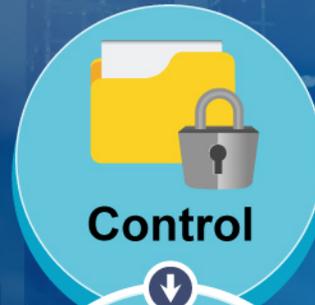


EXTENDING PDM

BEYOND DESIGN DATA MANAGEMENT

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It's Time to Get More from Product Data Management

Top Performers Better Leverage Data Management, Hit Product Development Targets

Our research finds that the current state of design data management continues to yield too many problems, too much wasted time, and missed product development targets. Top Performing companies, on other hand, spend less non-value-added time on data management and are better able to hit their product development goals.

How do these Top Performing manufacturers improve product development performance and spend less time managing data? Our survey of over 165 manufacturers offers some telling insights.

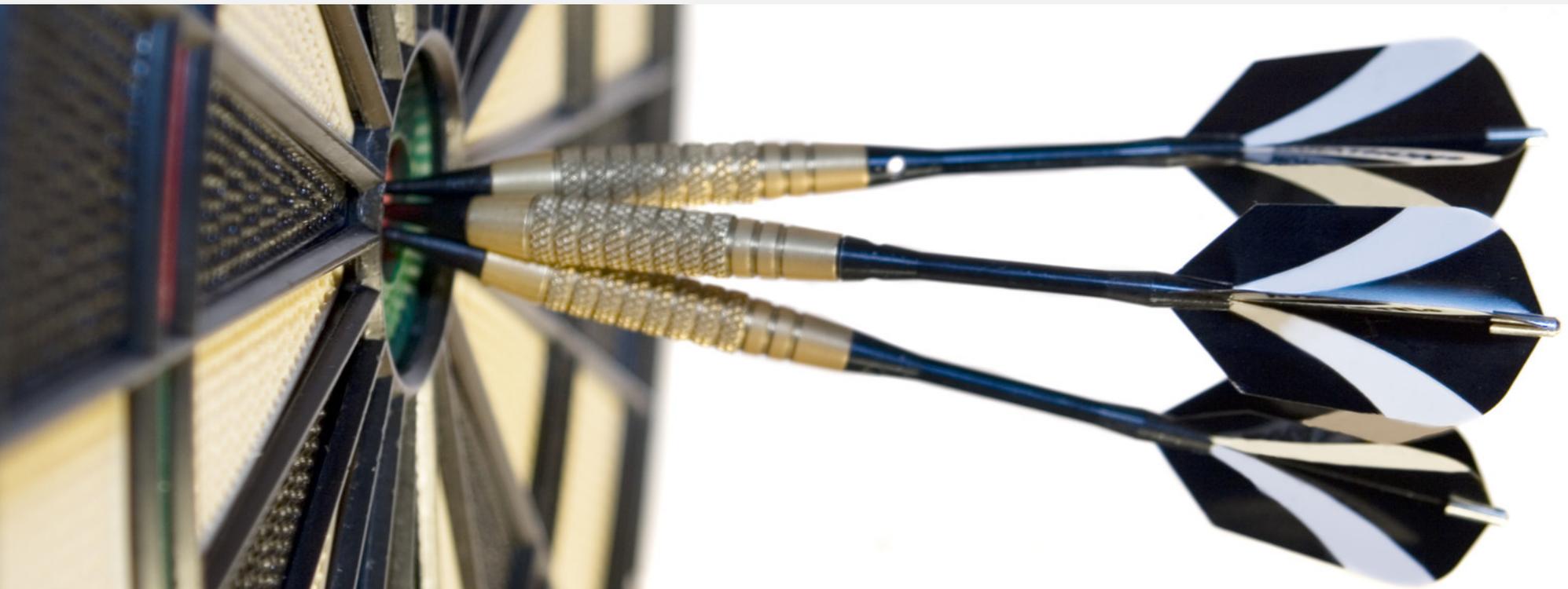


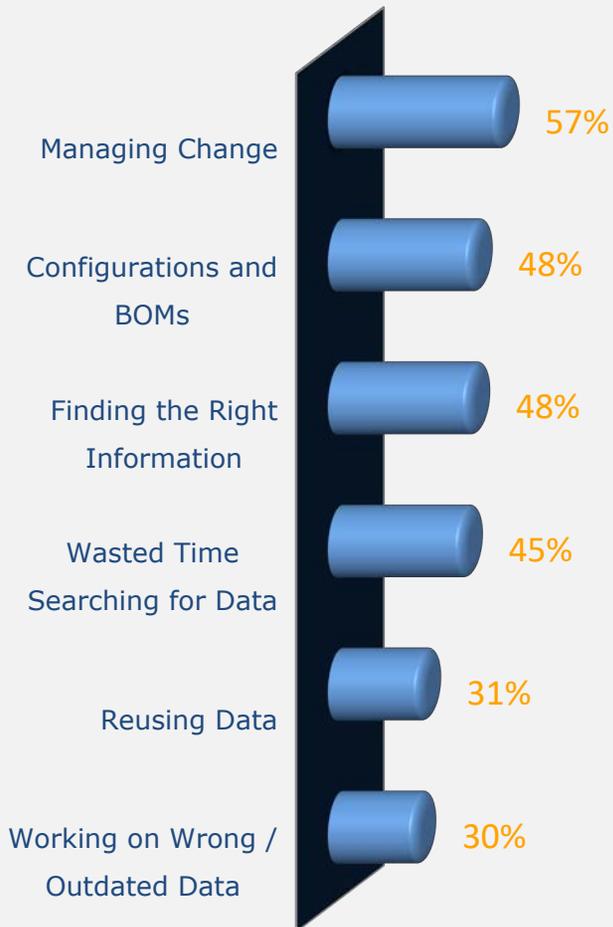
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Design Data Management Challenges Persist

CORE DESIGN DATA MANAGEMENT CHALLENGES



Back to the Basics: Finding Files

For those that work with CAD files every day it's probably no surprise to see "finding the right information" and "wasted time searching for data" are challenges reported by almost one-half of respondents. Many companies struggle with the basics of PDM; controlling, accessing, and sharing product data.

Putting Data into Context

The top data management challenges, however, go beyond managing files. They include change management and managing configurations and BOMs. These processes require more than controlling files, they demand the ability to put the data into a product context. This involves managing the complex relationships between parts and assemblies to accurately manage and communicate product details.

NPD Extends Challenges

Beyond core data management challenges, companies struggle when supporting new product development (NPD). NPD crosses both departmental and company boundaries, raising the stakes on data management. Not surprisingly, the top challenges stem from collaborating with others across the business and the supply chain, and managing designs along with their associated NPD projects. Challenges also include extending designs to incorporate manufacturing information and supporting cross-departmental processes.

PRODUCT DEVELOPMENT PROCESS CHALLENGES



Data Management Challenges Hamper Performance

Challenges Have Significant Business Impacts

Design data management challenges cost businesses time and money. They also limit the amount of time engineers and designers can focus on innovation.

