

COMPUTER-AIDED DESIGN (CAD) DATA MANAGEMENT: INCREASING PRODUCTIVITY THROUGH A SINGLE SOLUTION

April 2016

→ **Tracy Woo**, Research Analyst,
Product Innovation & Engineering (PIE)



Report Highlights

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

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The root of the problem lies in the collaboration and information handoff.

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Choose a data management system that can quickly and easily search for existing CAD models for potential reuse.

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Use a Single Data Management system that integrates with enterprise applications.

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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Rapid advances in product technology add pressure to CAD technology, requiring a sophisticated method to manage information transfer across multi-functional 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 involved in creation, modification, analysis or optimization.

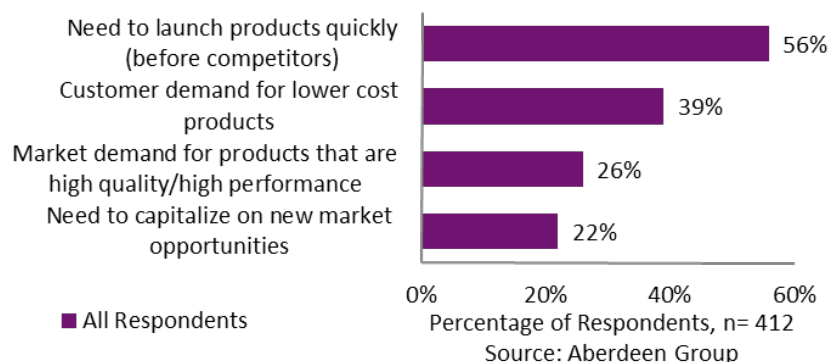
Software forms of CAD are used to increase productivity, efficiency, and collaboration during the design. Output is mostly in the form of electronic files used for print, machining, or other manufacturing processes.

For companies today, 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, as having a strategy that strives for product differentiation can pay huge dividends for companies with the right CAD Data Management system in place, ultimately providing 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 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

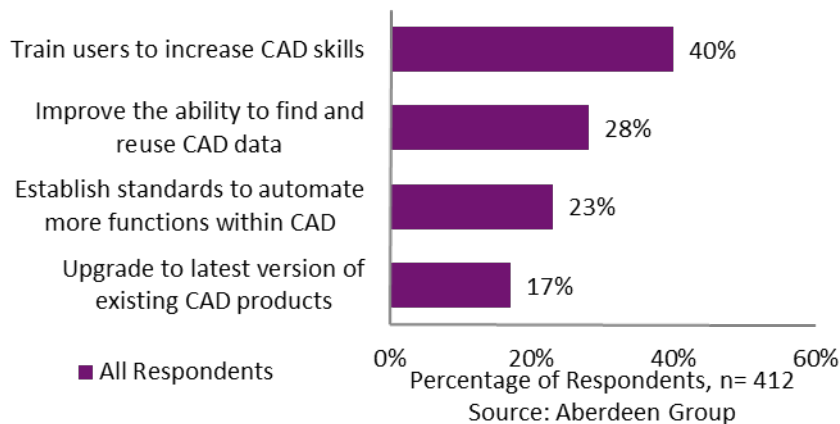


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Notably, 26% of all respondents cited market demand for products that are high in quality and performance as a top pressure. Developing high-quality products and launching them quickly seem to be in direct contrast. Developers need a solution that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

To meet the demands for higher quality and increased complexity 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



Second among CAD actions, 28% of all respondents said improving the ability to find and reuse CAD data was 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 review, and release to production. Inefficiently managed CAD

We Need Insight

Companies were asked what their major challenges of 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%

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The Biggest Challenge in Switching

Companies were asked what their biggest challenge was in switching from one CAD tool to another. Here's what they said:

- Learning Curve: 28%
- Reusing Legacy Data: 26%
- Cultural Changes (Resistance to Change): 15%
- Loss of Productivity: 12%

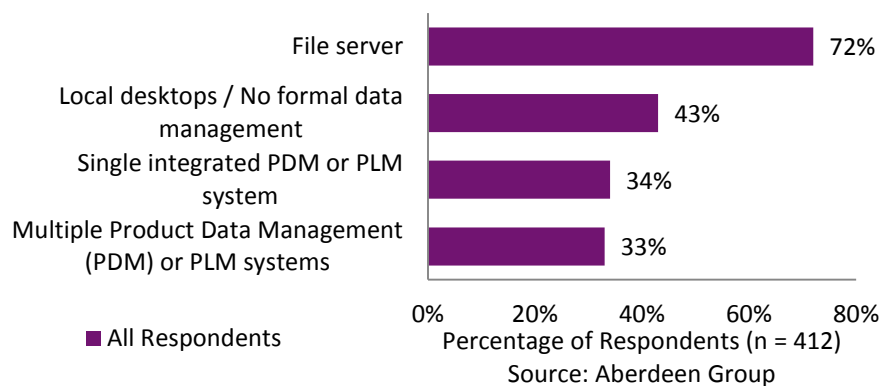
data hinders productivity. When data is isolated to functional teams, or workflow processes don't accommodate collaboration, shortened timelines become next to impossible to meet.

How Do You Manage Your CAD Data?

