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Growing Product Complexity in SMBs: A Guide to BOM Management

Aberdeen's [Responding to Growing Complexity: Improving BOM Management in Product Development and Beyond](#) (June 2012) showed that increasing product complexity complicates and delays product development processes. Top performing companies in this study were almost 40% more likely to be using a Product Lifecycle Management (PLM) system to enable BOM business processes and operate them efficiently.

Based on the experiences of over 200 companies, this Sector Insight shows the opportunities small and medium businesses (SMBs) have to improve their performance by adopting the Bill of Materials (BOM) management processes used by the top performing companies to address the challenge of increasing product complexity.

Business Processes and Product Development

Aberdeen's research has consistently shown that top performing companies have streamlined and standardized business processes. For example, Aberdeen's [ERP in Manufacturing 2012: The Evolving ERP Strategy 2012](#) report (July 2012) showed that Best-in-Class manufacturers were 65% more likely to have standardized processes that connect manufacturing and product development.

With 61% of respondents in the [Responding to Growing Product Complexity](#) study stating that the velocity of product launch is a top pressure, optimizing and streamlining key product development business processes only makes sense. The data also shows that BOM management a key process that can make a significant difference to a company's performance. This report will show which BOM management capabilities SMBs should adopt to improve their performance.

Products are growing in complexity as the number and types of components increase. As Figure 1 shows, SMBs are even more challenged by growing product complexity than all companies combined. On the other hand, SMBs are slightly less concerned than all companies combined when it comes to decision-making. This is more than likely the result of SMBs having smaller organizations, in which resources are co-located and communications tends to be more local.

Sector Insight

Aberdeen's Sector Insights provide strategic perspective and analysis of primary research results by industry, market segment, or geography

Sector Definition

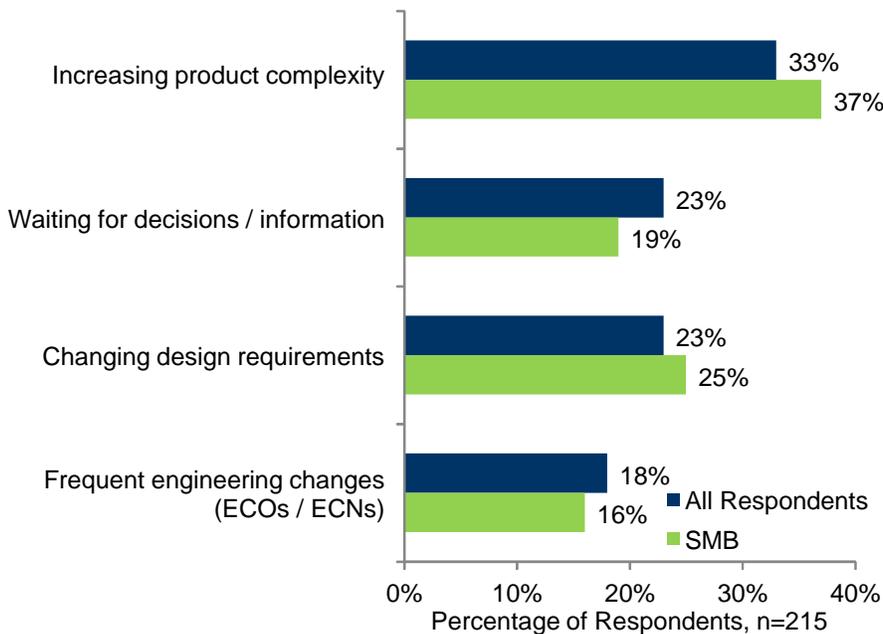
Aberdeen's standard company size definition:

- √ Large – Greater than US\$1B annual revenues
- √ Medium-sized - \$US100M to \$US\$1B annual revenues
- √ Small – Less than \$US 100M annual revenues
- √ Small to Medium-sized Businesses – Less than US\$1B annual revenues-

Top Three Pressures on Product Development for All Companies:

- √ Need to launch product quickly (61% of respondents)
- √ Customer demand for low cost products (46%)
- √ Need to capitalize on new market opportunities (37%)

Figure 1: Top Product Development Challenges



Source: Aberdeen Group, April 2012

Time to Market Improvements of the Best-in-Class

In addition to the performance gains defining the Best-in-Class, Aberdeen's research revealed that these leaders have experienced the following improvements related to time to market:

- ✓ **13% reduction** in time to release a new product to manufacturing
- ✓ **15% reduction** in time to release a new product to an initial market
- ✓ **17% reduction** in time to release a new product to subsequent markets

The Bill of Materials (BOM) must be coordinated between product development, manufacturing, and the supply chain. It becomes the foundation for how these different groups coordinate and communicate product information and deliverables across their siloes. This makes evaluating BOM management a critical opportunity for improving the execution of all of these handoffs and time to market.

