

# Collaborative Product Commerce: Creating Value Across the Enterprise

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**Collaborative product commerce improves the management of a product's entire lifecycle. The benefits of CPC include faster time to market, lower overall supply chain costs, and more satisfied customers.**

## Introduction

Designing and bringing to market products quickly, predictably, and with a high degree of responsiveness are critical elements for success. Products today have ever-shorter lifecycles, unpredictable demand levels, greater SKU variation, and an unprecedented number of features and user-selected preferences. To cope with this reality, geographically scattered design teams and supply chain partners are collaboratively designing products on a virtual basis. Static designs are being replaced by mass customization – often using predefined modules or building blocks to rapidly configure new product platforms that can be flexibly managed through their lifecycle. In this dynamic environment, collaborative product commerce (CPC) has emerged as a critical capability that organizations must acquire to remain competitive.

CPC is a new B2B solution that allows a product to be managed over the Internet throughout its lifecycle. It enables all intra- and inter-enterprise participants to work together from any geographic location with full data security and control through tailored, role-based workflow. CPC uses Web-based enterprise application integration, leverages existing data and systems, and couples with Web-based workflow to provide closed-loop business process management and execution. Effectively executed, CPC can shave days, weeks, or even months off the critical gap between concept and product launch.

CPC is emerging at an opportune time. Most technology-based companies are look-

ing to outsource product design in order to better focus on customer-valued core competencies. To achieve this, they need the capability to exchange and control product information and to perform real-time program/project management. Product data management (PDM) systems have been widely used in the past to manage product data, but were only accessible on a single, intra-enterprise system. CPC systems have emerged as the dominant technology for managing inter-enterprise data and providing design teams with a virtual design space.

## Defining Collaborative Product Commerce

CPC provides visibility and cooperation throughout the value chain and the product lifecycle. It is only possible through a combination of process capability, cultural and organizational alignment, and systems or technical ability. CPC enables an organization to react more effectively to customers, suppliers, and market dynamics.

More than two-thirds of all product lifecycle cost is determined during the key conceptual design process. As Figure 1 shows, although design accounts for only five percent of total costs under traditional cost accounting methods, its influence on total lifecycle costs is 70 percent. In other words, the majority of total lifecycle

costs are influenced during the crucial design phase.

Clearly understanding the impact of design decisions is critical to improving the product lifecycle process. CPC helps companies gain that understanding by managing product information across the product lifecycle and collaborating during the product development process, helping them make better decisions.

To fully appreciate CPC's potential, it's helpful to understand the product development process architecture that includes Internet-based tools. Figure 2 depicts that architecture supported by the electronic infrastructure backbone.

## The Advantages of CPC over PDM

The fundamental difference between CPC and traditional PDM tools is that CPC is built for speed. CPC uses the Web for seamless collaboration between external partners. This capability helps to build virtual development teams and use the combined core capabilities of multiple organizations to shorten development cycle times.

Unlike PDM, which is focused within the enterprise, CPC supports the extended enterprise and helps its constituents work together in a new design environment. CPC lets companies focus more intensely on core capabilities, such as project management and systems engineering, while taking advantage of external partnerships to ensure configuration of a complete solution. CPC helps companies build a three-dimensional development strategy – it allows them to jointly develop products, processes, and

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supply chain strategies (such as build-to-order) that address a fast-growing range of customer needs.

## How CPC Adds Value to the Extended Enterprise

Some important ways in which CPC adds value to the extended design/manufacturing enterprise is explored in the activities discussed below.