Too Much Wasted Time

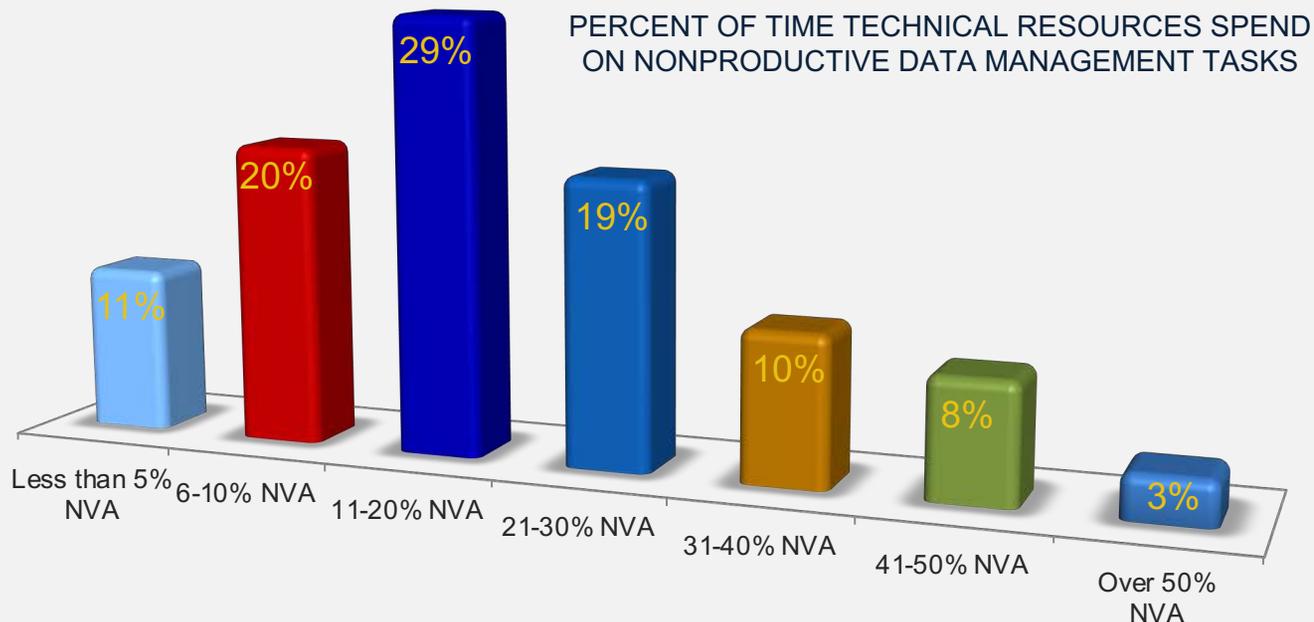
The most common impact of data management challenges is "wasted time and effort." In fact, the survey shows that companies waste an average of 20.3% of their technical resources' time on nonproductive data management tasks. That's about one work day a week of non-value-added time. Some companies report even more waste.

Companies Routinely Miss NPD Targets

The impacts of these challenges also include missed deadlines and budgets. About two-thirds of companies routinely miss design due dates, project/program budgets, and time to market goals by more than 5%. About one-third miss quality targets at that level. Manufacturers lose time and money because of inadequate data management.



PERCENT OF COMPANIES MISSING NPD TARGETS BY > 5% ON AVERAGE



Design Due Dates **63%**

Project / Program Budgets **65%**

Quality Targets **37%**

Time to Market Goals **66%**

Challenges, Impacts will Increase with Complexity

Product Development Complexity Increasing Dramatically

Product complexity has increased due to trends including smarter products, new materials, and changing manufacturing processes. But product complexity is only a part of the issue. The *business* of developing and delivering new products has also increased across multiple dimensions.

The market has become more dynamic. Almost three-quarters of companies say

that customer needs / requirements are changing more rapidly, and about one-third say that it has increased complexity "significantly."

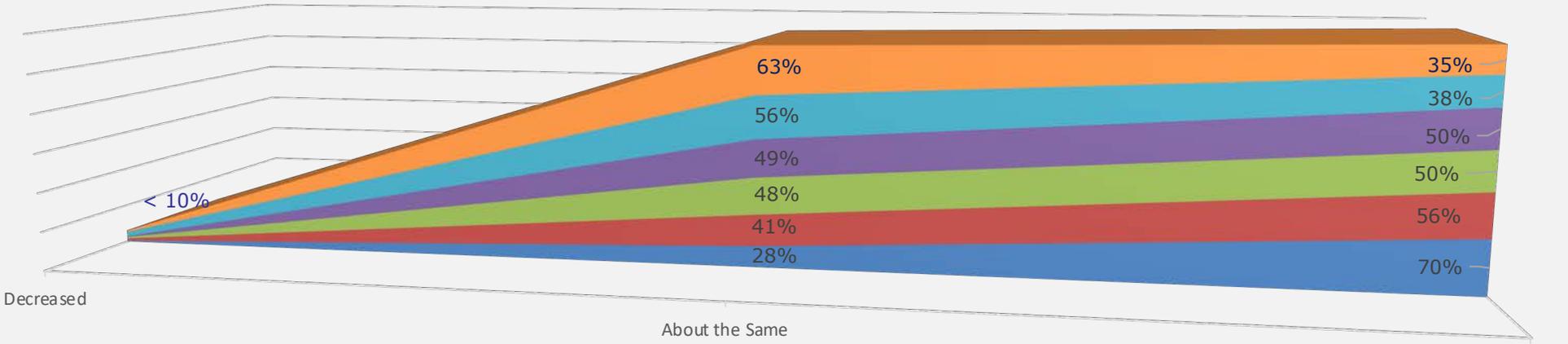
Producing products has also become more of a moving target. Over one-third of respondents have increased contract manufacturing. But even more telling is that the majority report that they have more frequent supply chain/ manufacturing partner changes.