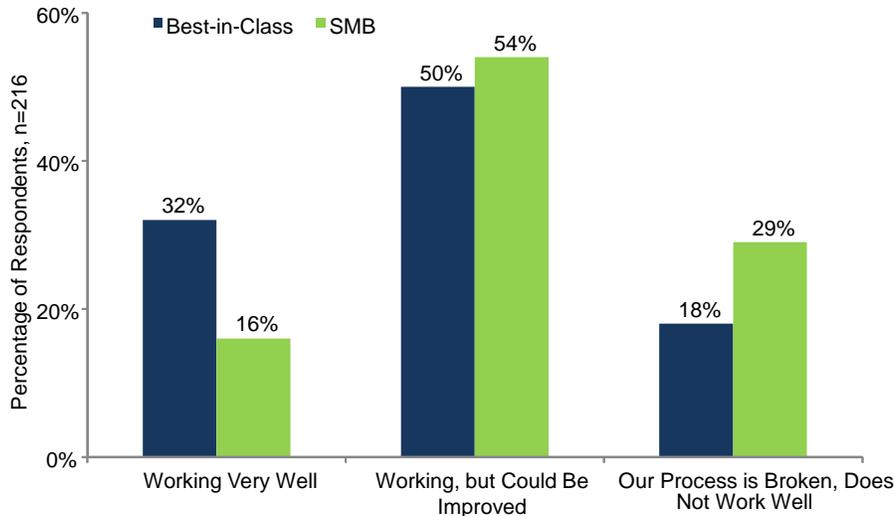
Collaboration across Silos in SMB

As the BOM is the critical foundation for communicating and collaborating between various departments in a manufacturing company, let's look at how Best-in-Class companies (see Table I for definition) and SMBs in particular handle those business processes (Figure 2).

As we can see, overall Best-in-Class companies are over 40% more likely than all SMBs to have an integration process between product design and all other parts of the company, while almost a third of all SMBs say those same processes are broken or non-functional.

Organizations that are already facing increasing product complexity compound these issues when they lack coordination and integration between critical business areas. Best-in-Class companies are better positioned to respond to complexity in their products through collaboration across silos.

Figure 2: Status of Integration between Product Development and Other Internal Groups



Source: Aberdeen Group, April 2012

“Integrating PLM with ERP has enabled us to cut the error rate to zero when we automated the entry of BOMs from our CAD system into ERP. They had been hand keyed, with an error rate that was about 0.5%”

~Theodore Langevin, Sr. VP
Technical Services, Gunther
International Ltd.

Maturity Class Framework

To identify BOM management best practices among participants in its *Responding to Growing Complexity: Improving BOM Management in Product Development and Beyond* study (June 2012), Aberdeen selected five key performance measures which indicate companies' degree of success at addressing the challenges of product complexity to streamline development and profit from new products. Aberdeen benchmarked study participants according to these metrics and categorized them as either Best-in-Class (top 20% of performers), Industry Average (mid 50%), or Laggard (bottom 30%). In this study, we will use the Best-in-Class criteria from the above report, which is independent of company size, and compare it to SMB data from the same study.

Table I summarizes the aggregate performance of organizations within each of these categories.

Table I: Top Performers Earn Best-in-Class Status

Definition of Maturity Class	Mean Class Performance
<p>Best-in-Class: Top 20% Of overall aggregate performance scorers</p>	<ul style="list-style-type: none"> ▪ 86% of product launch dates met ▪ 84% of product revenue targets met ▪ 85% of product cost targets met ▪ 86% of product quality targets met ▪ 22% reduction in development time

Definition of Maturity Class	Mean Class Performance
<p>SMBs: aggregate performance scorers</p>	<ul style="list-style-type: none"> ▪ 64% of product launch dates met ▪ 67% of product revenue targets met ▪ 68% of product cost targets met ▪ 68% of product quality targets met ▪ 11% reduction in development time

Source: Aberdeen Group, April 2012

The Best-in-Class meet product development targets with a high degree of consistency (between 84% and 86% of the time). By contrast, SMBs report success rates between 64% and 68%. Together, these metrics indicate that by adopting Best-in-Class practices, SMBs will improve their ability to competitively differentiate their products, as well as balancing cost and quality demands to bring in expected revenues.