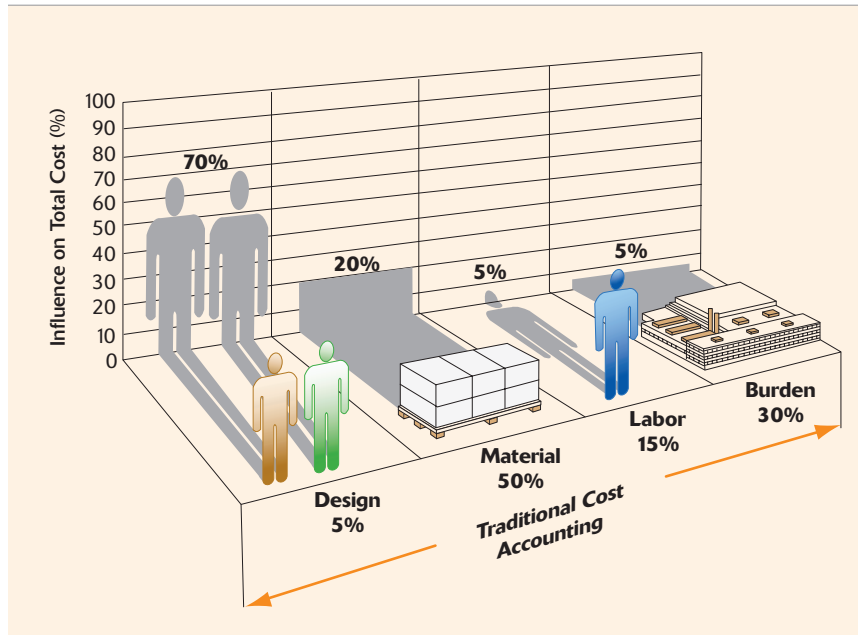
### Document Management and Vaulting

To promote early-stage cross-functional collaboration, most CPC implementations begin with basic document management

and to promote concurrent engineering practices, such as design for manufacture and design for service and support. This blend of technology and process makes it possible for companies to collaborate cross-functionally during the early stages of the product development process. Properly implemented, CPC ensures that cross-functional team members always have access to the latest revisions and can use that information to make rapid decisions. In practice, this could mean that engineering recognizes the need to delay the purchase of expensive new tools after seeing that a design engineer at a partner company has just put a part under change control.

- *Notification*: Letting individuals across the extended enterprise know that an action must be taken
- *Subscriptions*: Associating data objects with specific people or departments, thereby ensuring that notifications reach the right individuals in a timely and comprehensive manner
- *Visualization*: Enabling each participating person or group to view an engineering document, whether or not they have the original application
- *Red-line markup*: Enabling each participating person or group to add comments to an engineering document, regardless of whether they have the original application

To accelerate the process of implementing the correct product or engineering change, companies can automate the review and approval process using electronic workflow technology. Based on the type of engineering changes, approvals are routed to the appropriate people automatically. CPC's ability to extend the scope of approval workflows to team members outside the company is a significant advantage.



**Figure 1** | The influence of design decisions on total costs. (Source: Boothroyd & Dewhurst, BDI)

and data vaulting capabilities. These make it possible for product data to be stored in a single repository or data vault. Internal and external users can check information in and out based on their assigned privileges and responsibilities. Information in traditional PDM data vaults might be accumulated in much the same way, but it would be inaccessible to external team members.

Technology plays a key part at the data organization level. Yet significant business process changes must also occur to ensure the development of cross-functional teams

### Change Management Tools

As a new product advances through the development lifecycle (concept development, build, test, and production ramp-up), managing changes to the product and its manufacturing process becomes critical. Some companies may implement this capability even before the more basic document-management capabilities. Across the extended enterprise, CPC addresses product-change management with features that include:

- *Electronic workflow*: Automating the routing of changes for approvals

### Product Structure Management

CPC also facilitates product structure management, allowing bills of materials (BOM) to be consolidated into one master document and making configuration management easier.

### Bill of Materials

In the early stages of a new design, the cross-functional product design team creates the first BOM, also known as a product structure, or engineering bill of material. Some companies may not create a BOM until they get close to the end of the development process, when prototypes must be ordered and tested. The problem with this approach, however, is that multiple BOMs are more likely to be developed by different functional organizations. For example, a procurement engineer may create a BOM to initiate the ordering of materials, even while a manufacturing engineer is creating a separate BOM to launch the development of prototype tooling. Not surprisingly, this can result in serious problems with

accuracy, reconciliation, and version control. It could also result in a significant waste of money and effort.

