

Supply Chain Management

# Viewpoint

## The product complexity conundrum

Reducing/standardizing components and materials in communications and high tech products



*High performance. Delivered.*

By Chloe Barzey and Robert Forrest

Component and material standardization (CMS) is all about simplicity and collaboration. A successful CMS initiative will allow companies to minimize complexity while still providing differentiated products to their customer. In doing so these same companies will be able to consistently outpace competitors in attaining and sustaining high performance.

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Products in the communications and high tech space are more sophisticated than ever. But do they have to be more complex? That is, do they have to contain as many parts as they do? Do they have to be sourced from so many suppliers? And should there not be more opportunities for interchangeability by using fewer parts across products and product lines?

Companies wrestle with these questions all the time. They know that less (complexity, componentry, suppliers) usually equals more (efficiency, simplicity, profitability). But acknowledging the challenge is not the problem. The problem is knowing how to minimize complexity while still providing differentiated products to customers. After all, there is a limit to how much simplification and standardization is possible. But what is that limit, and how does a company know when it has been reached? It is a question that extends in many directions. Are suppliers taking an active role in complexity reduction, or are they simply trying to sell as many differentiated and sole-sourced components as possible? And to what degree might enhanced internal collaboration across design, sourcing and manufacturing reduce product complexity?

This Accenture point of view looks closely at the complexity conundrum's challenges and potential responses. Accenture's perspective is that simplicity and collaboration, the twin mantras of a component and material standardization (CMS) initiative, are equally key to attaining high performance. In effect, CMS is one of the business behaviors that enables companies to consistently outpace competitors to attain and sustain high performance.

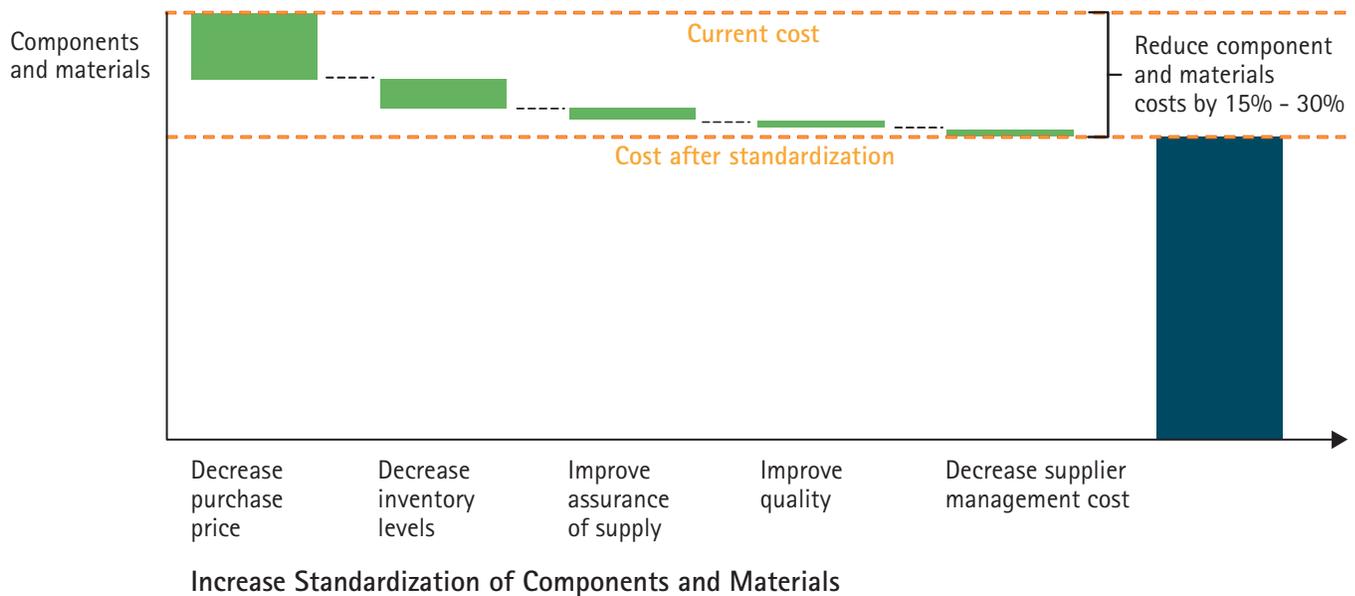
### The hardest job is simplification

Blink once and the communications and high tech industry has changed. Technologies. Products. Competitors. Services. Customer segments. Emerging markets. Just keeping pace means that communications and high tech companies often have too little time to refine and simplify products

