ACHIEVING BETTER, FASTER, SMARTER
INNOVATION

Contents

Executive Summary

Maintaining financial viability while delivering innovative, environmentally-sustainable products may be the most important business issue confronting Consumer Packaged Goods (CPG) companies today. Faced with a global recession, ever-changing consumer preferences, and higher development costs, CPG leaders want solutions that provide Better…Faster…Smarter innovation.

Leading CPG companies are finding success deploying Product Lifecycle Management (PLM) practices. As a strategic pillar for creating business growth, PLM enables:

- *Better innovation* while providing open, yet directed collaboration across the enterprise, and with consumers and suppliers
- *Faster innovation* through efficient use of internal and external resources and repeatable phase-gate processes
- *Smarter innovation* by efficiently capturing and re-using intellectual property (IP) and value chain capabilities throughout the product development process

PLM practices drive organic growth by linking a company's innovation engine intrinsically to its business strategy and empowering management to:

- Align product concepts with business goals and customer preferences
- Lower product development costs by implementing world-class best practices
- Make necessary adjustments effectively through the use of metrics that measure process against innovation imperatives
- Improve the success rate of production introductions and quality

Other successful methodologies that interface well with PLM include open innovation and virtual product development (VPD). Open innovation suggests that companies improve time to market by taking advantage of globally distributed knowledge and buy or license processes or inventions from outside the organization. VPD allows companies to drive organic growth to the lowest possible cost and complements open innovation and PLM processes.

Ultimately, PLM enables faster innovation, lower development costs, and more winning products by delivering the visibility necessary for virtually testing and validating design concepts prior to manufacturing and delivery.

The Challenge:
The Perfect Storm

In the current economic climate, the challenge of achieving organic growth while bringing products to market at the lowest possible cost seems almost insurmountable. Add the new imperative of doing that in an environmentally sustainable way and the task becomes even more daunting.

While over 80% of consumers are aware of the importance of sustainability, less than 20% are willing to pay more for products offering these benefits. These innovations must be delivered at competitive pricing.

Leading Consumer Packaged Goods (CPG) companies are asking themselves:

> *"How do we develop new, successful, and environmentally-sustainable products, at a competitive price, and increase profitability at the same time?"*

Many of these companies are realizing that they have to change the way that they operate as an organization and with their partners and customers.

As in most industries, the process for developing new products in the CPG industry follows a logical step-by-step approach where each functional group completes their task and passes the results to the next. For example, marketing provides product design criteria to research and development to develop the product. Once the design is approved and tested, they send it to manufacturing to be produced.

In a global economy where consumer preferences change by the minute, however, organizations need flexibility in order to adapt and respond to new demands promptly as well as understand the downstream implications of design changes on manufacturability, shelf-life, and supply chain. This flexibility is too often prohibited due to the fact that most of these functional groups have implemented individual information systems to help manage their processes. Over time, this linear approach has resulted in strengthening silos of information versus infusing collaborative behavior and sharing of ideas and information.

Organizational Amnesia Stifles Innovation

A recent study showed that CPG organizations with revenues of more than $1 billion per year have an average of more than 750 different software applications. This proliferation of applications directs information into these silos where it is hidden from the rest of the organization, impeding the innovation process.

This problem is often referred to as organizational amnesia. Lessons learned during the product development process include, to name a few:
- Consumer Preferences
- Raw Material Performance
- Supply Chain Performance
- Environmental Performance
- Manufacturing Capabilities
- Distribution Chain Capabilities
- Retail Space Limitations

More are either not captured or are captured in fragmented systems or personal files unavailable to others in the organization. It is then not available to the people that need the information during the product development process for reuse in future projects. For example, the product may not run efficiently on the manufacturing line or the package cannot be stacked properly in a warehouse for efficient use of space.

These problems are often discovered at the last minute as part of the validation process just prior to launch and result in late and costly changes such as:
- a redesign of the product
- retooling manufacturing process
- finding new suppliers
- modifying the distribution chain, etc.

All of these problems have a direct impact on gross revenue and profits.