By integrating the product structures created from the various engineering applications used in design (MCAD, ECAD), CPC makes it easier for companies and external partners to develop and work from a single BOM. This ensures that each cross-functional team member has an identical view of the current product and process definition. It also helps promote true concurrent engineering in the early stages of design. For example, manufacturing engineers could work with design engineers to optimize the design and manufacturing processes simultaneously. An engineer who

makes it difficult to maintain accurate BOMs in the early stages of design.

### Configuration Management

A growing number of customers are demanding products that are customized to their specific needs, which creates a tremendous challenge for product manufacturers. It also mandates the development of a portfolio management strategy focused on the joint development of product and process strategies. CPC addresses the challenge of configuring products to specific market needs. Essentially, CPC-based configuration management creates associations between components and assemblies, which help determine the range of permu-

- Introduce ways of shortening development times
- Identify ways of reducing the development cost of derivative products

### CPC's Far-Reaching Benefits

The advantages of implementing a CPC solution can be very impressive. Figure 2 summarizes the major benefits observed by Accenture's clients. (A particular example of online collaboration is provided in the sidebar on the next page.)

### Implementation Challenges and Approach

To realize the full benefits of CPC, companies first have to overcome four key implementation challenges:

- *People and Culture.* Any organization embarking on a CPC initiative will encounter challenges associated with people, culture, and the acceptance of change. CPC initiatives often run up against long-established work methods. People will now need to work not only as individuals within their own functional groups, but also as team members with colleagues in other parts of the company – as well as with teams outside of the organization. Resistance to these cultural changes can be significant if not properly approached. Usually, CPC programs will fail if they are predominantly approached as an IT deployment or renewal project without regard for the people who need to adopt and accept the initiative. Properly preparing and supporting an organization is absolutely essential to the success of the implementation.
- *Technology.* Technology challenges will surface on two fronts. The first relates to the capability and maturity of new Internet applications that combine multiple functions into a single application. Typical questions from users might include: Can this package really do this? What is the installed base that proves the capability? What does one application do compared to another one, and why can't existing systems perform this function? The second challenge revolves around the rules for

Reduction in:	Area of Improvement	Typical - Highest Reduction (in percentage)
Time to good design	Collaboration	25-40
Time to full production	Project management Better collaboration	25-60
Material cost in development cycle	Project management Configuration management	20-35
Purchase costs	Lifecycle management	10-20
IT support costs	Web-based technology	10-25

**Figure 2** Benefits of Implementing a CPC Solution

Source: Accenture, 2001.

needs to make a component substitution in the product structure could easily review the manufacturing process plan (also contained in the product structure) for any potential manufacturing-related problems.

To make this happen, a company must have a concurrent engineering process that promotes cross-functional collaboration in the early stages of design and allows for the joint release of product and process definition. It would also be helpful if the program structure comprises cross-functional development teams that are in place throughout the product's lifecycle. Traditional PDM systems do not facilitate sharing a product structure with external partners, which

tations that a product can have. Unlike PDM, CPC creates these associations regardless of whether external organizations have designed the part or assembly.

Configuration management capabilities also help minimize nonstandard product configurations and help control component proliferation. Configuration management is particularly powerful when deployed in conjunction with a portfolio management strategy. Among other capabilities, the portfolio management strategy should:

- Define the approval rules associated with new products
- Promote standard product configurations that leverage existing product platforms

product data management – regardless of the technology chosen. Typical user questions for this area include: Which system is the master at which stage and for what period of time? What do the MRP and ERP systems do in relation to this new system? Although some of the system and business rules associated with CPC are intricate to work through, they clearly can be resolved. It takes time and experience to get them right.

