Aberdeen*Group*

Product Development in Consumer Industries Benchmark

Leading the Next Wave of Growth

June 2004

Executive Summary

This report identifies the leading priorities, challenges, and prospective product development strategies and technologies employed by consumer product companies. Trends and recommendations detailed in this report are based on Aberdeen Group's examination of product management strategies at 215 consumer companies, and are intended to aid other enterprises in building a business case for action to enhance their own product development initiatives.

Key Business Value Findings

With the global economy on the mend, consumer companies are looking to product innovation and development to fuel the recovery. Aberdeen's *Product Development in the Consumer Industries Benchmark Study* found that more than three-quarters of consumer companies view new product development as a leading driver for revenue, profit, and market share growth. And more than two-thirds of these firms will rely on new products to contribute a growing portion of total revenues over the next three years.

Key forces driving the focus on product development improvements include increased competition (particularly from low-cost countries), goals to target new markets and create new revenue streams, customer demands for more innovative products, and pressures to reduce product costs. However, survey respondents are uncertain that their companies currently possess the requisite organizational alignment, procedures, and infrastructure to achieve their product innovation and delivery goals.

Specifically, most consumer products companies have not effectively aligned and standardized product development processes company-wide; and nearly a quarter of responding companies lacked any formal product development procedures at all. Consumer companies also reported only limited use of automation to manage product data and support product development processes – with just over half of respondents admitting to using any automation at all. Most consumer firms leveraging automation to assist product development initiatives currently rely on a hodgepodge of homegrown solutions coupled with a variety of commercially available computer-aided design (CAD) and visualization tools.

Implications and Analysis

Leading challenges to product development process improvements include gathering accurate information on customer requirements, enforcing standard product development procedures and methods across the enterprise, managing design and engineering changes, effectively planning and transitioning designs to manufacturing, and gathering information on aftermarket product performance. Respondents reported that these hurdles negatively impact their ability to align product innovations with market requirements, speed time-to-volume cycles, accurately predict product costs, and maximize the profitability for new products. Proof: less than half of respondents said their companies can predict product costs within 25% of actual costs. Such inaccuracies lead to product development delays and rework, extend time-to-market cycles, and shrink profit margins.

Not surprisingly, less than a quarter of consumer products companies are more than satisfied with their product development capabilities and performance. Prioritized strategies consumer companies plan to employ for product development improvements include:

- Product cost management

- Standardizing product development processes and metrics

- Outsourcing innovation and design to external providers

- Creating feedback loop on aftermarket product performance

- Parts standardization and reuse

Recommendations for Action

Improving product development performance will require more than just boosting research and development (R&D) funding. In fact, there was no correlation between R&D budgets and product development efficiency and performance. Instead, an examination of the attributes of consumer companies with the top-performing product development operations — in terms of efficiency, quality, and overall profitability of new products — leads Aberdeen to make the following recommendations:

- Align and coordinate design, procurement, and suppliers early in the design process.

- Standardize product development procedures on an enterprise-wide basis.

- Establish common metrics and procedures for measuring product development project milestones and performance.

- Improve ability to capture customer requirements and aftermarket performance data.

- Create information technology infrastructure that automates and integrates product data, processes, and analytics across the product life cycle.

The study identified automation as the most effective — and least used — lever for product development improvements. The study also revealed a strong line between product development automation use and the scope and execution of the above strategies.

Consumer products companies employing these strategies have reduced product development cycles by 25%, cut product costs by 18%, and shortened the time required to implement engineering changes by 75%. More importantly, these companies have demonstrated double-digit performance advantages over their peers in the areas of costing accuracy, new product profits, and new product contributions to overall revenues.

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Chapter One:
Issues at Hand

Key Takeaways

- Consumer companies view innovation and product development as key to recovery.

- New products expected to contribute an ever-increasing portion of total revenues over the next three years.

- Today's "Empowered Customer" requires innovative "solutions."

With most industry sectors mired in a slump in recent years, the consumer industries almost single handedly kept the global economy alive. Representing more than 60% of the global gross domestic product (GDP), the consumer industries include the ecosystem of companies that produce and sell goods that are either sold direct or channeled through distribution to reach the end consumer. Key industries included in this sector include: apparel, automotive, consumer electronics, consumer durables, consumer packaged goods (CPG), food and beverage, pharmaceuticals, and retail.

In the past few years, a key driver of the success of this sector has been the revival in product innovation. And with the global economy showing signs of recovery, consumer companies view product development as the catalyst to lead growth going forward. Early signs suggest their predictions are correct.

The revival in product innovation and development has come in many flavors. Some companies have launched entirely new categories of products, like the Apple iPod. Others have developed new products in attempt to commoditize one-time luxuries, as P&G did with the SpinBrush in the electric toothbrushes segment. Still others have tried

> Product managers at consumer firms view product development as the catalyst to lead their company out of the global economic slump.

to give new life and styling to old products, such as with the Volkswagen Bug or the Ford Mustang. And nearly every consumer company is rushing to develop products that can meet the needs of new emerging markets, like China.

In short, consumer companies increasing rely on product design and development to differentiate their brands and accelerate revenues and profits. Aberdeen's *Product Development in the Consumer Industries Benchmark Study* found that more than three-quarters of consumer companies view new product development as a leading or *the* leading driver of revenue, profit, and market share growth (Figure 1). Overall, respondents to the Aberdeen survey reported that product development had the most significant impact on revenue growth. However, an examination of individual industry sectors reveals that consumer companies view new product development as key driver of all key business metrics.