Some companies have tried to address this problem by customizing enterprise resource planning (ERP) systems to connect the different organization silos involved in the front end of the innovation process. But ERP is centered upon a transaction-based model in which information flows in a rigidly-defined linear path and looks at the history to understand product behavior. This approach is appropriate for managing the financial and manufacturing data that ERP was designed to handle. But an effective innovation process requires a much more flexible, iterative, knowledge-based system in which information flows on a continuous basis. As a result, a customized ERP solution usually impedes innovation more than it helps.

So how are companies addressing the organizational amnesia problem and the need for better, faster, smarter innovation in a challenging economy?

PLM Cures Organizational Amnesia

During a time of downsizing, leading CPG companies are deploying PLM practices as a strategic pillar for creating business growth. PLM enables better, directed innovation that is linked intrinsically to business strategy, while providing open collaboration across functional boundaries within the organization as well as with consumers and suppliers.

PLM also provides faster innovation through efficient use of internal and external resources and repeatable phase-gate processes.

And finally, PLM provides for smarter innovation by efficiently capturing and re-using intellectual property and value chain capabilities throughout the product development process.

As a result, leading CPG companies are improving the success rate of new product introductions and delivering higher quality products to the market, achieving rapid prototypes and lower development costs, and reusing organizational memory to effectively and efficiently create viable, environmentally sustainable products.

Better:

Improve Success Rate of New Product Introductions and Deliver Higher Quality Products

While recent signs of a recovering market are hopeful, news of our challenged global economy persists – unemployment rates continue to rise, home foreclosure rates in the United States are the highest in decades, and consumer confidence is slowly rebounding after hitting the lowest scores ever recorded.

Consumers are experiencing unprecedented change and behaviors have shifted toward conservative spending. And yet, CPG companies continue to show greater resilience than other industries (see Figure 1). With this change CPG companies are poised to take advantage of the situation if they can address the internal collaboration issues and increase communication externally.

The CPG industry sells large volumes of products at a low cost to the consumer. They are consumable products, things that get used up quickly and need to be replaced such as, food, beverages, personal care items and household cleaning supplies. New products, new variations of old products and new forms appear on retail shelves daily. In these challenging times where organization's leaders and managers must contend with doing more with less every day, how might they leverage current relationships, while developing new ones, to generate enough innovation to meet internal organic growth targets and remain competitive?
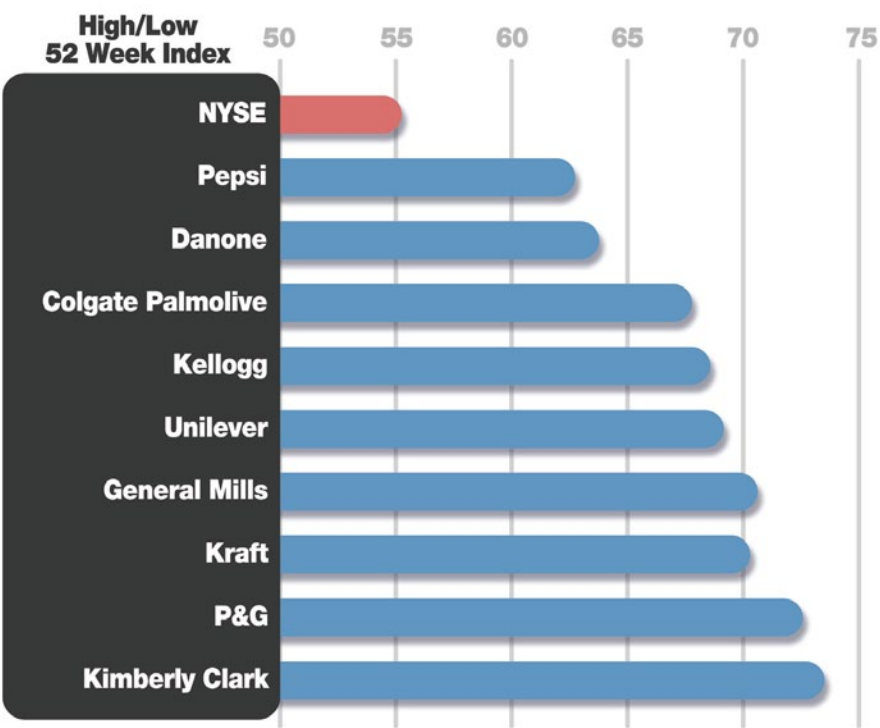

Figure 1:
CPG companies show greater resilience in tough economic times (Jan – Dec 2008).

