevant ERP data via the Windchill interface during the design phase, and conversely, Manufacturing users can access real-time design data residing in the ERP system. In addition, leveraging a central collaboration portal, like Microsoft SharePoint, allows cross-functional users at all levels, from sales to marketing to the executive team, to use a single SharePoint interface to access real-time, role-appropriate data and reporting from both systems, simultaneously.

PTC and Microsoft: Long-term partners in product innovation

Why should companies look to PTC and Microsoft for their integrated solutions? The partnership between these companies allows for each to bring the power of their solutions to their joint customers. Microsoft’s Dynamics AX provides best-in-class functionality combined with a familiar, intuitive user interface, helping companies deliver high-quality products and manage their extended enterprise. PTC’s Windchill is a leading PLM software solution designed to help manufacturers innovate and develop world-class products through best-in-class product data management, project management, global collaboration, change and configuration management, and all other facets of global product development.

PTC and Microsoft are partners in helping their clients develop world-class products. For manufacturers that have embraced a Microsoft-centric architecture, PTC solutions can be cost-effectively deployed on a Microsoft environment (Figure 3).

PTC offers Windchill Web Parts for SharePoint, and bases products like Windchill PPMLink™ for product portfolio management and Windchill SocialLink™ for social computing on Microsoft architecture. The result is a set of industry-leading solutions from two proven industry leaders.

---

**Figure 3: PTC/Microsoft Architecture Option**
Conclusion

Together, PTC’s Windchill and Microsoft’s Dynamics AX offer even greater potential to improve product development effectiveness, lower product development costs, speed time-to-market, increase data visibility across the enterprise, and reduce manufacturing errors.

An end-to-end solution integrates product-related business processes and data to help manufacturers by providing the best solutions for product development and manufacturing. Together, PTC and Microsoft can help manufacturers get the most out of their ERP and PLM systems to enable world-class product development and execution.

About PTC Windchill

Windchill, PTC’s Product Lifecycle Management (PLM) software for managing product content and processes, offers a powerful, proven solution for thousands of leading organizations worldwide. Fast, secure, and web-based, this business collaboration software enables companies to streamline product development processes and deliver superior physical goods and information products.

About Microsoft Dynamics

Microsoft Dynamics is a line of familiar, adaptable enterprise resource planning (ERP) and customer relationship management (CRM) solutions designed to meet almost any business need and help your people make important business decisions confidently. Microsoft Dynamics works like, and with, familiar Microsoft software—easing adoption and reducing the risks in implementing a new solution. These solutions automate and streamline financial, business intelligence, and supply chain processes in a way that can help you drive business success.