For example, respondents from the computer equipment industry said product development had the greatest impact on their companies' profitability and market share. Consumer electronics and food and beverage industries viewed new product development as the leading driver of market share growth. This directly contrasted automotive sector respondents, who said new product development has a high impact on profitability and revenue growth, but only marginal influence on overall market share. Similar dichotomies stood out between consumer durable manufacturers that felt product development had the most impact on profitability. CPG firms said that new products were major influencers of revenue and market share growth, but only a marginal contributor to profit.

Figure 1: New Product Development Impacts Key Measures of Business Performance

Impact of new product development on company performance
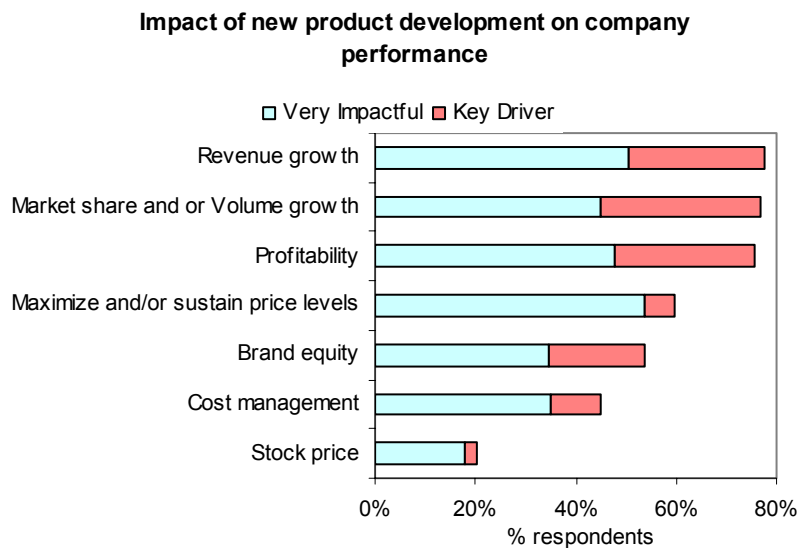
Source: Aberdeen Group, June 2004

Consumer Firms Look to New Products for More Revenue

Aberdeen found evidence that consumer companies are revving up their product development engine in the finding that more than two-thirds of consumer firms expect new products to contribute a growing portion of total revenues over the next three years. In fact, more than a third of respondents indicated that their companies are relying on new products to drive more than 20% of total revenues between now and 2007.

As would be expected, companies producing products with shorter life cycles — such as those in CPG — reported that new products contributed a higher share of total revenues. However, more than a third of companies producing products with longer life cycles — such as automotive and consumer durables — expect new products to deliver an ever-increasing portion of total revenues over the next few years.

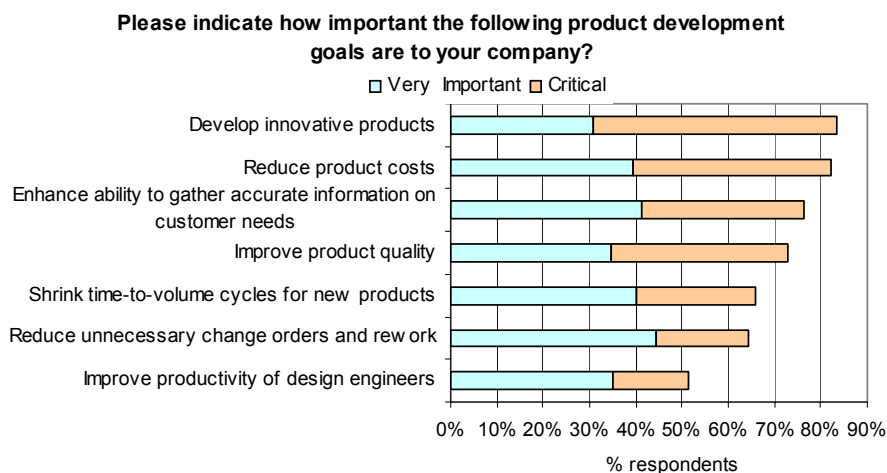## Innovation, Cost Competitiveness Are Key Goals

Such macroeconomic factors have heightened and will continue to foster demand for strategies and systems that can help make the product development cycle more effective and efficient. When managed effectively, new products can help improve profit margins and enable companies to gain market share in a global market. Equally important, high-quality products that can meet customer expectations help build brand loyalty and repeat sales.

Overall, consumer companies reported some of the following similar product development improvement goals (Figure 2):

- Develop innovative new products

- Reduce product costs

- Improve product quality

- Gather accurate information on customer needs

The priority of these goals varied by industry. Companies with shorter product life cycles and higher R&D budgets tended to be under more pressure to deliver new innovative products. Innovation was particularly critical for respondents from computer equipment, consumer electronics, and medical device sectors. Respondents from sectors with longer product life cycles, such as automotive, said controlling product costs was the leading goal of their product development improvement efforts. By contrast, respondents from the food and beverage and apparel/retail firms were less concerned with reducing products costs than with being more responsive to market trends and changing customer needs. Respondents from the CPG sector cited all these goals equally as top priorities.

Figure 2: Innovation, Cost Will Drive Overhaul of Product Development Operations

Please indicate how important the following product development goals are to your company?

