



I D C T E C H N O L O G Y S P O T L I G H T

Optimizing the Product Life Cycle Through Visual Decision Making

August 2012

Adapted from *Methods and Practices: Visual Information for Effective Collaboration in Product Life-Cycle Management* by Joe Barkai and Benjamin Friedman, IDC #MI223638

Sponsored by Oracle's AutoVue

Manufacturers find it increasingly challenging to make effective product-related decisions as the result of expanded technical complexities, elongated supply chains, and a shortage of experienced workers. These factors challenge the traditional methodologies companies use to make critical decisions. However, companies can improve decision making by the use of visual decision making, which synthesizes information from multiple sources into highly usable visual context and integrates it with existing enterprise applications such as PLM and ERP systems. Product-related information presented in a visual form and shared across communities of practice with diverse roles, backgrounds, and job skills helps level the playing field for collaboration across business functions, technologies, and enterprises. Visual decision making can contribute to manufacturers making more effective product-related decisions throughout the complete product life cycle. This Technology Spotlight examines these trends and the role that Oracle's AutoVue and its Augmented Business Visualization (ABV) solution play in this strategic market.

Introduction

Manufacturers of complex products find it increasingly challenging to make effective product-related decisions. There are a number of reasons for this, including expanded technical complexities across engineering disciplines, the advent of elongated and dynamic supply chains, and a growing shortage of experienced workers. These factors have created an environment that challenges the traditional methodologies and tools that companies have used to make critical product-related decisions, especially where decisions involve complex multidisciplinary considerations.

Organizations can improve decision-making capacity by intensifying the use of pervasive visual information, a capability that IDC refers to as *visual decision making*. By enabling access to product information from multiple sources, and synthesizing the information into highly usable visual form, organizations can create a more complete and exploitable context for effective decision making. By augmenting visual information (e.g., a design geometry) with other, nonvisual or textual information, both structured and unstructured, this approach provides a multifaceted view and context for not only improving local decisions but also assessing the impact of decisions on upstream and downstream activities.

Rich product-related information provided in a visual format and shared across communities of practice with diverse roles, backgrounds, and job skills helps level the playing field for collaboration across business functions, technologies, and enterprises. Visual decision making can contribute to manufacturers making more effective product-related decisions throughout the complete product life cycle.



Key Trends in the Global Manufacturing Environment

A number of market realities are creating a challenging environment for product manufacturers. Increasingly, companies are challenged to make effective decisions that consistently deliver new, innovative, and high-quality products. Product development is now characterized by shorter life cycles. The proliferation of high-quality products from manufacturers in low-cost regions and a growing population of highly informed and demanding consumers with discerning tastes and preferences now force product companies to assume a faster cadence for new product introduction and at the same time support revenue-generating legacy products.

Global manufacturing organizations are becoming less vertically integrated to take advantage of outside resources that provide technology and cost advantages as well as operational agility. As a result, decision-making processes in product design span not only greater geographical divides but also enterprise boundaries, business practices, and possibly different languages and cultures.

Typically, product development methodologies follow a linear path in which decisions are made within traditional development disciplines: market requirements, design, and engineering, followed by manufacturing and supply chain, and then service. This linear, forward-feeding flow of product information and decision making emphasizes individual task performance and is optimized to meet the goals and constraints of individual tasks in the product life cycle.

While this practice may work well within specific phases of product development, too often individual decision makers do not have sufficient visibility to understand the impact of their decisions on downstream activities. For example, a system designer may select a component that best meets functional requirements but may not be aware that the component is nearing obsolescence. Moreover, system-level decisions can be at odds with each other as when, for example, a designer optimizes an architecture that meets functional requirements at a low cost yet does not realize that this will increase the time and cost of system maintenance.