Best Practices in BOM Management

Effective BOM management can help companies achieve Best-in-Class status. First, streamlining access to BOM information enables organizations to better deliver that information to the right stakeholders at the right time in the format they need, be they in engineering, manufacturing, or further along the supply chain. This capability plays a critical role in avoiding unnecessary delays that ultimately cause organizations to miss launch dates. Second, early visibility to BOM information gives companies more lead time and flexibility within their supply chain to take cost out of supplied components. Third, traceability throughout all views of the BOM allows engineering changes to be implemented correctly the first time. This avoids errors that lead to delays, wrong parts, as well as scrap and rework, all of which negatively impact an organization's targets for new products.

Table 2 indicates the key differentiators of how the overall Best-in-Class approach BOM management using their PLM and ERP systems, compared to all SMB companies.

The Best-in-Class are 40% more likely than all SMB companies to use Product Lifecycle Management (PLM) tools. PLM includes a wide variety of product data and process management functions, and BOM management is a core aspect of all PLM systems (see below). As such, PLM plays a critical role in permitting organizations to maintain BOM accuracy at the source, control revisions, and maintain traceability for engineering changes.

PLM Definition

Product Lifecycle Management (PLM) is the methodology for managing the product development processes and associated data from product concept through end of life. PLM tools are the technology solutions that support various stages of the methodology.

Table 2: BOM Management

	Best-in-Class	SMB
PLM	Have a PLM solution in place	
	68%	43%
	PLM is the system of record for Engineering BOM	
ERP	34%	25%
	ERP is the system of record for Manufacturing BOM	
	43%	36%
	ERP is the system of record for As Built BOM	
ERP and PLM	31%	33%
	ERP is the system of record for As Maintained BOM	
	31%	37%
ERP and PLM	PLM system has been integrated with ERP	
	69%	51%

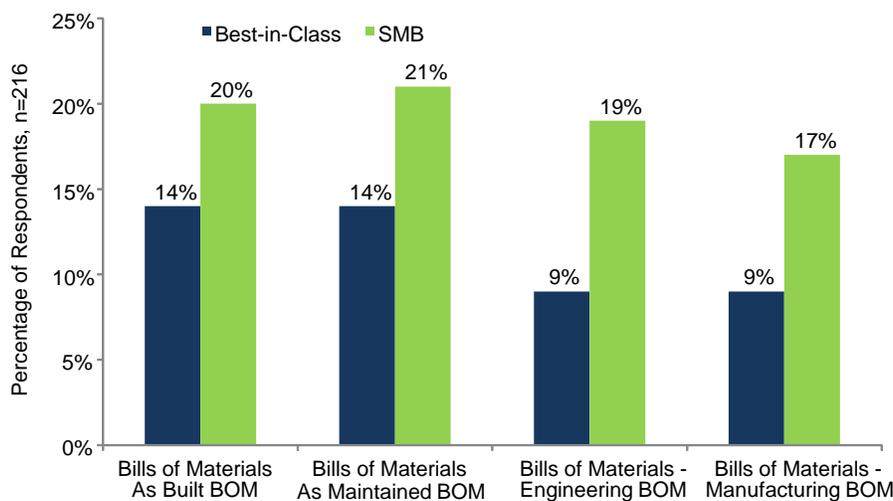
Source: Aberdeen Group, April 2012

Best-in-Class companies are more likely than SMBs to use a system of any kind (PLM or ERP) to maintain their BOMs. Figure 3 shows the significant differences between Best-in-Class companies' and SMBs in all four versions of BOM management. The biggest difference is in BOM management post-manufacturing, where SMBs are far less likely than Best-in-Class companies to have some system of record to support the BOM. This can lead directly to the decision-making challenges we saw in Figure 1.

ERP Definition

Enterprise Resource Planning (ERP) software is designed to be the system of record for operating and managing a business. It is typically the transaction engine for an enterprise and is used to maintain business processes in areas such as account payable/receivable, order management, material planning, etc.

Figure 3: No System of Record for BOM



Source: Aberdeen Group, April 2012

The Role and Value of PLM

PLM is a clear differentiator between Best-in-Class company performance and that of SMBs. But the support PLM offers to product development may be less clear. In part, this is because PLM is composed of a host of sub-capabilities and solutions. As a result, PLM implementations vary widely, which can cause confusion about what PLM is and what it can do. To provide a common definition, Table 3 shows the top five processes that survey respondents agree must be a part of a PLM solution. These top five are consistent, with equivalent percentages, across the Maturity Class Framework.