□ Very Important □ Critical

Goal	% respondents
Develop innovative products	
Reduce product costs	
Enhance ability to gather accurate information on customer needs	
Improve product quality	
Shrink time-to-volume cycles for new products	
Reduce unnecessary change orders and rework	
Improve productivity of design engineers	

0% 10% 20% 30% 40% 50% 60% 70% 80% 90%

% respondents

Source: Aberdeen Group, June 2004

Empowered Customers Require Innovative Solutions

Unlike other sectors, such as aerospace and defense (A&D) and industrial products, consumer industries face lower barriers to entry and shorter product life cycles. With the exception of automotive and consumer durables, most consumer companies measure product life cycles in months and weeks. Because they lack the ability to recover large R&D costs on fat margins or long-term warranties or aftermarket services, these companies must constantly balance trade-offs between innovation, quality, and costs.

Now that end-customers are empowered with more choices and more information on alternatives, consumer firms are under more pressure than ever. As a result, businesses need to differentiate themselves not only on the uniqueness of their products, but the quality of their service operations.

Winners in this age of the "Empowered Customer" must deliver innovative solutions that combine innovative products and support services (e.g., installation, warranty, information, etc.) that can be configured to meet the unique needs of individual customers. Again, consider the Apple iPod Mini, which combines a stylish MP3 player that comes in a myriad of color configurations. This core product integrates with Apple's iTunes site for a total solution experience. Advanced design, function, and service have allowed Apple to charge a premium for its iPod device and gain a recurring revenue stream (and direct marketing channel) through its "aftermarket" music service.

In short, the quickening pace of innovation, heightened customer demands, and the ability of low-cost competitors to replicate new product features are shrinking product life cycles as well as the window for profitability of new products. To drive and sustain innovation, consumer companies must develop a highly efficient product development infrastructure that supports a high degree of collaboration, control, and reuse across a distributed environment of engineers and other business functions as well as external supply, design, manufacturing, and service partners.

Chapter Two:
Key Business Value Findings

PACE: Product Development in the Consumer Industries

Respondents to the Aberdeen survey detailed multiple pressures, actions, capabilities, and supporting technologies (enablers) that their companies are using — or plan to use — to address product development process improvements. Aberdeen examined product development trends, challenges, and practices within the consumer industries using the following framework methodology:

- *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)

The results of our assessment of prioritized product development PACE within the consumer industries is summarized in Table 1 and examined in detail later in this chapter as well as in chapter three.

Table 1: Prioritized PACE for Product Development Programs*

Priorities	Prioritized Pressures	Prioritized Actions	Prioritized Capabilities	Prioritized Enablers
1	Increased competition from low-cost/offshore competitors (1) Pressures to reduce product costs (4)	Product Cost Management (PCM)	Aligning engineering, sourcing, and suppliers earlier in design cycle.	Project management, portfolio management, BOM management, e-sourcing, and analytics.
2	Requirements to improve product quality (5)	Standardize product development processes and methods. Track and manage development project milestones and performance.	Executive support and mandates. Metrics and incentives aligned for enforcement. New technologies available.	Project management, portfolio management, ECO management, visualization, PLM.
3	Demands for more innovative products (3)	Outsource innovation and development. Integrate internal and external stakeholders into development process.	Enhanced design services from EMS/CM. New "innovation service providers."	Project management, portfolio management, visualization, PLM.
4	Pressures to create new revenue streams (2) Develop flanking products to expand market share (6).	Create feedback loop for aftermarket product performance data. Parts standardization and reuse.	Standard product classifications and improve integration and analytical tools.	Project management. Field service/service parts management. PDM. Spend data classification tools and services.

*Numbers in parentheses reflect respondents' views of the top pressures that their companies face.

Source: Aberdeen Group, June 2004

Drivers of Product Development Improvements in Consumer Sectors

Overall, managers and executives at consumer firms reported that the following factors were driving their companies to focus on improving their product development operations, ranked in order of priority:

1. *Increased competition, particularly from low-cost competitors in emerging markets, especially China.* Example: Nearly overnight Chinese appliance maker Haier has emerged as a formidable global contender in the home appliance mar-

ket. The low-cost manufacturer is now the world's No. 2 refrigerator maker, after Whirlpool, and has expanded into washing machines, air conditioners, small appliances, televisions, and even computers and cellphones.

2. *Pressures to create new revenue streams by developing products for new market segments or for new geographic markets*. Example: computer equipment companies, such as Apple, Dell, Gateway, and HP, have recently developed new products targeted at the consumer electronics market.

3. *Demands for more innovative products*: Even stodgy old CPG and consumer durable companies that traditionally competed by the breadth and efficiency of their distribution networks, are now feeling pressures to differentiate themselves based upon product innovations and styling.

4. *Pressures to reduce product costs*: While innovation is important, cost effectiveness still reigns supreme in many industries, particularly automotive, computer equipment, and CPG.

5. *Requirements to improve product quality*: Ever since the total quality management (TQM) initiatives in the 1980s, quality has been a prerequisite for success. However, consumer companies feel the need to continually raise the quality bar. Quality improvement pressures are particularly acute in computer equipment, CPG, and pharmaceuticals, according to survey respondents.

6. *Develop flanking products to expand market share*: With pricing pressures from low-cost competitors, consumer companies must continually innovate to maintain product differentiation and profit margins. Savvy firms like Apple and Palm continue to improve on their initial designs to stay ahead of the competition.

Strategies for Improvement

The options for product development improvement are many. Over twenty different approaches were identified within this study alone. However, respondents identified the following as the leading strategies their companies were employing or planned to employ to improve product development operations and performance:

1. *Product cost management*: Despite the focus on innovation, respondents identified product cost management (PCM) as the leading product development strategy their companies are driving. Product cost management involves the alignment of product development, costing, and sourcing activities. The attributes and impact of an effective PCM strategy are examined in the next chapter.

