COMPUTER-AIDED DESIGN (CAD) DATA MANAGEMENT: MAXIMIZING DEVELOPMENT PRODUCTIVITY

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Report Highlights

p2

Forty percent of all respondents said their top CAD action was to train users to increase their CAD skills.

p4

The Best-in-Class were 29% more likely to meet their launch dates than All Others.

p5

Don't reinvent the wheel. Choose a data management system that can quickly and easily search for existing CAD models for potential reuse before new design work is started.

p6

What distinguishes the Best-in-Class from their peers? They pair the leveraging of CAD data management methods with product development.

Using an integrated CAD data management solution allows companies to leverage data across the entire enterprise to make better decisions about product development, management, design, and production. This report discusses the benefits of an integrated CAD data management solution.

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2

Rapid advances in product technology puts increasing demands on CAD technology requiring a sophisticated method to manage information transfer across multi-function groups in the design of a product.

Definition: Computer-Aided Design (CAD)

The use of computer technologies that aid in the design and documentation of a design. Design being actions in involved creation, modification, analysis or optimization.
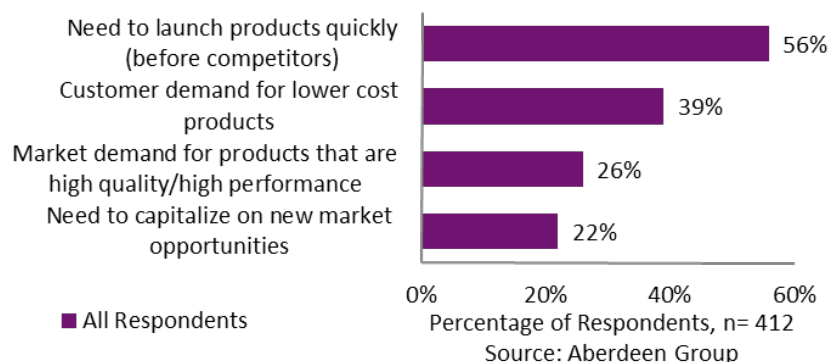
Software forms of CAD are used to increase productivity, efficiency, and collaboration during the design. Output is mostly in the form of electronic files used for print, machining, or other manufacturing processes.

For companies in today's markets, gaining a competitive edge means successful new product introduction in an ever growing global market. What fuels this rise is the market demand for higher functionality and customization under shortened time cycles while minimizing cost and upholding quality. Rightly so, a strategy that strives for product differentiation can pay huge dividends for companies that have the right CAD Data Management system in place that helps in automation and increased productivity.

The Need for a CAD Data Management Solution

The strategic goal of any company in product development is to develop a competitive product and operate profitably, all while growing their business in an ever widening global market. Still, many fall short of meeting these goals due to faulty execution of the design — be it in quality, failure to meet requirements, or missed delivery deadlines. In a recent survey conducted by Aberdeen Group, 56% of all respondents cited the need to "launch products quickly before their competitors" as a top pressure to improve the design process. Following demand for shorter timelines, 39% of all respondents said customer demand for lower cost products was the driving pressure to improve the design process.

Figure 1: The Top Pressures to Improve the Design Process

Need to launch products quickly (before competitors) — 56%
Customer demand for lower cost products — 39%
Market demand for products that are high quality/high performance — 26%
Need to capitalize on new market opportunities — 22%

■ All Respondents

Percentage of Respondents, n= 412
Source: Aberdeen Group

3

Notably, 26% of all respondents cited market demand for products that are high in quality and performance as a top pressure. Launching products quickly and developing high quality products seem to be in direct contrast with each other. Developers need a solution that enables them to meet these opposing needs. Many companies have turned to CAD solutions, which help with speed and automation of the process. Still, given the amount of documentation that results from CAD designs, developers need a system that helps them manage their CAD data.

To meet these demands for higher quality, increased complexity, and under decreasing timelines, serious measures must be taken to affect the development process. A popular strategy among developers is to simply educate. Forty percent of all respondents said their top CAD action was to train users to increase their CAD skills.