Open Innovation Leads to Success

Leading CPG companies are implementing open innovation practices.

This approach fundamentally reflects how innovation should come together as an iterative, on-going collaborative process.

Implementing open innovation in an organization may seem like a daunting task. You can either obtain leadership support ahead of time, or fly under the radar until you try some things, demonstrate success and build your case.

Regardless of your approach, you should begin by evaluating your organization's current position relative to strategic goals, then establish your open innovation goals, strategies and tactics, and finally, measure your success and failures along the way.

In addition, you will need to ensure sufficient mechanisms are in place to support a cultural shift toward this new thinking. For example, you could create a "proudly invented elsewhere" award to reward those involved in the open innovation success.

And finally, you will need to evaluate what might work for your organization and take small steps forward that will allow you to scale quickly after the momentum begins to build.

"The central idea behind open innovation is that in a world of widely distributed knowledge, companies cannot afford to rely entirely on their own research, but should instead buy or license processes or inventions (e.g. patents) from other companies. In addition, internal inventions not being used in a firm's business should be taken outside the company... through licensing, joint ventures, and spin-offs."

Henry Chesbrough, Adjunct Professor, Haas School of Business, University of California at Berkley and executive director at the Center for Open Innovation at Berkeley. [1]

PLM Supports Open Innovation

PLM provides the visibility needed to align open innovation processes to organic growth innovation targets to ensure strategic fit, consumer fit, financial fit and operational fit for all projects. By establishing defined processes and providing visibility, PLM provides a governance infrastructure that helps the organization make better decisions and achieve both strategic and operational goals.

The ability of PLM to provide collaboration across all disciplines involved in the innovation process is enabled by a collaborative environment that provides a common repository for formulas, specifications, packaging design, and distribution channel information —a single version of the truth for all participants (see Figure 2). As a result, CPG companies can reduce the number of quality incidents, achieve right-first-time specifications performance, and increase purchasing savings.
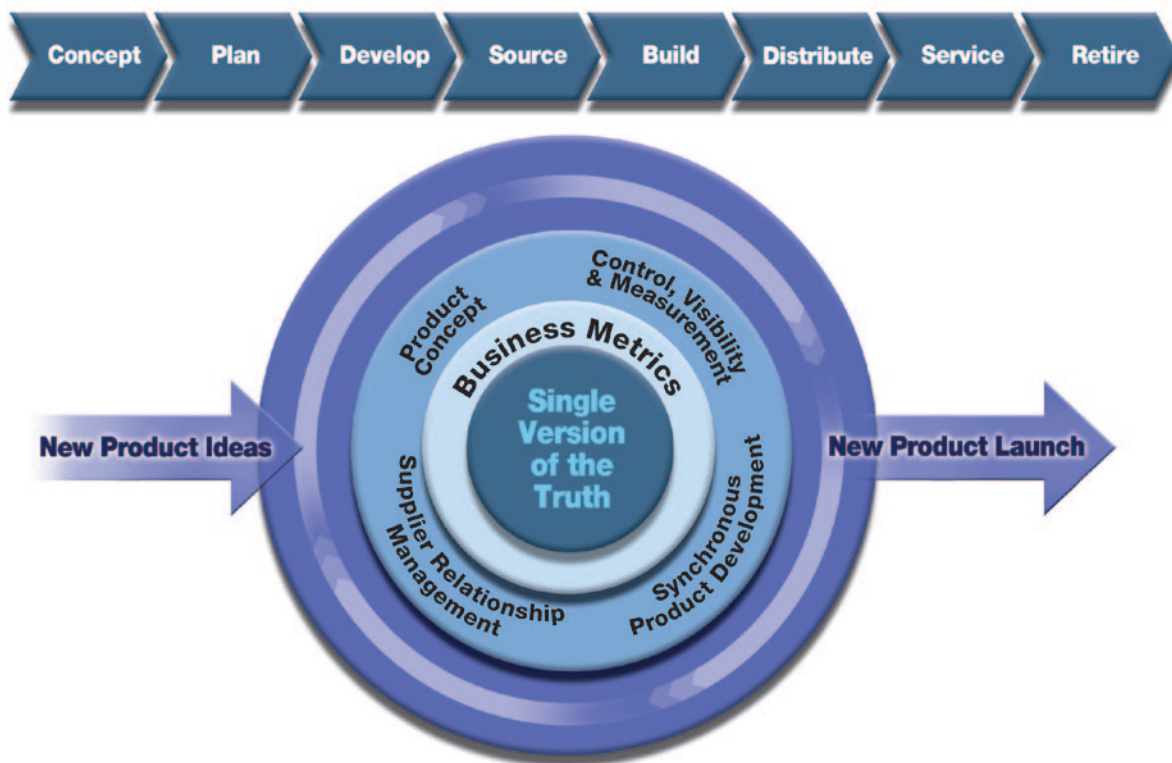