2. *Standardize product development processes and metrics:* More than 80% of survey respondents indicated that their companies have identified process definition and standardization as a leading strategy for improving their product development performance. Standardizing on common practices can dramatically improve process efficiency and reduce performance and cost variability across product lines and divisions.

3. *Outsource innovation and design to external providers:* Heightened customer demands and competitors' rapid replication of new products and features are forcing many consumer firms to face facts: staying ahead of the innovation curve will require outside assistance. Developing "the next big thing" requires a vast

network of researchers, engineers, and other specialists. Such facts are prompting leading consumer companies, such as Microsoft and Sony, to outsource a variety of innovation activities — from basic research to product or process concept, development, and launches. P&G already has two outsourcing successes under its belt, having tapped third-parties to assess market requirements and design Whitestrips and SpinBrush for the Crest brand. P&G has set a goal for half of all product innovations to come from third-party design shops and other partners. In a future study, Aberdeen will examine how enterprises are organizing to recruit and manage outsourced R&D as well as the IT requirements to support, secure, and control these innovation networks.

4. *Integrate internal and external stakeholders earlier in the design process:* Less than 15% of consumer companies currently involve suppliers, procurement, or other business stakeholders in the development process prior to the prototype phase. However, studies conducted by Aberdeen and others revealed cost, cycle time, and market share advantage for early stakeholder involvement. With these factors in mind, consumer companies are increasingly making product development a company-wide and network-wide initiative. Consider Harley-Davidson, which has created a facility to co-locate design engineers with key stakeholders from procurement, manufacturing, and supplier partners. The legendary American motorcycle manufacturer also uses product data management and other tools to foster such collaboration.

5. *Create feedback loop on aftermarket product performance:* The service chain offers a veritable gold mine of information on customer satisfaction, operational performance, and product quality and reliability. This information can provide valuable guidance for product development, delivering information on customer needs, and showing where existing products have failed to meet them. Unfortunately, related Aberdeen research found that only about half of companies programmatically collect and leverage information on service parts performance to aid product development initiatives.[1]

6. *Enforce parts standardization and reuse*: Parts proliferation is a challenge affecting multiple consumer industries. Lacking sufficient access to existing part lists, alternatives, and attributes, engineers will often unnecessarily incorporate new parts into new designs. Standardizing on common components across designs can speed time-to-market, improve product quality, reduce design and product costs, and increase profitability. Consider this example: It costs between $20 million and $30 million and at least six months to design and tool a new seat frame. If a tier one vendor can satisfy automakers' requirements with an existing seating system, it can cut vehicle development costs by more than half and shrink time-to-volume cycles considerably.

Challenges to Product Development Success

A basic yet prime motivating force driving consumer companies to overhaul their product development operations is the fact that most companies are dissatisfied with their current

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[1] *Service Parts Management Benchmark Report* (Boston: Aberdeen Group, September 2003)

product development performance. Less than a quarter of respondents said they were more than satisfied with their company's product development operations, systems, and performance.

Aberdeen's study uncovered the following factors as the most challenging product development activities (Figure 3):

- Gathering accurate and timely information on customer needs
- Standardizing and enforcing product development processes and methods enterprise-wide
- Gathering accurate data on aftermarket product performance and service
- Managing design/development changes and iterations

More than 90% of respondents said that gaining timely and accurate insight into dynamically changing customer preferences and requirements was the key challenge to product development success. Respondents also identified customer market assessments as the most time-consuming portion of the product development process (Figure 4).

Figure 3: Customer Information Key Challenge to Product Development

Please indicate how challenging the following product development activities are for your company?
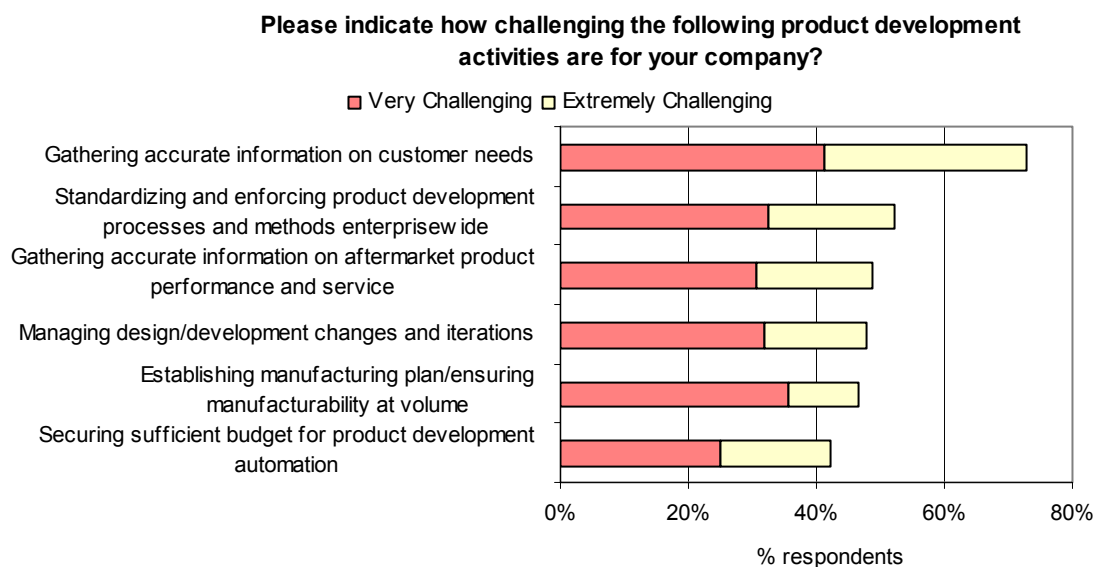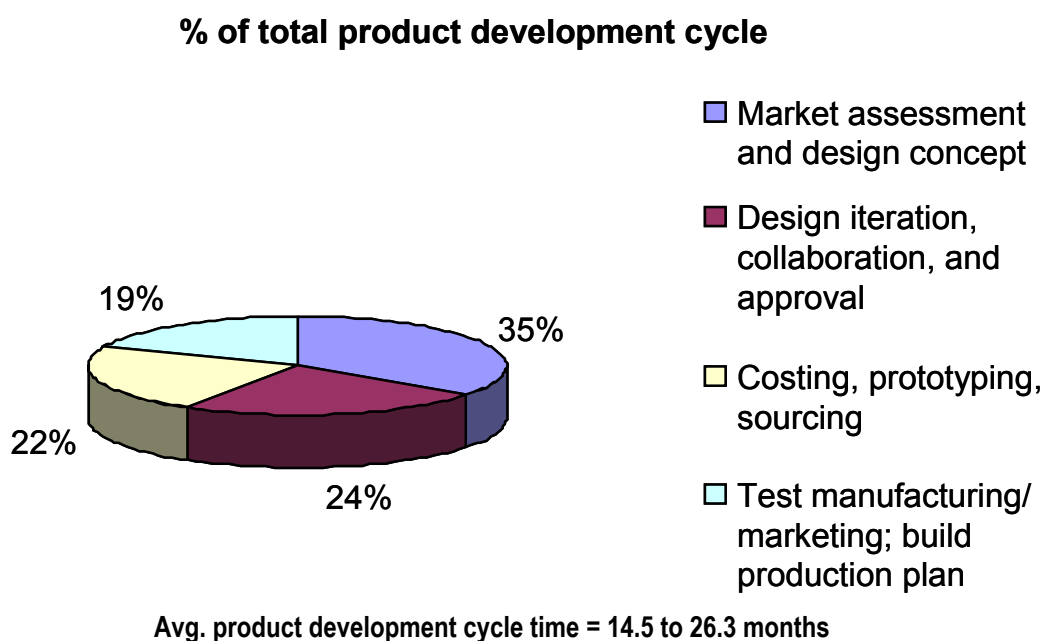

