Aberdeen *Group*

Profitable Product Development for SME

Small to Midsize Enterprises Profiting from Innovation

March 2007

Executive Summary

Small to midsize enterprises (SMEs) are actively pursuing product development improvements to deliver more innovative products to their customers, including improved control over their projects and product information. Aberdeen benchmarks reveal that Best in Class SMEs are meeting the product development goals that drive product profitability 49% to 74% more frequently than average companies, and up to 14 times more frequently than laggards. These leading SMEs enjoy a significant performance advantage over their peers by leveraging a variety of product lifecycle management (PLM) technologies to improve their product development execution. This report highlights the approaches that leading SMEs take to achieve and extend this performance gap, serving as a roadmap for other smaller manufacturers who wish to improve their product development performance and enhance product profitability.

"Product development is key to our success in growing the business. Without it, we would remain stagnant and would not be able to compete in the worldwide marketplace."

- Jeff Scoville, Director of Engineering, Construction Machinery Industry

Best in Class Performance

Aberdeen used five key performance criteria to distinguish Best in Class companies. These key performance indicators (KPIs) represent the ability for benchmarked companies to meet the product development targets that drive product profitability – including revenue, cost, launch date, and quality targets. Best in Class SMEs show superior performance in all five measures including:

- **2.1 times** more likely to hit *product launch date* targets
- **2.4 times** more likely to hit *product revenue* targets
- **2.3 times** more likely to hit *product cost* targets
- **2.7 times** more likely to hit *product development cost* targets
- **2.2 times** more likely to hit *product quality* targets

These metrics indicate the leading SMEs are able to hit their targets. In addition, they are achieving better relative performance to their peers. Benchmarks on product development lead times indicate that Best in Class companies **deliver products to market an average of 22% faster than their competition** – a significant time to market advantage.

Competitive Maturity Assessment

Survey results show that the SMEs enjoying Best in Class performance shared several common characteristics with respect to their product development approaches, such as:

- Best in Class SMEs are **34% more likely** to have an executive responsible for product development performance.
- Best in Class SMEs are **nearly two times as likely** to formally manage new product development with performance metrics.

- Best in Class SMEs are **over 50% more likely** to leverage centralized product data to improve product development performance and profitability, and are over **2.5 times more likely** to extend product data beyond items and bills of materials (BOMs).

Required Actions

In addition to the specific recommendations in Chapter 3 of this report, to achieve Best in Class performance, small to midsize enterprises must:

- Assign executive responsibility to new product development
- Centralize management of product information, and extend electronic product data with new product development project data, commercial product data, processes or workflows, and technical product information such as simulation and analysis results.

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Chapter One:
Benchmarking the Best in Class

Fast Facts

- Best in class SMEs meet the product development goals that drive product profitability **49% to 74%** more frequently than average companies, and **up to 14 times** more frequently than laggards.
- Best in class companies deliver products to market an average of **22% faster** than their competition – a significant time to market advantage.

Manufacturers face stiff competition in global markets. To combat this, companies of all sizes are turning to product innovation in order to simultaneously increase revenue and decrease cost – pursuing profitable growth. Most companies, however, struggle to meet the product development metrics that drive product profitability – namely hitting revenue, cost, launch date, and quality targets. Aberdeen's *The PLM for Small to Midsize Manufacturers Benchmark* indicates that average midsize companies are even less able to hit these "metrics that matter" than their larger counterparts. On the other hand, leading companies – both big and small – enjoy a significant performance advantage over their competition. Clearly these leaders must be taking different approaches to achieving innovation and driving product profitability.

"Developing products that meet new and tighter regulations is essential to our survival. Even without these regulations, new and innovative products are key to sales growth and being competitive."

- Jon Ferguson, V.P. of Supply Chain, Outdoor Power Equipment Industry, Shindaiwa Inc.