- *Disruption to the business.* The migration path to deploying a new CPC platform requires considerable thought and planning. The key is to find an approach that is low-risk, cost-effective, and timely – and causes minimal disruption to the business. In large organizations, this will require a well-managed application architecture transition and will involve trade-offs between the “big bang” and incremental systems implementation approaches.
- *Timing.* The final challenge is timing the investment, which is particularly relevant in the current uncertain business climate. The risk of not starting a CPC initiative now is that competitors will improve their own CPC capabilities and move ahead. In today’s business environment, being second or third can quickly turn into disaster. Committing to any improvement program usually involves some risk, no matter how good the business case looks. However, if companies are to survive and prosper in both the short-

and long-term, they really have no choice but to aggressively develop a CPC capability.

## Call to Action

To effectively move forward on CPC, executives must take action in these key areas:

- Critically assess your existing internal/external capabilities in relation to the scope of CPC. Look at the revenue, cost, and quality opportunities associated with your entire product development and introduction process.
- Examine the way that you manage product data. Assess the process and organization model you operate to design and introduce products or services. Look at the workflow and the implications for white-collar productivity.
- Evaluate your time-to-market capabilities – the speed and predictability of introducing your products. Assess your ability to be innovative and responsive to the market and your customers’ needs.

Bring these key areas together in an empirical, qualitative form. Comprehensively identify the benefits and the costs of achieving the new capabilities in a well-rounded business case. Understand the relative importance of the process, technology, and people components. Do not underestimate the cultural and human aspects of any proposition.

Finally, create a high-level road map that shows how to develop and improve CPC capabilities to get your executive manage-

ment excited about CPC as a key strategic initiative. Once established as a strategic initiative, keep it on the agenda as an ongoing priority for improvement – not just as a project that is completed and then forgotten.

## Conclusions

CPC is a far-reaching initiative. It embraces the product design, development, and introduction processes as well as the associated management of product data and requires a coalition of internal and external constituencies. CPC is a complex process area that is not the specific responsibility of any one part of the organization. As such, it is difficult for most companies to manage.

The benefits of developing robust CPC capabilities can be compelling. They typically come in the form of increased revenue and margin, lower operating costs, and higher quality improvement. More importantly, CPC also heightens the emphasis on timeliness and predictability to market.

There are a number of rapidly maturing, legitimate new applications available that can help organizations improve their CPC capabilities and act as a catalyst for change. Management should seriously consider their deployment as part of any CPC initiative – but not at the expense of understanding and managing the human and cultural components of any changes.

Finally, executive management should establish CPC as a strategic imperative on their agendas, fully recognizing the competitive value and power that it can bring to their organizations in the markets they serve. ■

## TSMC Takes Collaboration Online

TSMC is a good example of a company that understands the potential of collaborative commerce and is working successfully to tap that potential. With year 2000 sales of \$5.2 billion – a 125 percent increase over 1999 – TSMC is the world’s largest semiconductor foundry. The company now has close to 15,000 employees in locations around the world.

Building on the cornerstone of its world-class manufacturing capabilities, TSMC sought to develop value-added services for its growing, global customer base. Its key objectives were to make it as easy as possible to do business and to reduce chip-production cycle time. The company recognized that achieving those goals would require superior 24/7 customer service and technical support.

TSMC saw this as an opportunity to enable customers to interact with the foundry easily and conveniently – from any place and at any time. The company’s vision of the future was for an e-business model called “virtual fab.” That model has been implemented and is now delivering important benefits across the extended supply chain.

TSMC calls its virtual fab the eFoundry. It’s an online customer service program that gives customers all of the benefits of an in-house fab without the associated expenses and organizational issues. The company is automating the entire process of communications and logistics related to technology, inventory, process, production data, foundry-selection criteria, and post-sales support. From their own computers,

customers can access and review information on any of these areas – at any time that is convenient for them.

The eFoundry initiative is producing significant results. Customer acceptance and utilization of the virtual fab is evidenced by a rapidly rising number of online events. TSMC expects that the popularity and functionality of this online collaborative service will translate to a sustainable increase in customer loyalty, production orders, and profit performance. Just as importantly, the success of this initiative is expected to open the doors to future e-business opportunities.