Source: Aberdeen Group, June 2004

Responses also suggest that many consumer companies lack sufficient infrastructure to efficiently communicate and manage engineering change orders (ECOs). Design or bill of materials (BOM) changes are often shared using a mix of online and offline technologies and, as a result, take an average of to be received, acknowledged, and implemented. Such information lag time can delay product launches and cause development errors as stakeholders in the design chain operate on outdated designs and BOMs until the engineering change requests (ECRs) and ECOs catch up to them.

These two challenges are major contributors to lengthy product development cycles. The Aberdeen study revealed that average product development cycles in the consumer industries range from 14 to 27 months. In certain industries, such as automotive, vehicle development cycles are closer to three years (although industry leaders are investing in product development systems and driving reuse programs to cut these cycles in half). According to study respondents, more than a third of the product development process is tied up in assessing the market to understand customer preferences and requirements, and searching for new parts required to create a product concept. Aberdeen research indicates that the typical engineer spends 25% to 30% of his time searching for part information.

Figure 4: Product Development Cycle Deconstructed

% of total product development cycle

- Market assessment and design concept
- Design iteration, collaboration, and approval
- Costing, prototyping, sourcing
- Test manufacturing/ marketing; build production plan

Avg. product development cycle time = 14.5 to 26.3 months

One activity conspicuously absent from the list of top product development challenges faced by consumer companies is efficient and accurate costing of product BOMs. However, the priority of product cost management as the leading area for improvement and the fact that consumer companies are highly ineffective at predicting the costs of new product designs. Specifically, *fewer than half of respondents said their companies are able to predict actual product costs within 25% accuracy*. Related Aberdeen research has identified insufficient access to product and costing data, ineffective alignment of design, procurement, and suppliers, and a fragmented product development and sourcing processes and systems as key inhibitors to effective product costing.

Other key challenges identified by respondents include managing the handoff between design and manufacturing (i.e., developing and executing an effective manufacturing plan) and securing sufficient budget for product development automation.

Prioritized Technology Investments

The sheer volume and complexity of today's distributed design environment requires that any successful product development strategy be supported by suitable technologies for design, costing, knowledge transfer, collaboration, and program management. However, to date, the consumer sector has fallen behind other product sectors in its use of product development business applications.

Just over half of consumer companies currently leverage automation to support their product development processes. Removing automotive companies from mix, reduces use of product development and management automation to about 40% of all consumer companies. Responses from companies using automation revealed that consumer firms rely on a hodgepodge of commercial and homegrown applications to support product development activities.

Processes automated most to date include design development (58%); drawing/schematic sharing/visualization (58%); engineering development (55%); product costing (55%); and project/program management (52%). Most consumer companies reported that their product development technology infrastructure was custom-built in house or with support from third-party system integrators.

Computer-aided design/computer-aided manufacturing (CAD/CAM) and product visualization were the one solution area where the use of packaged applications outnumbered custom apps. However, Aberdeen research revealed that the types and versions of such engineering authoring tools can vary greatly within a given enterprise. Such variability increases exponentially as external partners are incorporated into the product development process.

The bottom line: at most consumer companies, design schematics, drawings, ECOs, and other critical product data are distributed across a heterogeneous mix of business systems and data stores within and outside the enterprise. Such fragmented product development systems architecture is causing development delays, sapping productivity, and inhibiting collaboration across the product life cycle.