Figure 2: Top CAD Actions Improving Productivity

Source: Aberdeen Group
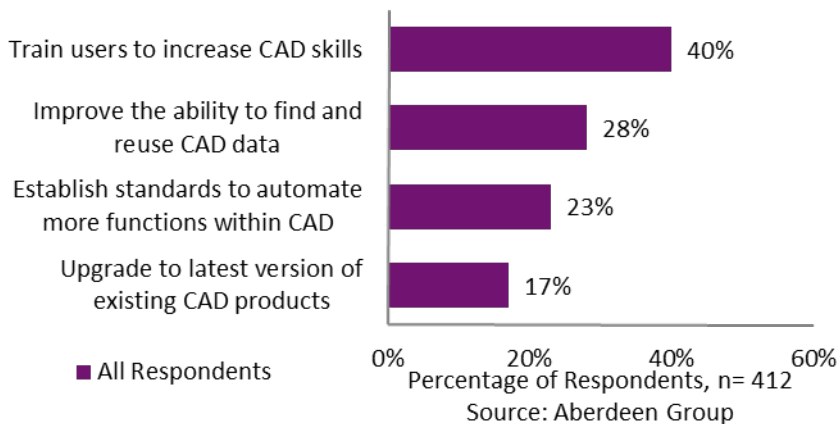
Second among CAD actions, 28% of all respondents said improving the ability to find and reuse CAD data as one of their top actions to improving productivity. CAD data is a key component of product design: it fuels a wide range of downstream processes that aid in collaboration, stage gate

We Need Insight

Companies were asked what their major challenges in getting insight into product development were. Here's what they said:

- Too many manual processes (spreadsheets): 39%

- No method for visibility to data to support decisions: 31%

- Lack of expertise/resources to make proper decisions: 19%

- Inability to assess should-be cost of a proposed part or product: 16%

4

The Best-in-Class Distinguish Themselves

Other performance metrics that separate the Best-in-Class from All Others.

- Overall Product Cost Decrease
  Best-in-Class: 20%
  All Others: 9%

- Decrease in Length of Development Cycle
  Best-in-Class: 24%
  All Others: 11%

- Decrease in Number of Engineering Change Orders (ECOs) After Design Release
  Best-in-Class: 15%
  All Others: 7%

review, and release to production. Inefficiently managed CAD data hinders productivity. When data is isolated to functional teams or workflow processes don't accommodate collaboration, shortened timelines become next to impossible to meet.

Defining the Best-in-Class

To define the Best-in-Class, survey respondents were divided into two maturity classes — Best-in-Class (top 20%) and All Others (bottom 80%). This division was made by using five organizational performance metrics: quality, product launch dates met, product cost targets met, product revenue met, and change in length of development time (increase or decrease). Respondents were asked to identify the frequency at which products in the past two years met these targets. Figure 3 highlights the performance of the two maturity groups.

Figure 3: Metrics Used to Define Best-in-Class
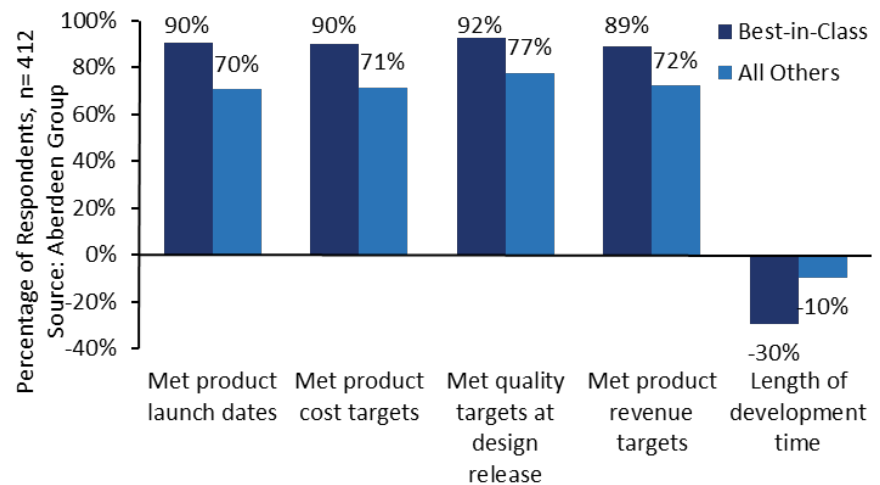
Best-in-Class companies consistently outperformed their peers in all four target metrics. The biggest difference between Best-in-Class and All Others was in the percentage of products meeting their product launch dates. The Best-in-Class were 29% more likely to meet their launch dates than All Others. A large part of new product introduction success is the on-time release of a

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5

product to market. Late delivery to market could be disastrous for a product's success due to costly delays which could result in the key selling season being missed.

Guidelines for Effective CAD Data Management

Throughout a company, all levels and functions impact product development, be it directly or indirectly. Effective management of CAD data requires a systematic approach by the entire enterprise. Companies should follow these specific guidelines for product success:

→ Establish a relationship between data. Understand how the data for parts, drawing, and assemblies depend and interact with each other. Use a data management solution that has a central file storage area to keep track of where used and content information can be automatically viewed. Single Product Data Management (PDM) users are 39% more likely than Non-Single PDM users to centrally manage CAD data.