A prevalent problem among engineering companies is the lack of structure when managing their CAD data. Even the best-intentioned labeling and organizational processes can be problematic if data are stored on file servers or personal hard drives. The root of the problem lies in the collaboration and information handoff. Specifically, it's often hard to reflect downstream changes upstream if modifications are made. If external vendors or manufacturers don't have a clear channel or common platform with developers, important information can be lost along the way.

And even with the knowledge that information loss is a real possibility, 72 percent of survey respondents said they had no automated solution, and instead simply organized their data on a file server. Another 43% of respondents use their own local desktops or have no formal data management system in place.

Figure 3: CAD Data Management Practices



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Though the argument for manually managing CAD data may be due to the difficulty of implementing an automated solution, or for cost reasons, many current solutions are affordable and quite easy to implement. And given the potential for error, productivity loss, and costs due to corrective measures, it would be foolish not to go the route of a product data management solution.

The Benefits of a Single Data Management Solution

To accurately measure the effectiveness of a single solution, we compared survey respondents who currently use a single product data management (PDM) or product lifecycle management (PLM) solution for CAD data management versus those who did not. What we found was consistent over performance by single PDM users.

	Single PDM Solution Users	All Others (not using a PDM solution)
Percent of new designs reusing existing CAD data	68%	58%
Change in overall length of development time	15% Decrease	4% decrease
Percentage of development time spent on non-value add activities? (i.e. searching for files, data transfers, etc.)	8%	14%

Single PDM users were able to reuse CAD data 68% of the time for new designs, versus All Others not using a PDM solution, who reused existing CAD data only 58% of the time. The ability to quickly and easily leverage existing data for new designs accelerates the development process, saves time, and reduces development costs. The benefits can be seen in the measured

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%
All Others: 50%
- Downstream departments create deliverables leveraging 3D CAD models
Single PDM: 57%
All Others: 36%
- A single person is assigned responsibility for maintaining a library of reusable models
Single PDM: 34%
All Others: 35%
- Employ previous CAD data in new designs
Single PDM: 68%
All Others: 58%

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Which CAD Tool Do You Use?

Survey respondents were asked which CAD tool they primarily used.

- AutoCAD Autodesk: 51%
- SolidWorks Dassault: 47%
- CREO Parametric (formerly Pro/ENGINEER) PTC: 29%
- Inventor Autodesk: 23%
- NX Siemens: 20%
- CATIA Dassault: 19%

change in overall length of development time. Those using a single PDM solution saw a 15% decrease in development time, versus only a 4% decrease by All Others not using a single PDM solution. That same boost in productivity was seen by the decrease in time spent on non-value added activities. Single PDM users only spent 8% of their time on non-development activities versus 14% by All Others. In dollars, for an engineer paid at \$50 per hour for a 2000 hour work year, that's a \$6000 *savings* by using a single PDM solution.

Guidelines for Effective CAD Data Management

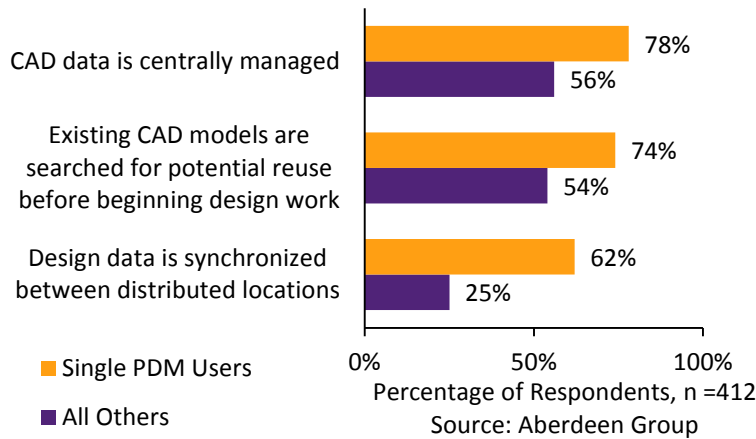
Effective management of CAD data requires a systematic approach by the entire enterprise. Companies should follow these specific guidelines for product success:

- ➔ **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 All Other 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 users that 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.

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- ➔ **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.
- ➔ **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 All Other 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 time cycles is not an easy task, but with the right tools, these steps can be accomplished.

Key Takeaways

For Single Solution PDM companies, CAD data management is a well-defined process that ties early phase development with CAD data management together. What distinguishes them from their peers? They pair the leveraging of CAD data management

CAD Workstation and Hardware Configuration

Companies were asked what their current hardware and workstation configurations were.

- Dual Monitors
Single PDM: 84%
All Others: 66%
- 3D Controllers (3D Mouse)
Single PDM: 64%
All Others: 47%
- Cloud Computing
Single PDM: 13%
All Others: 5%
- Server Farms/Cluster
Single PDM: 27%
All Others: 17%
- Blade Server
Single PDM: 35%
All Others: 17%

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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 data management with product development is often non-existent. Single PDM solution 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.

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

Related Research

[*The Path to Product Success: Listen to Your Customers*](#); December 2015

[*The Value of Strategic Supplier Data Management*](#); July 2015

[*PCB Data Management: How Industry Leaders Are Managing their Data*](#); August 2015

[*Multi-domain MDM and the Customer-Centric Approach*](#); September 2015

Author: Tracy Woo, Research Analyst, Product Innovation & Engineering (PIE)
(tracy.woo@aberdeen.com)

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