These linear processes and multiple groups often result in key processes becoming involved only late in the product life cycle. For instance, for many years, it has been the norm to incorporate manufacturability considerations only after most of the principal design has been completed, and serviceability even later. In addition, service considerations tend to be grossly underrepresented in many product designs. Another significant hurdle is the fact that individual decision makers (especially in global design and engineering environments where activities are outsourced or executed by partners) come from diverse backgrounds, process disciplines, and skill/experience levels.

Because of these factors, a chain of individual but highly optimized decisions often results in an overall suboptimized design or process. Because product development is highly linear, too frequently the impact of a suboptimal decision is detected after the fact, when making changes is too costly.

Exploring Visual Decision Making and the Benefits of Collaboration

As product complexity, globalization, and scarcity of experienced personnel increase, effective collaboration and optimized decisions will become more critical. Effective product development now demands that decision makers excel in making efficient and impactful multifaceted cross-disciplinary decisions. As discussed, effective collaboration for product life-cycle decisions mandates the participation and contribution of multiple communities of practice both within and outside the enterprise. However, as described, different business drivers, narrow-focus business functions, and diversity of skills and backgrounds often hinder this process.

Over the decades, product companies have enlisted a broad portfolio of increasingly capable IT tools to support various product life-cycle activities, including CAD and CAE, CRM, supply chain planning, and forecasting tools. However, many decision support tools used throughout the product life cycle —

especially task-specific tools considered to be "best of breed" — tend to focus on narrow task performance and algorithmic superiority.

Unfortunately, this is often done at the expense of familiar user interfaces, open architectures, and the ability to exchange information with other tools. The proliferation of often incompatible software and information stores drives up the volume and complexity of information, making it harder to obtain a broad multidisciplinary view. All this has a profound effect on collaboration. The more organizations and functions, and, consequently, the more task-specific tools involved, the more difficult, inefficient, and time consuming collaboration becomes.

Visual decision making helps level the playing field, expands the decision-making population, and allows groups underrepresented in product decisions to contribute their input, suggestions, and experiences. By synthesizing information from multiple sources, visual decision making provides richer contextual decisions. It makes these data sources accessible to broader communities of decision makers for cross-disciplinary decisions, and even more so when experience, skills, culture, or language differences might have an impact on the fidelity of such decisions.

Some specific use cases can highlight its benefits. A manufacturing engineer might view eBOM and mBOM structures, while a supply chain staff might want to highlight BOM components sourced from the same supplier and view the supplier's scorecard. A quality engineer trying to pinpoint a quality issue might use the same data to highlight components involved in a set of warranty claims. Suspecting a certain failure mode, the engineer would find it useful to highlight components that are in close proximity to determine if an overheating part might cause a neighboring component to fail.

The use of visual decision making rendered in the appropriate business context and shared with cross-functional teams contributes to more effective product-related decision making, encourages parts reuse, and positively impacts business performance. Unlike other methods of organizing and presenting information, visual decision making uses a common navigation scheme to allow multiple decision makers to organize information to best support a specific role or a task they need to perform.

Considering Oracle's AutoVue with Augmented Business Visualization for Visual Decision Making

Oracle's AutoVue suite of enterprise visualization solutions delivers document and CAD visualization and collaboration capabilities, providing users across the product value chain with the ability to open, view, and collaborate securely on virtually any document type, from back-office files to advanced engineering files (MCAD, ECAD, etc.). Because visualizing documents without the proper business context serves little value, Oracle's AutoVue also delivers an open standards-based integration framework, which makes it possible to integrate AutoVue with key enterprise applications such as PLM, CRM, and ERP and provide users with in-context access to information. For example, documents and related digital annotations can be associated with specific engineering change requests in PLM or service requests in CRM to provide viewers with the relevant business context.

AutoVue also features Augmented Business Visualization (ABV), which enables connecting portions of documents back to business data in enterprise applications. When integrated with enterprise applications such as PLM and ERP, the Augmented Business Visualization framework helps organizations create rich and actionable visual decision-making environments, making it easier for users to consume and understand data in the specific context of business processes.