Considering these factors — coupled with the prioritized strategies noted above — it is not surprising that consumer companies have prioritized the following technologies for investment:

- Product data management (PDM) — This is a tool to manage data and attributes associated with a product. PDM is a basis for collaboration and parts standardization and reuse.

- Product costing — Product costing is the activity of assessing the cost and feasibility of engineering BOMs against existing supply, market pricing, and future pricing. Effective product costing also incorporates non-price but cost related factors, such as tariffs, taxes, and transportation costs, to execute total cost analysis, including build-versus-buy scenarios. Costing solutions incorporate advanced analytics, product cost and attribute data, and collaboration-based sourcing capabilities. This subject will be examined in the next chapter.

- Project and program management — A project management collaboration platform is used to define project milestones and groups and measure and enforce performance against these goals. Advanced project management tools include data management,

event-based alerting, and advanced workflow capabilities. Project management is key to process standardization and collaboration.

- Visualization: Visualization links all relevant product data elements and provides controlled access to this information to approved users in their native or preferred format. Timely, accurate, and complete access to product data fosters collaboration, shrinks product development cycle times and costs, and better align designs with supply, manufacturing, and business capabilities and goals.

Other areas respondents identified for technology investment include manufacturing design and simulation, sourcing, and artwork and packaging design management. Technology investment priorities varied by industry.

Chapter Three:
Implications and Analysis

Making product development a competitive advantage takes more than just boosting R&D budgets. In fact, the Aberdeen study showed little correlation between the comparative size of R&D budgets as a percent of revenue versus overall product development efficiency and performance. On the contrary, some respondents with the largest R&D budgets — as a percentage of revenue — showed the worst performance levels. Instead, the best indicator of product development success is the degree to which a company has aligned its product development procedures, controls, and systems.

Table 2 summarizes the common attributes of product development organization, process, knowledge, technology, and metrics of consumer companies and their corollary performance. Readers can use this guide to assess their own company's product development competence and to determine requisite strategies for improvement.

Table 2: Maturity Framework for Product Development Competence Evaluation

	Laggards	Industry Average	Best in Class
Process	No formal product development procedures. Design exchange, collaboration, and ECOs executed using mix of offline and online processes.	Product development processes standardized at the division or product-line level. Design exchange, collaboration, and ECOs supported by mix of homegrown and off the shelf tools.	Product development processes standardized enterprise-wide, promoting sharing of best practices and innovation across product lines. All design exchange, collaboration, and ECO management automated and integrated on company-wide (and inter-company) platform.

	Laggards	Industry Average	Best in Class
Organization	Highly fragmented, product development organization. Design and development decisions made at site or functional level. Design and development activities limited to development group.	Product development groups aligned by product type/lines. Design and development decisions on product line basis. Some sharing of practices and innovation across product groups and divisions. Development aligned with other functions or partners at or after prototype phase.	Centralized product development group facilitates standard processes and tools and fosters collaboration, best practice, and innovation sharing across product lines and divisions. Design and development aligned with other functions and partners at inception or design stage.
Knowledge	No central repository for product designs, BOMs, or development milestones and performance. Limited insight into actual product cost. No information on customer needs or after market product performance.	Design and BOM repositories and sharing limited to product groups or divisions. Varied approaches and systems for development milestone tracking and performance. Product cost data not aligned with actual or future supply costs. Some information of customer needs and after market product performance; but inconsistent procedures for incorporating this data into development process.	Central design and BOM repository used to facilitate reuse across products. Product roadmap aligned with those of key supply partners. Accurate and timely access to customer requirements and after market product performance data. Product cost data aligned with actual and future supply costs; benchmarked against industry indexes. Formal feedback loop and systems for incorporating this data into development process.

	Laggards	Industry Average	Best in Class
Technology	Limited use of automation. Designs and schematics exchanged primarily via fax and mail. No automation to support collaboration, milestone tracking, or performance assessment.	Mix of homegrown project and data management tools and off the shelf CAD/CAM solutions. Systems decisions and architecture aligned by product group or division. Limited use of decision support tools to track development milestones and asses performance. Little, if any, integration with customer or aftermarket systems.	Design exchange, collaboration, and management automated and integrated on company-wide platform. Systems decisions and architecture aligned company wide. High use of off the shelf solutions, particularly project management and decision support tools to track development milestones, manage ECOs, and assess costs and performance. Product development systems integrated with customer and aftermarket systems.
Performance Metrics	No formal metrics for measuring product or development costs and performance. Profit margins on new products are less than 20%. New product revenues account for less than 10% of total revenues. Product development and time to market cycles lag industry average by 10%-15%.	Formal metrics for measuring product and development costs and performance; but applied inconsistently. New product profit margins of 20-40%. New product revenues 10-30% of total revenues. Product development and time to market cycles at industry average.	Standard metrics for measuring product and development costs and performance; applied companywide and accessible on demand. Profit margins on new products are greater than 40%. New product revenues account for >30% of total. Product development and time to market cycles 25%-30% shorter than industry average.

The Business Impact of Process Standardization

As evidenced in Aberdeen's benchmark research of other business issues, the breadth of standardization of processes and metrics across the enterprise had a high degree of correlation to a company's overall product development performance:

- Respondents whose companies established and enforced standard procedures enterprise-wide reported an incrementally higher percentage of revenues from new products (26%), on average, than those with less standardization (24.4%).

- Enterprisewide process standardization also resulted in slightly higher profit margins for new products (32.7%), on average, versus standardization at a lesser scope (30.41%).

- Consumer firms standardizing procedures company-wide demonstrated significantly better product reliability, reporting 90% fewer product recalls than companies employing standardization on a lesser scale.