Competitive Framework Key

The Aberdeen Competitive Framework defines enterprises as falling into one of the three following levels of practices and performance:

Best in Class (20%) —practices that are the best currently being employed and significantly superior to the industry norm

Industry norm (50%) —practices that represent the average or norm

Laggards (30%) —practices that are significantly behind the average of the industry

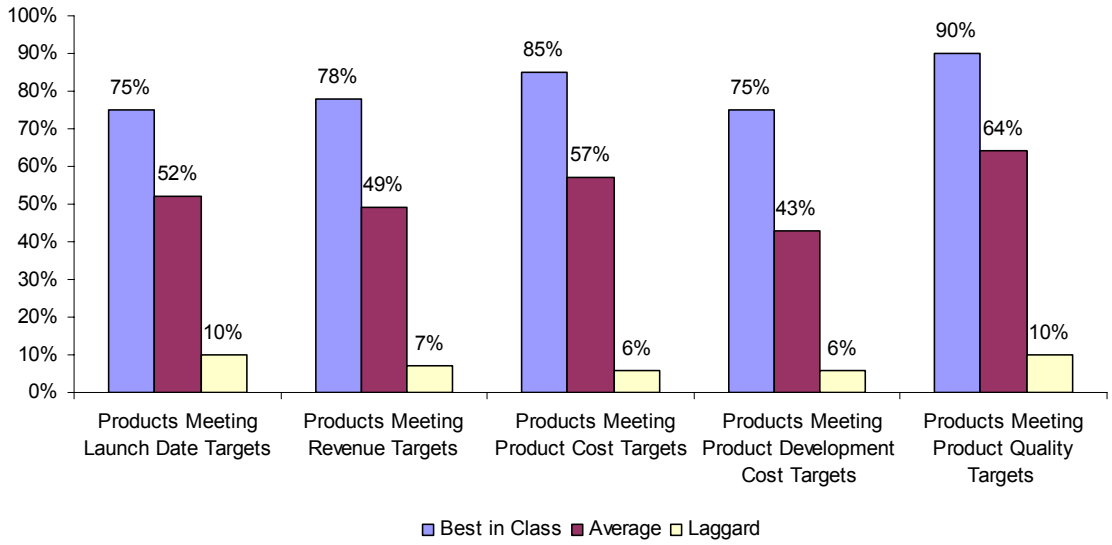
Maturity Class Framework

Using Aberdeen's Competitive Framework (see Competitive Framework Key at left), benchmark respondents were classified into three levels of performance to determine which companies are leading the pack in hitting their product development and product lifecycle targets, including:

- Product quality
- Product launch dates
- Product development costs
- Direct product cost
- Product revenue

The survey respondents were ranked according to a composite metric that represents their ability to hit the five targets. Figure 1 summarizes the ability for these companies to meet their targets and defines "Best in Class performance" for this study.

Figure 1: Companies with Top Performance Earn "Best in Class" Status



Source: AberdeenGroup, March 2007

Best in Class PACE Model

Best in Class approaches to product development by SMEs contribute to achieving the five key performance metrics cited above, each of which has a direct impact on the manufacturers' product profitability. Best in class companies achieve their high performance through a combination of strategic actions, organizational capabilities and enabling technology that can be summarized as follows:

Table 1: Best in Class PACE Framework

Pressures	Actions	Capabilities	Enablers
• Customer demand for innovation • Global markets / competition • Cost / margin pressure	• Improve project management • Improve design capabilities • Improve design collaboration	• Product data extended beyond items/BOMs • Formal management of new product development with performance metrics • Centralized product data (physical or logical) • Standardized NPD processes • Responsibility for product development at executive level	• Product data management (PDM) • Product cost management • 3D publishing tools • Project collaboration • Rapid prototyping • Design collaboration • Product portfolio management (PPM) • Digital manufacturing / manufacturing simulation

Source: AberdeenGroup, March 2007

SMEs are clearly facing challenging market conditions. These smaller companies must compete against the resources of larger companies to develop new, innovative products

that meet customer demands. At the same time, global competition and markets have simulatenously increased the demand and complexity of innovation (see *Mid-Size Manufacturers Struggle with Global Product Design*). In order to maintain market share and grow, these companies must innovate. In order for them to profit from this growth, they are also under considerable pressure to reduce cost to maintain margins.

Small to midsize manufacturers are addressing the challenges by improving their capability to innovate and deliver these innovative products to market. These companies are actively focused on improving their ability to manage product development projects, coordinating a growing number of participants from inside the enterprise and out. They are also improving product innovation itself, by focusing on improving their ability to design products as well as their ability to collaborate with others on their product designs.

"New product development is important to our company, in reducing cycle times as we try to close competitive product gaps and meet aggressive customer timelines on new technology."

- Product Design Manager, Automotive Supplier

Leading companies are being rewarded with improved product development performance. For example, Table 2 indicates that Best in Class manufacturers have a **22% average time to market advantage** over poorer performing average and laggard companies. This is a significant advantage that can be used to combat the market pressures identified above.