ABV provides a complete view of integrated structured and unstructured information and can be integrated with any enterprise system to render documents in the context of a business process. ABV has been engineered to work with both Oracle and non-Oracle solutions. Information from multiple sources is reconciled and presented in a single visual environment. ABV dynamically displays business data from ERP and other enterprise applications in the context of visual information.

Users can, for example, view supplier information or costs associated with a given part in the context of a specific assembly. It then allows the creation of bidirectional, actionable links between parts of documents and business data in those applications by highlighting trends, status, and important elements in visual color-coded reports. Actions can then be triggered in enterprise applications from those documents to maximize user productivity. For example, with ABV, users can launch the creation of an engineering change request in PLM directly from within the 3D representation of a product. The goal is to make it easier for users to consume data, identify trends or areas of concern, and make optimized product-related business decisions.

The benefits of AutoVue and Augmented Business Visualization include the ability to address many of the product life-cycle challenges described previously. For example, organizations can leverage visualization connected to enterprise applications such as PLM to drive effective decision making and innovation and enable a simplified end-to-end design-to-manufacturing process. Information rendered in the appropriate business context and shared across functional teams contributes to more effective product-related decision making, encourages parts reuse, and has a transformational effect on business processes. It also allows groups typically underrepresented in the product development process to participate and to contribute to innovation. Equally important, it does this without putting the organization's intellectual property (IP) at risk.

Challenges

The most difficult challenge for Oracle in exploiting ABV is making the necessary process changes for instilling effective collaboration. Many organizations employ a very linear product development process. They need to move decisions that typically happen late in the process earlier. That means engaging stakeholders early. Another challenge, almost a distraction, is that the less-informed audience not aware of the value of visual decision making might view AutoVue — Oracle's technology that drives ABV — as a simple CAD visualization tool. However, this challenge should be relatively easy to surmount, once the clear value of ABV is delineated.

As more decision makers and stakeholders use ABV, within and especially outside enterprise boundaries, concerns may be raised about data security and IP protection. The nature of ABV, where the data itself is stored in the original repositories and is not moved to the point of consumption, should help alleviate this concern.

Conclusion

In today's marketplace, global manufacturers must excel in decision making, effectively leveraging information generated throughout the product life cycle from many different applications and platforms. However, these information silos are typically not integrated in a way that optimizes innovation, productivity, and profitability. Visual decision making helps improve the fidelity of decisions by integrating and widening access to digital information assets and using PLM and ERP tools across engineering, manufacturing, sales, and marketing to create rich business and technical context.

Sharing visual information across functional teams contributes to manufacturers making more effective and long-lasting product-related decisions. It also allows groups typically underrepresented in the product development process to participate and to contribute to innovation. Oracle's AutoVue product, using Augmented Business Visualization, implements an enterprise visual decision-making environment that, when supported by the necessary business and knowledge processes described previously, can help manufacturers of complex products improve their capacity to make better product-related decisions more quickly.

A B O U T T H I S P U B L I C A T I O N

This publication was produced by IDC Go-to-Market Services. The opinion, analysis, and research results presented herein are drawn from more detailed research and analysis independently conducted and published by IDC, unless specific vendor sponsorship is noted. IDC Go-to-Market Services makes IDC content available in a wide range of formats for distribution by various companies. A license to distribute IDC content does not imply endorsement of or opinion about the licensee.

C O P Y R I G H T A N D R E S T R I C T I O N S

Any IDC information or reference to IDC that is to be used in advertising, press releases, or promotional materials requires prior written approval from IDC. For permission requests, contact the GMS information line at 508-988-7610 or gms@idc.com. Translation and/or localization of this document requires an additional license from IDC.

For more information on IDC, visit www.idc.com. For more information on IDC GMS, visit www.idc.com/gms.

Global Headquarters: 5 Speen Street Framingham, MA 01701 USA P.508.872.8200 F.508.935.4015 www.idc.com