Figure 2:
PLM provides a single source of information to all stakeholders.

Faster:

Enable Rapid Prototyping and Lower Development Costs with Strong Project Oversight

Leading CPG companies have also made major strides by implementing a phase-gate process to drive product development. Cross-functional teams complete a prescribed set of related activities in each stage prior to obtaining management approval to proceed to the next stage of product development.

Each activity is undertaken in parallel to enhance speed to market. As a result, phase-gate methodology has substantially increased the speed of the product development process by enabling activities to proceed in parallel while managing risk. By establishing defined processes and providing visibility throughout the product development process, phase-gate coupled with portfolio management practices allows an organization to make business-focused decisions.

PLM Drives Organic Growth

Management teams can establish common hurdles early and evaluate them often throughout the product development cycle. This enables the development of only those concepts that align with a company's strategic goals and best satisfy consumer needs. Actionable process metrics provide the ability to measure its process against innovation imperatives and make appropriate changes. As a result, PLM enforces standard processes and over time creates world-class business best practices for faster innovation.

Strategic application of PLM practices enables an organization to link its innovation engine to a company's business strategy to drive organic growth. This enables companies to define and standardize workflows across the organization that match the natural innovation process and support communications across all disciplines so changes can be rapidly implemented.

Synchronizing the contributions of internal and external resources through the creation of cross-functional groups and open innovation processes can reduce time to market by up to 75%.
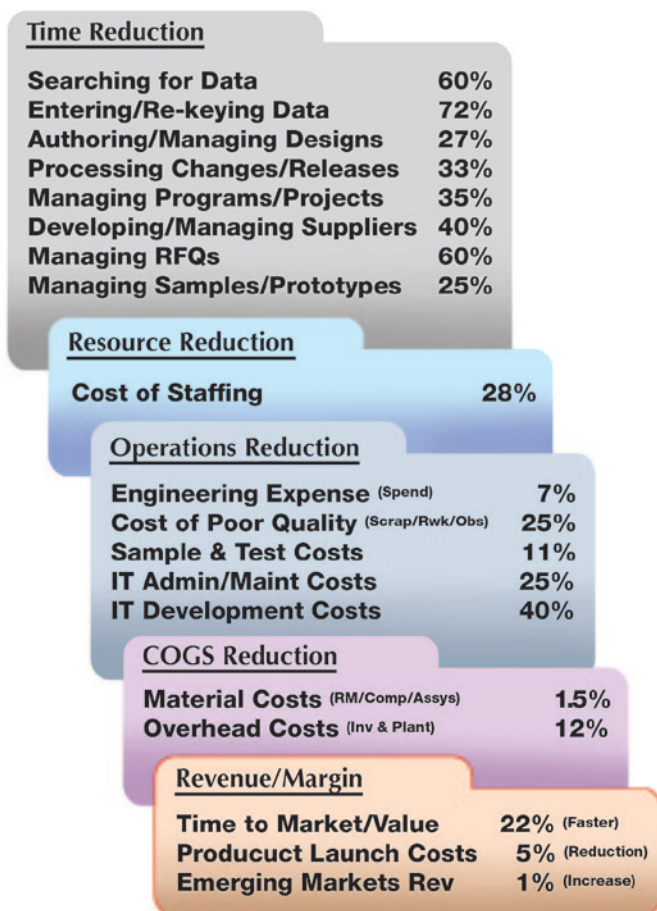
Time Reduction