Table 2: Best in Class Product Lead Time Advantage

Product Development Benchmark	Best in Class Lead Time Advantage
Minor revision to an existing product	**30%**
Major revision to an existing product	**17%**
New product, similar to existing products (or in existing product platform)	**25%**
Entirely new product (or new product platform)	**15%**
Average product development lead time advantage	**22%**

Source: AberdeenGroup, March 2007

As this example illustrates, the Best in Class are clearly enjoying significant benefits from their enhanced performance in the form of a market advantage over their competition. In the next chapter, we will see what the top performers are doing to achieve these gains.

Aberdeen Insights – Part 1

Small to midsize manufacturers face an innovation imperative. To compete in today's fast-paced, global market they must out-innovate their competition and better deliver on the needs of customers. Their products must show differentiated value over competitive offerings. The competitive edge from innovation is often fleeting, however, so these companies are not only compelled to deliver innovation – they are focused on delivering innovation rapidly. SMEs must improve product innovation in order to grow the top-line.

At the same time, these companies face significant price and margin pressures from customers, channels, and competitors. At the same time companies are driven to provide better products to market, they are also constrained by cost. Smaller manufacturers, therefore, must also improve product innovation to control product costs in order to grow the bottom-line.

Chapter Two:
Benchmarking Requirements for Success

Fast Facts

- Best in Class SMEs are **34% more likely** to have an executive responsible for product development performance.
- Best in Class SMEs are **nearly two times as likely** to formally manage new product development with performance metrics.
- Best in Class SMEs are **over 50% more likely** to leverage centralized product data to improve product development performance and profitability, and are over **2.5 times more likely** to extend product data beyond items and bills of materials (BOMs).

Small to midsize manufacturers, compelled to improve innovation to compete in challenging global markets, are taking action and achieving results. By investing in improvements to their ability to create innovation (by improving design capabilities and design collaboration) and their ability to bring innovation to market (by improving project management and project collaboration), leading companies are proactively addressing both top-line and bottom-line innovation challenges.

Competitive Maturity Assessment

Survey respondents fell into one of three categories based on their product development performance – Best in Class, Average, or Laggard – based on a composite metric that indicated their ability to hit the product development targets that drive profitability. As seen in Figure 1, Best in Class companies are achieving superior results as compared to their peers. Aberdeen investigated the business capabilities and technical enablers that these companies have adopted in order to determine what sets these Best in Class companies apart from the rest, and to provide actionable recommendations to Average and Laggard performers.

"Cost makes or breaks our budgets. We need to understand the cost of the product in order to engineer it properly."

- Jeff Scoville, Director of Engineering, Construction Machinery Industry

The Competitive Framework (Table 2) investigates the characteristics of companies in each of the three performance classes in five key categories: (1) process; (2) organization; (3) knowledge management; (4) technology enablement; and (5) performance management. The results indicate the Best in Class companies take fundamentally different approaches to enabling product innovation in all five aspects of their business:

Table 3: Competitive Framework

	Best in Class	Average	Laggards
Process	Formal Change Management/Revision Control Processes		
	76%	55%	54%
	Standardizing NPD Processes		
	68%	47%	47%
	Formal Design Reviews		
	82%	77%	52%
Organizational Structure	Responsibility for Product Development at Executive Level		
	71%	58%	45%
	Cross-Functional Product Development Teams		
	66%	66%	50%
Knowledge/ Data Management	Centralized Product Data		
	68%	48%	40%
	Product Data Extended Beyond Items/BOMs		
	65%	30%	19%
Technology Usage	Product Data Management (PDM)		
	65%	37%	33%
	Product Cost Management		
	80%	55%	45%
	3D Publishing Tools		
	55%	26%	23%
	Workflow		
	68%	44%	33%
	Project Collaboration		
	82%	54%	53%
Performance Management	Formal Management of New Product Development with Performance Metrics		
	52%	28%	27%

Source: AberdeenGroup, March 2007

Organizational Capabilities and Technology Enablers

Best in Class companies are hitting their product development targets and bringing their products to market an average of 22% faster because they have aligned their businesses to develop and capitalize on product innovation. These leading companies have taken differentiated approaches in all five aspects analyzed in the benchmark study:

- From a process perspective, the **Best in Class have formalized and standardized processes**. This is not to say that they have fully "re-engineered" their product innovation processes, as many have taken a more straight-forward approach. On the other hand, they are addressing new product development (NPD), change management, and design review processes. These core processes provide a level of control and coordination to product development that ensures project resources are aligned and organized, and provide a level of coordination and collaboration between engineering and downstream parties such as manufacturing.
- Organizationally, **Best in Class companies have created environments where product development and product innovation can flourish**. These companies place an executive in charge of innovation and operate with cross-functional product development teams. These approaches help to break down the potential for miscommunication and conflict between organizations that can have competing goals, by ensuring that there is a business leader and team structure that is aligned with the overall goal of developing a profitable product.