before the next generation product is due in the marketplace. But do these new products have to be more complex than the previous product? That is, do they have to contain as many parts as they do? Do they have to be sourced from so many suppliers? And should there not be more opportunities for interchangeability by using fewer and more common parts across product lines and product platforms? Coordinating design and part-selection decisions can be particularly challenging because it occurs across globally distributed design groups. In effect, keeping it simple is just too complex sometimes. But the alternative is excess components and materials. Which in turn means higher costs, more obsolescence problems, inflated inventories, and compromised quality and delivery performance.

Consolidating, rationalizing and standardizing are immensely challenging, which is why many companies have fallen short. But it's

Figure 1. Standardizing components and materials can reduce total costs by a possible 15 to 30 percent, while improving quality



also why quantum improvements have so much potential to improve a company's competitiveness, as well as its profitability. One challenge is that standardization demands higher than average levels of global collaboration across design groups, manufacturing, marketing and procurement/sourcing organizations. In fact, a new standardization-centric process, a different sort of design/sourcing relationship, is the single most important way to make a permanent difference. Tighter controls, better risk-mitigation approaches and more sophisticated financial models are also needed. The latter is crucial because the current impact of fragmentation and complexity must be quantified before the cost/benefit relationship of a new approach can be determined.

The bottom line is that effective component and material standardization efforts span the enterprise and are critical throughout the product

lifecycle. They impact design and development; procurement and sourcing; manufacturing and inventory management; service and support; and marketing and pricing. And it all must happen without undermining the ability to release selectively differentiated products on time and within targeted costs.

### The potential of simplicity

The change required to truly optimize product complexity is not small. But the rewards are not small either. For one of the world's largest communications companies, a recent component and material standardization effort yielded a 27 percent reduction in direct material costs. This result is not atypical. Several large global companies have announced plans to reduce components and suppliers by up to 90 percent. With missions like that, the potential benefits are huge:

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- 10 percent to 30 percent drop in direct material costs (Figure 1).
- 40 percent to 80 percent reduction in the number of suppliers.
- 20 percent to 30 percent decrease in safety stocks, spares and obsolete items.
- 30 percent to 70 percent decrease in product configurations.
- Double digit reductions in supplier management costs.
- Improved supply assurance.
- Improved component and material quality.

Generally speaking, doubling the volume of a particular purchase can yield price reductions of 5 to 20 percent. Thus, up to 20 percent could be saved every time an existing part is deployed in a product that formerly required a unique component.

Conversely, the impact of failing to rationalize or simplify can also be dramatic—often increasing a company's total product, equipment or component costs by 20 percent or more. Basically, companies pay a premium to maintain inventories, stock spares, store materials, distribute items and manage suppliers. Manufacturing operations may also be affected because product and part complexity make it more difficult to run a lean manufacturing operation. It is not uncommon for a company or one of its suppliers to maintain or produce multiple, but largely unnecessary, versions of the same basic part or module with minimal true (through the customer's eyes) differentiation.