Searching for Data	60%
Entering/Re-keying Data	72%
Authoring/Managing Designs	27%
Processing Changes/Releases	33%
Managing Programs/Projects	35%
Developing/Managing Suppliers	40%
Managing RFQs	60%
Managing Samples/Prototypes	25%

Resource Reduction

Cost of Staffing	28%

Operations Reduction

Engineering Expense (Spend)	7%
Cost of Poor Quality (Scrap/Rwk/Obs)	25%
Sample & Test Costs	11%
IT Admin/Maint Costs	25%
IT Development Costs	40%

COGS Reduction

Material Costs (RM/Comp/Assys)	1.5%
Overhead Costs (Inv & Plant)	12%

Revenue/Margin

Time to Market/Value	22% (Faster)
Producuct Launch Costs	5% (Reduction)
Emerging Markets Rev	1% (Increase)

Figure 3:
Average PLM value achieved
by leading consumer companies.[2]

Virtual Product Development Reduces Development Costs

Virtual product development (VPD) – the collective use of virtual product design, virtual product simulation, virtual product manufacturing, and virtual consumer experience tools – is a new practice being used by leading CPG companies to complement phase-gate processes and augment PLM applications.

The use of virtual product design and simulation allows engineers to evaluate performance of the product and package in the early design stage long before physical prototypes are available. For example, you can automatically determine the weight of different product and package design alternatives and calculate shipping costs with a software prototype. Or, you can define a simulated drop test and perform it automatically on proposed packaging designs as part of the workflow. You can also set up a simulation that quickly evaluates many different package design alternatives one after another and provides the results in a report.

In each case, the results are posted to the fit-for-use scorecard – visible to all stakeholders – to show how the design aligns with defined business goals and success criteria such as consumer preferences, manufacturing capabilities, supply chain capabilities, and retail shelf space considerations. These scorecards can then be compared against corporate level strategic goals.

Virtual product manufacturing also compliments phase-gate capabilities by allowing process engineers to plan and model new manufacturing process technology and simulate the production line. In addition, manufacturing engineers can create a complete definition of the production facility and equipment needed to produce the product. Once such a model is established, any change can be analyzed such as throughput, cycle time, and product count.

Since virtual product manufacturing capabilities are linked directly to the other applications, they are able to test their ideas rapidly and provide feedback before the design has been stabilized. The use of digital manufacturing and rapid prototyping in a fully digital environment allows you to get from concept to shelf in weeks as opposed to years. In addition, with fewer physical prototypes, fewer tooling modifications are required, and packaging designs can be optimized to consume the least possible amount of materials

As a result of applying all of these technologies – phase-gate processes in conjunction with virtual product design, virtual product simulation, and virtual product manufacturing – lower overall total development costs can be achieved.

Figure 4:
VPD supports the end-to-end development process and provides a common system for all users.

Smarter:

Reuse Organizational Memory Effectively and Create Viable, Environmentally Sustainable Designs

PLM provides real-time access to the organizational memory needed to ensure that the proper product specifications are used and lessons learned from past designs are captured and applied for future innovation.

As opposed to ERP, PLM enables an iterative, intuitive design process that delivers flexibility plus visibility, allowing intellectual property to be shared across the enterprise. As appropriate, PLM enables collaboration across all boundaries, resulting in identification of the best ideas at the fastest possible speed.

PLM offers an information warehouse that provides for efficient re-use of material specifications, product design properties, supplier performance data, regulatory compliance specifications, and much more. The resulting organization memory creates a truly learning product development system.

VPD and PLM Enable Profitable, Sustainable Designs

By providing flexibility and transparency in the product development process, VPD allows intellectual property to be shared throughout the enterprise enabling companies to be more innovative and deliver products at a faster rate.

Using VPD, CPG companies can learn early and measure often throughout the entire product development process and learn how each design iteration measures up against decision criteria, consumer preference scores, financial and operational benchmarks through automated fit-for-use scorecards.

VPD also enables CPG companies to better develop environmentally sustainable products. With VPD, companies can decrease the consumption of non-renewable energy and solid waste throughout the design and production lifecycle.

Additionally, the ability to minimize material usage and still meet package design/performance requirements results in significant material cost savings and a lighter environmental footprint.

Finally, VPD provides virtual consumer experience capabilities that enable users to create a virtual product and experience it from the perspective of their consumers inside a virtual store. The user lays out the product on-line from a dynamic 3D library, animates and explores different configurations by customizing colors, lighting, and assembling elements in order to create the product he or she would like to see on the market.