> ***"Project collaboration is critical as many departments' and functions' collective efforts are needed for a successful product evaluation and launch."***
>
> - Jon Ferguson, V.P. of Supply Chain, Outdoor Power Equipment Industry, Shindaiwa Inc.

- **Best in Class companies have aligned their product knowledge** in addition to their people. Leading companies have created centralized product repositories to better capture, share, and reuse core information such as items and bills of material (BOMs). Beyond this, these companies have extended the information that they capture and manage, including: more commercial product data (such as requirements); more project-oriented information (tasks, timelines, and deliverables); as well as more technical data (analysis or simulation data). Capturing and centralizing this information improves efficiency, helps companies make better product decisions, promotes reuse, and also helps to enable better communication and change management across departments.

> ***"The problem we have is that we have parts that are integrated – items and BOM's -but the process falls short when considering commercial product data. And forget about simulation / analysis information. It's not even a consideration."***
>
> - Timothy Cunningham
> Food Processor

- **Best in Class companies are using more PLM-related technology** to enable product development. These leading companies are using a wide variety of technologies to improve product development. Core technologies in use by top performers include product data management (PDM) and project collaboration. These are the basics for enabling the process and knowledge management approaches defined above. In addition to these, a number of software solutions that perform specialty functions were more common in Best in Class companies. These include specialty tools like product cost management (PCM) that give companies great visibility and control over product cost early in the design phases where changes can still be made to enhance profitability. They also include 3D publishing tools that can be used to enhance design collaboration and speed the development of product and service documentation. Beyond these, some more advanced tools such as product portfolio management (PPM) and digital manufacturing (including manufacturing simulation) were less prevalent (only about one third have these technologies), but twice as common in Best in Class companies.

> ***"Centralized product data helps give us a good reference so more time is spent on making the product better, not trying to remember how we made it 'good' in the first place."***
>
> - Jeff Scoville, Director of Engineering, Construction Machinery Industry

- Finally, the **Best in Class measure their product development performance with metrics**. These top performers are almost two times as likely to formally track their performance using key performance indicators (KPIs). These companies recognize that measuring their ability to bring new products to market allows them to identify and resolve problems quickly as well as improve their product development capabilities over time.

Best in Class small to midsize companies have addressed the basics of new product development effectively, bringing together their people, processes, product knowledge, technology, and performance management approaches. These approaches can be adopted by others that are looking to enhance the performance of their new product development efforts – and enhance product profitability.

Aberdeen Insights – Part 2

Small to midsize companies have the opportunity to improve their product development performance. Some of the Best in Class approaches to product development identified in the benchmark confirm commonly held beliefs of best practices, such as the utilization of cross-functional teams or the centralization of product data. Smaller companies are adopting these approaches and reaping the benefits. In addition, newer approaches like design and project collaboration are validated by the report. Many companies have adopted collaborative approaches based on their belief that better coordination and communication will have a positive impact on their performance. These benchmarks should serve as confirmation that these approaches are providing value and helping driving tangible improvements in the metrics that drive product profitability. In addition, the report identifies that some less common technologies, such as product portfolio management (PPM) and digital manufacturing are finding their way into smaller organizations. While these technologies are not as prevalent in even Best in Class companies, they are being used by leading product development companies with success. Overall, these benchmarks should help to provide a roadmap for companies to continuously improve their product development capabilities to deliver greater innovation to market.

Chapter Three:
Required Actions

Fast Facts

- Laggard companies should address the basics, including widely recognized best practices such as cross-functional teams, standardized new product development process, and basic product data management.
- Average companies should look for an advantage, adopting more collaborative project approaches, implementing more broad data management strategies, and extending core product data to a richer product definition and incorporating project information.
- Best in Class companies should look to extend their lead by adopting more cutting-edge approaches and technologies to improve product development, such as manufacturing simulation and product portfolio management (PPM).