- Broader process standardization also offered marginal advantages in terms of shorter time-to-volume cycles for new products and improved product costing accuracy.

Product Cost Management

Aberdeen defines PCM as a systematic approach for aligning design and sourcing strategies and processes to identify and optimize costs and performance across the product life cycle. Our research into enterprise product development strategies has led us to define the following organizational, process, and system requirements as vital components for an effective PCM strategy (Figure 5):

- *Assess* – Conduct customer and market research and analysis to assess requirements for new products, features, styling, and solution bundles. Examine competitive offerings and access aftermarket performance data on existing products.

- *Conceive* – Develop initial product structure and bill of materials (BOM) for initial costing, manufacturing, and service feasibility assessments.

- *Source* – Align design concept with available capabilities and innovations through early supplier integration (ESI), involving both procurement, suppliers, and other relevant stakeholders during design concept and development phases.

- *Test* – Conduct costing, manufacturing, quality, and performance feasibility assessments by modeling design in different environments. Align new designs with marketing and key customer and channel partners for initial field testing. Develop manufacturing designs and strategies and pricing for post-sales service.

- *Build* – Execute manufacturing plan and begin to assess production process improvements and potential outsourcing or off-shoring strategies.

Effective PCM requires organizational alignment; process standardization and control; and a systems infrastructure that supports collaboration, design creation, exchange, and redlining; and project tracking and management. At the core of any PCM framework is the product record, which provides "single point of truth" for all product information, including engineering BOM (eBOM), product and part attributes, approved vendor lists (AVLs), ECO data, and detailed information on price and non-price costs. This cost data should be enriched with external market information on part cost, obsolescence, and alternatives.

Figure 5: A Framework for Effective Product Cost Management
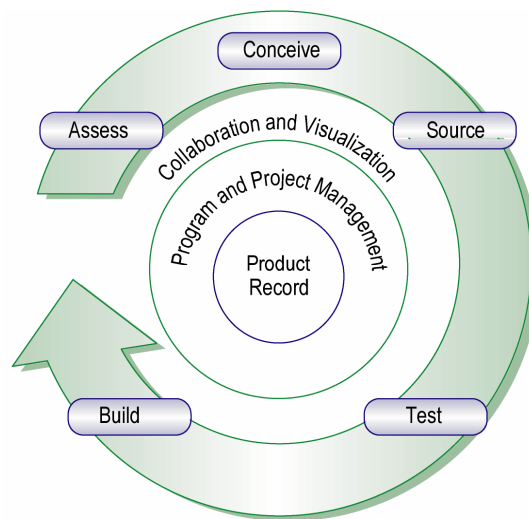
Related Aberdeen research indicates that companies leveraging PCM methods for costing and earlier supplier integration realize considerable cost and cycle time advantages:

- Companies involving suppliers and procurement groups in the new product development process at design inception and development were able to reduce costs by nearly 18% compared to companies delaying such collaboration until the product prototype phase[2].

- Early involvement also provides 10% to 20% improvements in time-to-market cycles, allowing companies to capture greater market share and gain larger profit margins for being an early mover.

Automation Required

Aberdeen's study identified automation as the most effective — and to date, least used — lever for product development improvements. It should be noted that the most aggressive users of product development automation were also the most likely to have standardized procedures and metrics, and to involve multiple stakeholders early in the design process. These findings strongly suggest that automation is a key enabler of organizational and strategy alignment and performance.

Respondents whose companies applied integrated product data, project management, and analytics across the product development cycle reported significant advantages over those not using automation. The most striking benefits reported by respondents employing an integrated product life-cycle management (PLM) platform included:

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[2] Aberdeen Group E-sourcing Index (Boston: Aberdeen Group, May 2003).

- New product revenues accounted for 27.4% of total sales for companies with an integrated PLM deployment, versus just 21% for companies not using automation.

- 12X fewer product defects per million (PPM) versus those lacking automation

- 14X fewer product recalls than companies lacking automation

Table 3 summarizes related Aberdeen research into enterprise use of automation to streamline and integrate product data and process management.

Table 3: Benefits of Product Development Automation[3]

Area of Financial Impact	Measurement of Improvement
Reduction in product costs	17.5%
Reduction ECO cycle times	75%
Reduction in design cycles	25% - 35%
Reduction in time-to-volume cycles	10% - 15%
Reduce part duplicates and introduction of new parts (i.e., improve product reuse)	30%-40%
Reduce part search times/improve engineering productivity	15% - 20%

Source: Aberdeen Group, June 2004

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[3] *Product Cost Management: Designing and Sustaining a Competitive Edge* (Boston: Aberdeen Group, March 2003)

Chapter Four:
Recommendations for Action

Key Takeaways

- Assess, benchmark, and standardize best-in-class processes.

- Define common metrics and measure rigorously.

- Align and coordinate engineering with other key stakeholders — particularly procurement and suppliers.

- Enhance integration and access to customer and product performance data.

- Create information technology infrastructure that automates and integrates product data, processes, and analytics across the product life cycle.

Although consumer companies approach product development improvements with different starting points, goals, and resources, the Aberdeen study reveals several key critical success factors in the strategies and practices of top-performing companies.

Strategies for improving product development operations will vary depending upon the existing structure and maturity of these operations (see Table 2). However, Aberdeen's research concludes that the following strategies should be common goals for creating an efficient and sustainable product development infrastructure:

- *Standardize product development procedures*: Map existing product development procedures and organizational structures, and benchmark these against attributes and processes of industry peers and best-in-class performers. Identify to-be state and set an aggressive but attainable timetable for reaching that goal. Define clear milestones and expected revenue, profit, cost, and performance benefits for reaching these goals. Measure progress and return of each milestone, and reset goals as necessary.