→ Control file access by creating a check-out/check-in procedure. Look for data management capabilities that keep revisions restricted to one user at a time. Keep a log that shows the full history of operations performed on each file. In this way, redundant work can be avoided and knowledge of whom has worked on each part is available. Single PDM users are more than twice as likely to synchronize design data between distributed locations. An official check-in procedure for modified files helps other team members see the latest revisions.

→ Enforce overwrite protection such that changes made by one user cannot be overridden by another user. This restriction ensures projects are properly documented for future non-design team users further downstream.

How Do You Manage Your CAD Data?

Companies were asked what tools they used to manage their CAD data. Here's what they said:

- File Server
  Best-in-Class: 80%
  All Others: 70%

- Local Desktops/No Formal Data Management Solution
  Best-in-Class: 46%
  All Others: 43%

- Multiple PDM or PLM Systems
  Best-in-Class: 31%
  All Others: 32%

- Each Company Location has its Own PDM/PLM System
  Best-in-Class: 28%
  All Others: 20%

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6

Design Reuse from Models

Companies were asked how well they reuse their design models:

- Features created in other models are copied to new models
  Single PDM: 60%
  Non-Single PDM: 50%

- Downstream departments create deliverables leveraging 3D CAD models
  Single PDM: 57%
  Non-Single PDM: 36%

- A single person is assigned responsibility for maintaining a library of reusable models
  Single PDM: 34%
  Non-Single PDM: 35%

- Employ previous CAD data in new designs
  Single PDM: 68%
  Non-Single PDM: 58%

➔ Don't reinvent the wheel. Choose a data management system that can quickly and easily search for existing CAD models for potential reuse before new design work is started. Single PDM users are 37% more likely than Non-Single PDM users to reuse existing CAD models.

Figure 4: CAD Data in Design
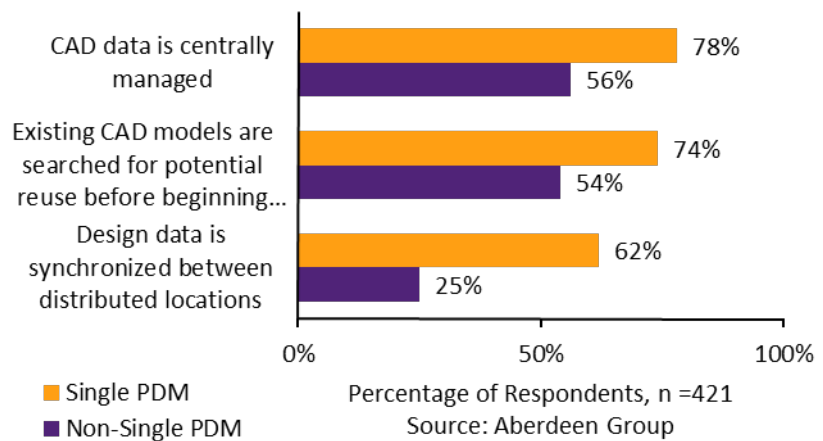
Companies who streamline their most complex processes enable themselves to develop, launch, and manage products more effectively. Streamlining processes while decreasing timecycles is not an easy task, but with the right tools, these steps can be accomplished.

Key Takeaways

For Best-in-Class companies, CAD data management is a well-defined process that ties early phase development with CAD data management together. What distinguishes the Best-in-Class from their peers? They pair the leveraging of CAD data management methods with product development. The manner in which the Best-in-Class execute this plan:

➔ **Use an integrated CAD data system for easier management of design data.** A direct link between CAD

7

data management with product development is often non-existent. Best-in-Class companies distinguish themselves by using a CAD data management tool that allows for central file storage which in turn allows for decreased hardware capacity in reducing duplicate designs.

➔ **Synchronize user access.** Keep redundant versions from occurring during global or split company location development. Doing so will provide a shorter time to market, cost reduction, and improve quality and certification.

➔ **Use a Single Data Management system that integrates with enterprise applications.** Effective CAD data management occurs by giving tools to the right people. This allows the entire process to move quickly and efficiently without expensive re-works or over target costs.

Companies can significantly reduce their production costs, decrease delays to market, and minimize compromised quality by taking the right steps to effective implementation of a CAD data management system. This requires a systematic approach across the entire enterprise by deploying a proven set of data management solution capabilities to equip users to work efficiently and productively.

8

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Related Research
The Path to Product Success: Listen to Your Customers; December 2015   *PCB Data Management: How Industry Leaders Are Managing their Data*; August 2015
The Value of Strategic Supplier Data Management; July 2015   *Multi-domain MDM and the Customer-Centric Approach*; September 2015

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