Whether a company is trying to move its performance in product development usage from "Laggard" to "Industry Average," or "Industry Average" to "Best in Class," the following actions will help spur the necessary performance improvements:

Laggard Steps to Success

1. *Adopt basic organizational and process management approaches that are proven to improve product development performance*

   A significant body of research indicates that developing cross-functional teams for product development projects provides better results. Laggard companies should adopt this strategy, as well as assign an executive to oversee product development processes. These actions will help to eliminate disconnects and conflicting goals from hampering product development efforts.

2. *Implement basic product data management and project collaboration capabilities*

   Aberdeen benchmarks consistently show that centralized product data is a key factor in improving product development performance. At a minimum, laggard companies should develop a data management approach that provides a single, trusted, and current source of product information such as item definitions and bills of material.

3. *Implement processes and performance measurement to improve product development performance*

   Laggard companies should implement formal product development processes and measure performance. Performance information should be collected and analyzed in order to determine where problems occur and to develop actions to improve product development. What gets measured gets improved.

Industry Norm Steps to Success

1. *Extend organizational approach beyond the basics of cross-departmental teams*

   While average companies appear to have the basics in hand, these companies must ensure executive sponsorship for new product development by appointing an executive in charge.

2. *Implement and extend basic product data management and project collaboration capabilities*

   Average companies are behind in basic product data management. At a minimum, average companies should develop a data management approach that provides a single, trusted, and current source of product information such as item definitions and bills of material. Average companies should extend this data repository with project-oriented information such as project timelines and deliverables to improve project execution.

3. *Implement processes and performance measurement to improve product development performance*

   Average companies should follow the recommendation for laggards to implement formal product development processes and measure performance. Performance information should be collected and analyzed in order to determine where problems occur and to develop actions to improve product development. What gets measured gets improved.

Best in Class Next Steps

1. *Extend product data management and project collaboration capabilities to include more aspects of the product*

   Best in Class companies that already have centralized product and new product development project data under control should look to extend the value of this information. These leaders should look to bring more information under formal control, including commercial and technical information. This approach will improve their ability to predict and manage the impact of change, enhance collaboration, and reduce communication errors.

2. *Extend product data management and project collaboration capabilities to include more specialized product lifecycle management (PLM) functions*

   Best in Class companies that already have centralized product and new product development project data under control should also look to extend the value of this information with specialized PLM applications. Solutions such as product portfolio management (PPM) can help guide the product development process towards higher value projects, leading to greater returns on product development investments. In addition, advanced design and collaboration capabilities such as digital manufacturing (including manufacturing simulation) can greatly enhance the ability to develop products “right the first time” to bring higher quality, more profitable products to market.

3. *Implement performance measurement to better understand product development performance*

Despite the fact that Best in Class companies are two times as likely to manage new product development with metrics, almost half of these companies are not. Leading companies should implement formal product development performance measurement. Performance information should be collected and analyzed in order to determine where problems occur and to develop actions to improve product development. What gets measured gets improved, particularly for these leading companies that have already tackled many of the basics of easy improvement opportunities.

Aberdeen Insights – Part 3

Regardless of performance class, there are opportunities for all companies to benefit from improved product development. Leading companies are enjoying significant performance advantages in hitting their product development targets – including revenue, cost, launch dates, and quality – by employing better approaches. Laggards have some very basic opportunities available for improvement by adopting well known best practices. Average companies have the opportunity to learn from the leaders, and determine how they can either join the ranks of the Best in Class or at least remain in the middle of the pack as the Laggards improve. The Best in Class have the opportunity to further adopt best practices and technologies that have been developed by larger organizations, and are now mature enough for adoption by smaller organizations. The opportunity for improvement is there for those companies that choose to invest their time and resources in improving product development performance.

Appendix A:
Research Methodology

Between January and February 2007, Aberdeen Group examined the new product development practices of nearly 400 enterprises in a diverse set of manufacturing enterprises.

Responding retail executives completed an online survey that included questions designed to determine the following:

- The challenges they face in bringing profitable products to market
- The organizational approaches and level of process standardization in their product development environments
- The business capabilities that they have put in place, including technology used to support product development
- The ability for these companies to meet the product development targets that drive product profitability

Aberdeen supplemented this online survey effort with telephone interviews with select survey respondents, gathering additional information on product development strategies, experiences, and results. The study aimed to identify emerging best practices for product development in manufacturing industries and provide a framework by which readers could assess their own management capabilities.