The next step is creating the virtual store by choosing 3D objects like doors, tables, chairs, devices, shelves and selling goods. This solution enables product developers and retailers to simulate product and consumer behavior in the first moment of truth (in store) and the second moment of truth (in use) prior to the delivery of any product. As a result, product developers and retailers can easily optimize the product for the marketplace without spending additional costs for physical prototypes.

VPD Facilitates New Product Introductions

Marketing and sales teams can test consumers' shopping, consuming and merchandising experience before the product, store or commercial space even exists. Maintaining design focus on consumer needs at first moment of truth (FMOT) and second moment of truth (SMOT) increases the likelihood of success of new products in the market.

VPD facilitates new product introductions by demonstrating compliance with consumer design constraints throughout the development process and providing early and frequent consumer feedback.

Used collectively, the application of strategic PLM practices coupled with the components of VPD make it possible to virtually define, test, plan, manufacture, and monitor all phases of the product development process, truly enabling smarter innovation across the enterprise. These tools allow companies to focus on achieving growth and delivering successful, sustainable products; directed innovation that is intrinsically linked to business strategy while providing open collaboration throughout the organization and with consumers and suppliers.

Conclusion:

Leave Your Competition Behind

PLM enables better innovation by providing the visibility that aligns the product development pipeline with top and bottom line goals —ensuring a strategic, consumer, financial, and operational fit for all new product introductions.

The approach delivers faster innovation by allowing you to virtually test and validate design concepts prior to manufacturing and delivery. PLM provides for smarter innovation by efficiently capturing and re-using intellectual property and value chain capabilities on an on-going basis and throughout the product development process.

With the right tools and processes, you too can deliver better, more innovative, environmentally-friendly products at the lowest possible cost, and achieve sustainable, organic growth.

Enabling ***Better, Faster, Smarter Innovation*** requires consideration of the practices of open innovation, leveraging the intellectual property generated both inside and outside the organization for maximum value attainment. It requires enhanced and connected phase-gate processes with defined metrics so that you can consider each project's merits on an even playing field and allow resources to be allocated to the projects that can deliver the greatest value.

And finally, ***Better, Faster, Smarter Innovation*** requires a strategic implementation of PLM business process applications so that you can reuse the intellectual capital of your organization efficiently and accelerate future innovation. In conjunction with Virtual Product Development and automated fit-for-use scorecarding,[3] this technology will revolutionize the way you innovate and leave your competition squarely in your rear view mirror.

About the Authors

Rosemary Grabowski, VP Business Development and Strategy with Dassault Systèmes, ENOVIA has held several executive positions over her 24 year career history and has experience in leveraging innovation to drive organic growth. Prior to Dassault Systèmes, she lead innovation process design, implementation, change management and executive strategic innovation portfolio reviews at Cadbury Schweppes. Her multi-discipline career provides leadership experience in strategy, innovation process design and implementation, brand licensing, promotion, channel management, brand marketing, and supply chain management.

Vince Sonson, Director of CPG Product Strategy for Dassault Systèmes ENOVIA, owns the product roadmap for ENOVIA's CPG solution set and provides thought leadership on the application of leading-edge technologies and practices that raise the bar of PLM practice in CPG. Vince has dedicated his career to designing and delivering best in class enterprise software solutions to leading consumer goods manufacturers and their extended value chains.

ENDNOTES:

1. *Open Innovation: Researching a New Paradigm (Oxford, 2006).*

2. *Dassault Systèmes Services Business Value Assessment benchmark study, Consumer (2008).*

3. *Go to http://perspectives.3ds.com/2009/06/08/fit-for-use-lead-design/ to learn more about Fit-for-Use lead design*

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Europe/Middle East/Africa
Dassault Systèmes
10, rue Marcel Dassault
CS 40501
78946 Vélizy-Villacoublay Cedex
France

Asia-Pacific
Dassault Systèmes
Pier City Shibaura Bldg 10F
3-18-1 Kaigan, Minato-Ku
Tokyo 108-002
Japan

Americas
Dassault Systèmes
175 Wyman Street
Waltham, Massachusetts
02451-1223
USA

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