"Integrating PLM with our other enterprise systems tied in CAD PDM with BOM management to eliminate data entry redundancy and errors."

~ Engineering manager,
Automotive Supplier

Table 3: The Capabilities that Should Be Part of PLM

Capabilities	All Respondents
Product data management (PDM)	75%
Project / program management	72%
Document management	71%
BOM management	70%
Change management	70%

Source: Aberdeen Group, April 2012

PLM plays a key role in BOM management by centralizing product data and managing related workflows. Centralized product data makes it easier to collaborate and manage changes. It also provides a single source of product information, reducing the risk of errors. This lets companies better manage the BOM and ensures that the right information gets to the right person at the right time.

To help organizations understand how PLM supports product development, Table 4 summarizes study participants' satisfaction with PLM in various aspects of product development processes. A score of more than 3.0 in Table 4 indicates that use of PLM exceeded expectations at the time of implementation. Best-in-Class approaches to the use and support of PLM have yielded greater user satisfaction.

Table 4: Satisfaction with PLM

	Best-in-Class	SMB
Collaboration within product development / R&D teams	4.2	3.6
Collaboration with other departments outside of product development / R&D teams (manufacturing, marketing, etc.)	4.1	3.4
Number of engineering changes post design release	4.0	3.4
Product quality	4.0	3.5

	Best-in-Class	SMB
Number of engineering changes prior to design release	4.0	3.1
Collaboration with third parties (suppliers, partners)	3.9	3.1

Source: Aberdeen Group, April 2012

Best-in-Class satisfaction with PLM surpassed that of SMBs in all categories. SMBs can benefit by looking to the criteria the Best-in-Class use to select their PLM solutions. Table 5 indicates the selection criteria the Best-in-Class indicated were the most important to their choice of a PLM solution, ranked on a scale of 1 to 5.

PLM must be efficiently and effectively incorporated into the business as a whole. To this end, the Best-in-Class focus on finding a solution that is easy to adopt, works with their existing business processes, and makes engineering and product development information more readily available to the rest of the enterprise.

Until we got our PLM system fully adopted and used, our BOMs were kept in spreadsheets. We estimate we saved 200 engineering hours a month in coordinating all those BOMs"

~ VP of Supply Chain
US\$75M Tool and Die manufacturer

Table 5: Most Important Selection Criteria of the Best-in-Class

Criteria	Best-in-Class Rating
Ease of use	4.34
Ability to integrate with other enterprise systems	4.32
Ease and speed of implementation	4.30
Ability to support existing business processes	4.28
Flexibility of tool to be used by different audiences (engineering, manufacturing, marketing, etc.)	4.27

Source: Aberdeen Group, April 2012

Key Insights and Recommended Actions

As they work to develop and launch products faster, companies must have business processes and systems in place to give the whole organization the tools it needs. Product development and engineering lay the foundation for success with the initial engineering BOM, but must work with the rest of the organization to maintain that success as the BOM develops throughout the lifecycle of the product.

New methods for BOM management present organizations with significant opportunities for improvement. By following the example of the Best-in-Class, SMBs can improve product development processes and related downstream operations, leading to more successful product launches and increased profitability.

"We struggle with coordinating the BOMs with our suppliers. We have one key supplier that stated they receive four different BOMs for each product launch. We see PLM and ERP combined as solving that problem."

~ VP of Operations,
US\$150M manufacturer of electronic components

Organizations seeking this kind of improvement must:

- Make sure you have a system of record for the BOM. SMBs are almost twice as likely as Best-in-Class companies to have no system of record for any BOM. No matter which stage of BOM management you have reached, that system lays the foundation for managing the BOM across all parts of the organization.
- Implement a PLM solution and use it as the system of record for the engineering BOM. The Best-in-Class are 40% more likely than their competitors to have a PLM solution in place.
- Integrate PLM and ERP. Use PLM as the system of record for the engineering BOM while using ERP as the system of record for the Manufacturing, As Built, and As Maintained BOMs. The Best-in-Class are 17% more likely than SMBs to integrate PLM with ERP, which is a key step to ensuring that BOM data is accurate and traceable from engineering to manufacturing and the supply chain.

For more information on this or other research topics, please visit www.aberdeen.com.

Related Research	
<i>Product Development Single Source of Truth: Integrating PLM and ERP</i> ; April 2012	<i>ERP in Manufacturing 2012: The Evolving ERP Strategy</i> ; July 2012 <i>NPD - The 2011 Growth Imperative: Optimizing Speed and Cost in New Product Development</i> ; November 2010
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