Responding enterprises included the following:

- ***Job title:*** The research sample included respondents with the following job titles: director or manager (38%), senior management (14%), senior vice president (8%), CFO (1%), CIO (1%), staff (27%), consultant (4%) and other (8%).
- ***Job function:*** The research sample included respondents from the following functional areas of responsibility: Engineering (65%), Manufacturing (7%), Business Process Management (6%), Information Technology (3%), Sales (2%), Logistics/Supply Chain (1%), and Others (9%).
- ***Industry:*** The research sample included respondents predominantly from manufacturing industries. At a high level, the respondents represented discrete manufacturing (77%), consumer products (25%), and process manufacturing (38%). From a more detailed perspective, the industries represented were widely varied. Industries that were more highly represented included aerospace and defense (21%), industrial equipment manufacturing (30%), and medical devices (19%).
- ***Geography:*** The majority of study respondents were from North America (86%), with other representation from Europe (9%) and Asia Pacific (Asia, Australia) (3%). The remaining respondents were from the Middle East or Africa.

- ***Company size:*** About 48% were from small businesses (annual revenues of $50 million or less), 37% of respondents were from medium-size enterprises (annual revenues between $50 million and $1 billion), and 16% were from large enterprises (annual revenues of more than $1 billion U.S.).

Solution providers recognized as sponsors of this report were solicited after the fact and had no substantive influence on the direction of the *Profitable Product Development* Benchmark Report. Their sponsorship has made it possible for Aberdeen Group to make these findings available to readers at no charge.

Table 4: PACE Framework

PACE Key
Aberdeen applies a methodology to benchmark research that evaluates the business pressures, actions, capabilities, and enablers (PACE) that indicate corporate behavior in specific business processes. These terms are defined as follows: *Pressures* — external forces that impact an organization's market position, competitiveness, or business operations (e.g., economic, political and regulatory, technology, changing customer preferences, competitive) *Actions* — the strategic approaches that an organization takes in response to industry pressures (e.g., align the corporate business model to leverage industry opportunities, such as product/service strategy, target markets, financial strategy, go-to-market, and sales strategy) *Capabilities* — the business process competencies required to execute corporate strategy (e.g., skilled people, brand, market positioning, viable products/services, ecosystem partners, financing) *Enablers* — the key functionality of technology solutions required to support the organization's enabling business practices (e.g., development platform, applications, network connectivity, user interface, training and support, partner interfaces, data cleansing, and management)

Source: AberdeenGroup, March 2007

Table 5: Competitive Framework

Competitive Framework Key
The Aberdeen Competitive Framework defines enterprises as falling into one of the three following levels of product development practices and performance: *Best in Class (20%)* — Product development practices that are the best currently being employed and significantly superior to the industry norm, and result in the top industry performance. *Industry norm (50%)* — Product development practices that represent the average or norm, and result in average industry performance. *Laggards (30%)* — Product development practices that are significantly behind the average of the industry, and result in below average performance

Source: AberdeenGroup, March 2007

Table 6: Relationship between PACE and Competitive Framework

PACE and Competitive Framework How They Interact
Aberdeen research indicates that companies that identify the most impactful pressures and take the most transformational and effective actions are most likely to achieve superior performance. The level of competitive performance that a company achieves is strongly determined by the PACE choices that they make and how well they execute.

Source: AberdeenGroup, March 2007

Appendix B:
Related Aberdeen Research

Related Aberdeen research that forms a companion or reference to this report include:

- *The PLM for Small to Midsize Manufacturers Benchmark* (March 2006)
- *Mid-Size Manufacturers Struggle with Global Product Design* (March 2006)
- *The Configuration Management Report* (January 2007)
- *The Product Innovation Agenda Benchmark* (September 2005)
- *New Product Development: Profiting from Innovation* (January, 2006)
- *Mid-size Manufacturers Collaborating Closer to Home* (August 2006)
- *Product Innovation for Mid-size Enterprises* (November 2005)
- *Mid-Size Companies Fighting to Protect Intellectual Property under Siege* (January 2007)
- *PLM "Software as a Service"* (December 2006)
- *Unsustainable Compliance Approaches Common in Midsize Companies* (November 2006)
- *Outsourcing SMEs Exacerbate Mechatronic Integration Issues* (September 2006)
- *Mid-size Manufacturers Competitive in Product Portfolio Management* (September 2006)

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