- *Establish common metrics and procedures for measuring product development project milestones and performance*: Clearly define metrics for product development performance — e.g., on-time development, defects per million, reductions of new part introductions — and map these to the prime metrics of the business, such as revenues, profits, costs, and asset utilization. Tie metrics to corporate as well as personal incentives of all internal and external stakeholders.

- *Align design and other key stakeholders early in the design process*: Develop cross-functional teams that align engineering, procurement, suppliers, and other key stakeholders — e.g., finance, manufacturing — during concept and development phases *before product designs are locked down*. Ensure capture of technology and process innovation by aligning product roadmaps with those of key suppliers. Develop gain-sharing opportunities for supplier-contributed product innovations, cost savings, and process and productivity improvements.

- *Establish information technology infrastructure that automates and integrates product data, processes, and analytics across the product life cycle*: Aberdeen's study clearly identified automation was as a prime lever for improving the efficiency, per-

formance, and contribution of product development operations. The optimal product development environment should automate and integrate product data and processes across the product life cycle — from design inception through aftermarket performance.

However, few, if any, examples of this end-to-end infrastructure exist. Instead, most companies have begun by automating sub-components of the product development life cycle, such as PDM or artwork and packaging management. For the uninitiated, Aberdeen recommends starting with systems to improve ECO management, a problem common to every company and one where improvements can deliver rapid and measurable payback.

Long-term benefits can be had by adopting advanced modeling and analytics capabilities and by creating a common repository for the product record – i.e., all BOM, parts data, schematics, cost data, and other business information related to a particular product or part. Consumer companies with more advanced product development infrastructures should consider integrating design engineering systems and customer relationship management (CRM) systems and field service systems. Linking customer information and performance data to the product record can give engineers and other business stakeholders a holistic view of total product life-cycle performance and costs.

Author Profile

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Tim Minahan, senior vice president of supply chain management research, provides analysis and assessment of software and services that automate and streamline procurement, sourcing, design, and supply chain management operations.

A recognized expert on supply chain and technology issues, Minahan has appeared on CNN and ABC News as well as in several business publications. In 2003, he was named one of "50 Pros to Know" in the supply chain management sector by iSource Magazine, for the second time in as many years, and was also named one of the SCM sector's most influential analysts by Supply Chain Technology News.

Minahan specifically focuses on total cost management (TCM), which is an organizational and technological framework for managing the total cost of ownership of supply relationships. Within TCM, Minahan tracks spending analysis, sourcing, procurement execution, contract management, and supplier performance measurement technologies. Minahan also covers product life-cycle management (PLM) technologies and their convergence with TCM. Minahan continually consults with early implementers of these applications to identify world-class supply management strategies and to determine the strengths and weaknesses of technology solutions and services that are competing in this market.

Minahan holds a B.A. from Boston College.

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Aberdeen*Group*

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Aberdeen delivers unbiased, primary research that helps enterprises derive tangible business value from technology-enabled solutions. Through continuous benchmarking and analysis of value chain practices, Aberdeen offers a unique mix of research, tools, and services to help Global Business Executives accomplish the following:

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- PRIORITIZE operational improvement areas to drive immediate, tangible value to their business

- LEVERAGE information technology for tangible business value.

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Appendix A:
Research Methodology

Between April and May 2004, Aberdeen Group examined the product development management procedures, experiences, and intentions of more than 215 enterprises in a wide range of consumer industries. *IndustryWeek* magazine recruited the respondents for this research project. Responding product design, development, and operations executives completed an online survey intended to determine the following:

- The priority and impact product development has on corporate strategies, revenue growth, market share, operations, and financial results.

- The structure and effectiveness of existing product development operations and systems infrastructures.

- Planned product development strategies and technology investment priorities.

- The attributes of the best-performing product development operations and the benefits derived from these.

Aberdeen supplemented this online survey effort with telephone interviews with select survey respondents, gathering additional information on product development management strategies, experiences, and results. This study is intended to identify emerging best practices for product development management and provide a framework readers could use assess their own product development capabilities and devise strategies for improvement.

Respondents had the following attributes:

- *Job title/function* — The research sample included respondents with the following job titles: CEO (14.4%), COO (3.9%), CFO (2.6%), EVP/VP (13.1%), partner (3.3%), director (19.0%), manager (35.3%), other (8.5%).

- *Industry* — The research sample included respondents from consumer industries such as automotive (22%), computer equipment and peripherals (8%), consumer durable goods (19%), consumer electronics (10%), consumer packaged goods (11%), distribution (3%), food and beverage (6%), medical devices (11%), pharmaceutical manufacturing (4%), retail/apparel/wholesale (6%).

- *Geography* — Study respondents comprised people from both companies with global operations (41%) as well as with Local / Regional operations (59%).

- *Company size* — About 30% of respondents were from small companies (annual revenues < $50 million); 43% were from midsize enterprises (annual revenues between $51 million and $1 billion), while the remainder were from companies with revenues greater than $1 billion.

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

Appendix B:
Related Aberdeen Research and Tools

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

- *Contract Management Center of Excellence* (June 2004)
- *Supply Management in the Public Sector* (April 2004)
- *Procurement Outsourcing Benchmark Report* (April 2004)
- *Seven Habits of Highly Effective Supply Management Groups* (January 2004)
- *Contract Management Benchmark Report* (July 2003)
- *Making E-Sourcing Strategic* (September 2002)

Information on these and any other Aberdeen publications can be found at www.aberdeen.com or by e-mail at inquiry@aberdeen.com.

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