### The keys to simplicity

Simplicity initiatives to reduce unique part count and increase reuse often

have a finite start and end point. But in another sense, the process is ongoing. Companies are always developing and updating products, and thus they should always be seeking new complexity reduction opportunities while investigating new or better leveraged supplier relationships. For this reason, a component and material standardization initiative is more accurately a component and material standardization capability— a living, breathing and evolving competency that is exercised when critical analysis requires it, and bypassed when it does not. In this next section, we look at four behaviors that comprise a component and material standardization capability:

**1. Understand the opportunity** by assessing current perspectives and processes, and by developing a financial model that helps identify the

## The causes of complexity

For some communications and high tech companies, frenzied competition and the frantic pace of change are most responsible for a proliferation of parts, materials and equipment. In effect, these organizations have neither the time nor the bandwidth to transform their development and sourcing functions into a unified process that is driven by simplicity. However, many other factors are also at work. A good example is the ubiquity of mergers and acquisitions and the associated problems integrating and rationalizing product lines. Other causes include:

- Poor coordination and controls across engineering and product development.
- Limited understanding of the financial impact of component and material fragmentation.
- Lack of processes or tools to facilitate standardization.
- Internal cultural and organizational challenges.
- Distributed network or product decisions with minimal sourcing influence.
- Limited spend- and equipment-configuration analysis.

components and products for which a rationalization initiative will drive the greatest benefit.

**2. Design a structured, pan-enterprise process** that encourages part-reduction initiatives.

**3. Source more holistically**—become a "strategic sourcer."

**4. Use technology** to support the standardization process, maximize control and share information across the enterprise.

### 1. Understand the opportunity

Companies that excel at minimizing componentry know what they want. Using a detailed and ongoing self-evaluation process, they have determined that significant parts-reduction potential exists on an ongoing basis. However, many companies fail to move forward with parts-reduction initiatives because the scope of the problem, or conversely, the depth of the opportunity is not clear to them.

Still, most organizations have a general sense that more could be done to rationalize and standardize parts and simplify products. They may, for example, be experiencing increased pressure on product or service margins and conclude that greater standardization could relieve some of that pressure. Similarly, companies that have gone through one or several mergers or acquisitions may intuitively know that parts-rationalization opportunities exist. Moreover, companies with large numbers of suppliers, minimal "preferred supplier" relationships, highly distributed manufacturing/distribution operations and convoluted decision-making mechanisms may also have the sense that there is a substantial opportunity.

Of course there are more specific ways to decide if a component and material standardization initiative is worth

investigating. Consider the following set of "self-check" inquiries:

- Do clearly defined parts-standardization goals exist? If so, are there cross-functional metrics for tracking standardization progress against those goals? One particularly successful communications and high tech company has a formal product-development requirement stating that 30 percent of all parts in new designs come from a preferred parts list. When a non-standard part is called for, a structured review/approval procedure must be followed.
- Do the company's performance measures encourage or work against a parts-standardization mission? For example, measuring procurement on both initial material cost and annual cost reduction can help to encourage optimal part selection.
- Is there a mechanism for identifying "standardizable" items? Technologies exist for capturing part specifications, determining "preferred part" status and facilitating part selection. Establishing the criteria for a preferred part can also help to ensure consistency in part classification.
- Are standardized items maintained and updated by a cross-functional team? Assigning ownership and responsibility for maintaining a preferred parts list is key.
- Has a process for using non-preferred parts been defined and followed? Having a clearly defined and responsive escalation process is one of the best ways to keep the product development effort on track and eliminate potential delays.
- What percentage of new parts is typically required for each new product? Developing a "product road map" that aligns with the company's sourcing strategy can help sequence the introduction of new technologies, parts and suppliers.

**Companies are always developing and updating products, and thus they should always be seeking new complexity-reduction opportunities and investigating new or better leveraged supplier relationships.**

## Key questions to better understand the business problem

- Component, material or equipment function?
- Typical application and usage?
- Critical specifications?
- Interdependencies across components or network equipment?
- Substitutable items?
- Common configurations?
- Key specifications to group models?
- Technology trends?
- Supply industry dynamics/cost trend?
- Supplier chain operating model?
- Standardization risks?
- Risk mitigation approach?

- How many suppliers does the company buy from for a particular commodity (e.g., batteries, power cords, screens)? Numerous suppliers for a commodity often indicates a problem with part fragmentation. However, over-reliance on sole-source suppliers can have the same effect.
- Has the company's culture internalized the importance of standardization? Do senior executives support, or even acknowledge, the value of standardization?

Regardless of how in-depth their operational self-analyses are, most companies cannot fully calculate the total costs associated with excess complexity or part proliferation. The missing link is a financial modeling capability that would help understand current costs on a per-part or per-product basis, quantify potential standardization benefits, and establish a part standardization and consolidation road map.

As a starting point, the financial model needs to account for core supply chain costs, which typically include purchase price, inventory carrying costs, quality, part obsolescence and spare parts. Additional costs and savings can also be reflected in the model. For instance, some part standardization initiatives drive down manufacturing costs and improve yield. In addition, service and warranty costs can also be reduced as new products incorporate preferred parts and suppliers. Our experience is that the financial model needs to be developed at a part level or "bottoms up" level and reflect costs that directly tie to the existing cost management system and classification approach. In this way, the financial model can help to both quantify the part standardization benefits and track the results of the standardization initiatives. Linking part standardization to the product profit and loss is a powerful way to gain alignment and support across the organization.

## 2. Develop a structured, enterprise-wide process

There are limits to how "prescribed" a component and materials standardization process can be. Every company is different. However, most communications and high tech companies have somewhat similar shortcomings:

- They lack a robust parts-classification hierarchy that enables attribute-based searches and encourages reuse of existing items.
- Their business metrics are not focused on material, part and equipment standardization.
- Resources for focusing on standardization are insufficient.
- Cross-functional cooperation between design and sourcing is undefined or limited.
- There is limited executive buy-in for, or visibility into, the company's standardization efforts.

Figure 2. Standardization and complexity-reduction initiatives will vary from company to company, but a general four-step process often applies.



## Design/sourcing collaboration and strategic sourcing are core contributors to a component and materials standardization initiative.

All of these characteristics point to the lack of a formal process for identifying, communicating, tracking and sustaining the use of components and materials. Although this process will vary from company to company, it also has common features that broadly apply (Figure 2).

For example, the first of four typical stages would be to document current item and supplier usage, and then group substitutable items. To make this happen, cross-functional standardization teams must be deployed. Design/engineering and sourcing are the team's core players, but representation also should include supply chain, material and equipment technical resources, as well as marketing representatives. Working together, these teams map items by technical attribute, and analyze usage by subcommodity, supplier, item and region/market.

The process' next stage is to identify standard items and preferred suppliers. Key activities include defining standard specifications across regions and markets, and mapping suppliers based on their performance and ability to provide standard items. Again, decisions must be made cross-functionally and focus on optimizing and aligning across groups or locations.

Negotiate updated supplier pricing is the third phase. This is not a typical sourcing effort because its emphasis is linking part standardization with supplier consolidation to increase supplier leverage and drive down costs. Key activities are estimating potential reductions in suppliers' costs resulting from fewer items and configurations, and then developing and deploying enhanced commodity and negotiation strategies.

The final step is to transition usage to standard items. Detailed transition plans and deployment metrics are key to this stage's success. The cross-functional teams also will need to develop standardization guidelines and methods for tracking implementation progress and attaining benefits.

### 3. Source more holistically

Every product in the communications and high tech space involves relationships with scores of suppliers. This may always be the case, regardless of how much complexity is winnowed out. However, complexity reduction initiatives often change the nature and number of those relationships. Take a typical hardware supplier. The supplier's preference would be to work directly with the design community because that is the inroad for proprietary (high-margin, low-competition) components. Pitching off-the-shelf items just paves the way for commodity-focused price cuts.

This is where strategic sourcing comes in—ongoing collaborations across departments to methodically identify, select and shape global supplier value propositions. We know that about 70 percent of most new products' costs are determined during their design/development stage. It is therefore good sense for design teams to work more closely with those able to acquire the most value for the least cost. That is sourcing's job—to obtain the greatest value by leveraging relationships, negotiating skills and contractual commitments across a globally distributed supply network. For this reason, design/sourcing collaboration and strategic sourcing are core contributors to a component and materials standardization initiative—reducing parts quantities and potentially reducing suppliers to lower the total cost of a product or product line.

#### 4. Leverage the right tools and technologies

The volume, velocity and complexity of decision making required to efficiently establish and maintain the appropriate levels of complexity must be supported with technology. This is particularly true because the negative impact of poor decision making and record keeping are high. The negative impact of poorly managing component and product information includes:

- Overly expensive components and products.
- Needlessly introduced new components, with the related negative impact on investment, quality, inventory and time.
- Poorly managed safety and regulatory compliance documentation.
- Highly fragmented decision-making processes that tend to stall or make conflicting decisions.

The good news is that much of the information related to these tens or hundreds of thousands of parts, related products and associated documentation often exists in myriad of internal legacy systems. These include: engineering, procurement, enterprise resource planning, specialty tools built by functional organizations and desktop decision support tools often built by individuals. The IT and data management activities required to sort out the legacy environment and determine the correct support tools to be rationalized and gaps to be filled are straightforward and consist of:

- Alignment of cross-functional key business processes, expected outcomes and related areas for improvement.
- Development of an underlying required data model to support these processes inclusive of data architecture, ownership and systems integration requirements.

- Establishment of a road map of resulting business requirements and fit/gap analysis versus legacy systems environments and ongoing projects.
- Agreement between IT and the business on the time-ordered program of projects to realize business requirements.

Adopting this collaborative and evolutionary approach to enable complexity and cost management results in both short-term gain and long-term capability, which drives continuous improvement.

#### The rewards of simplicity

More standardization. Less complexity. Higher levels of interchangeability. None of these aspirations are new. In fact, the only thing that may be older than these goals is communications and high tech companies' broad inability to achieve and sustain them. On the one hand, this is understandable, given the industry's rapid pace of change. But the fact remains that standardizing components and materials may be one of the richest untapped opportunities available, and one that can help companies accelerate their journey to high performance. Consider the benefits:

##### Cost advantages

Higher degrees of standardization can help reduce suppliers' costs. Subsequent reductions to the purchase price can mean significant bottom-line benefits.

##### Quality

Complexity reduction initiatives make it easier to help ensure the integrity of parts and components by focusing usage on the highest-quality suppliers.

##### Inventory

Significant reductions in inventory carrying costs can be achieved by rationalizing items.

#### Excess and/or obsolete items

By standardizing components and materials, companies can reduce product transition costs.

#### Warehousing and distribution

Less storage space, less handling and less logistical complexity are inevitable.

#### Spares

Significant savings can be realized by applying the reduced number of SKUs to a portion of the spares volume.

#### Warranty and service

Fewer, more-standardized parts mean fewer problems with reverse logistics, easier identification of suspect components and potentially greater support from a smaller base of suppliers.

#### Supplier relationships

Standardizing components and materials can produce stronger, more fruitful relationships with a fewer number of total suppliers. Principal advantages include greater leverage, more strategic involvement (i.e., assistance with design), shorter qualification periods and increased economies of scale.

#### New products

Fewer parts and better supplier relationships can cut the time needed to bring new products to market.

As noted earlier, component and material standardization is all about simplicity and collaboration. In fact, the latter frequently begets the former. Tighter relationships between sourcing and design, for example, are virtually certain to identify part-standardization opportunities. Deeper involvement with suppliers serves the same purpose: synergies focused on simplicity. Companies committed to high performance—and there are many in communications and high tech—will recognize that simpler is better and that now is the time to act.

## Key success factors

The success of a standardization effort is determined by several key behaviors:

- Ensuring cross-functional executive support and clear communication of expectations.
- Defining clear roles by function across geographies (engineering, manufacturing, sourcing, marketing).
- Developing a comprehensive total cost model that includes purchase price, inventory, complexity costs and supplier performance.
- Creating a detailed standardization plan based on assessment results and a business case.
- Launching the effort with targeted commodities to test-drive the process and address inherent barriers.
- Deploying a detailed standardization process that emphasizes sustainability and cross-functional goals and metrics.

### About the authors

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We collaborate with clients to implement innovative consulting and outsourcing solutions that align operating models to support business strategies, optimize global operations, enable profitable product launches, and enhance the skills and capabilities of the supply chain workforce. For more information, visit [www.accenture.com/supplychain](http://www.accenture.com/supplychain).

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