In addition, one-half of surveyed companies have seen continued increases in globalization and the same number have seen expanding demand for customization.

Complexity is Additive

Each of these is challenging, but it's important to recognize that these challenges are happening *concurrently*. As the chart shows, the cumulative increase in complexity is enormous.

PRODUCT DEVELOPMENT COMPLEXITY INCREASE OVER PAST FIVE YEARS



- Customer Needs / Requirements Changing More Rapidly
- Frequent Supply Chain / Manufacturing Partner Changes
- Increased Globalization
- Demand for Customization
- More use of Contract Manufacturing
- Frequent Design Partner Changes

Top Performers Beat NPD Targets, Waste Less Time

Benchmarking Product Development Performance

In order to investigate best practice processes and technology, we use a benchmarking process we call "Performance Banding." For this study, we analyzed respondents' assessment of their company's performance compared to their competitors in four critical NPD measures:

- Developing products efficiently
- Developing high quality products
- Accurately ramping up manufacturing
- Meeting design project / program cost targets

We identified the top 25% of these companies and labeled them "Top Performers." Then we compared their data management approaches with the poorer performing "Others" to identify opportunities for improvement.

Top Performers Have Better Design and New Product Development Performance

Our earlier research¹ found that Top Performers are about twice as likely to beat estimates for design due dates, quality targets, and project / program budgets. This research goes further to show that these advantages go beyond Engineering to support broader product development goals.

Data for this report, in fact, shows that Top Performers not only report better performance than their competitors, they also:

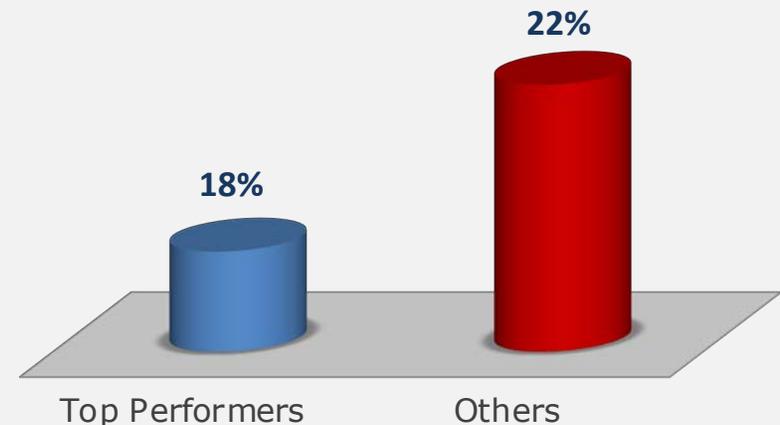
- Beat their product development targets more often
- Spend 18% less time on nonproductive data management tasks

Let's see what these leaders do differently in the way they manage design data.

COMPANIES THAT COMMONLY BEAT THEIR NPD TARGETS



PERCENT OF NONPRODUCTIVE DATA MANAGEMENT TIME



Top Performers Rely Less on Informal Technology

PDM Better Supports Data Management and Product Development

Our research consistently shows the value of formal data management solutions like PDM and PLM. For example, one survey¹ shows that Top Performers in product development are 37% more likely to use PDM. This survey confirms these findings but also shows that Top Performers are more likely to extend PDM *beyond* core PDM capabilities.

When we look at extended PDM, which includes design collaboration and managing product development, we see that Top Performers are more likely to use PDM for these capabilities as well.

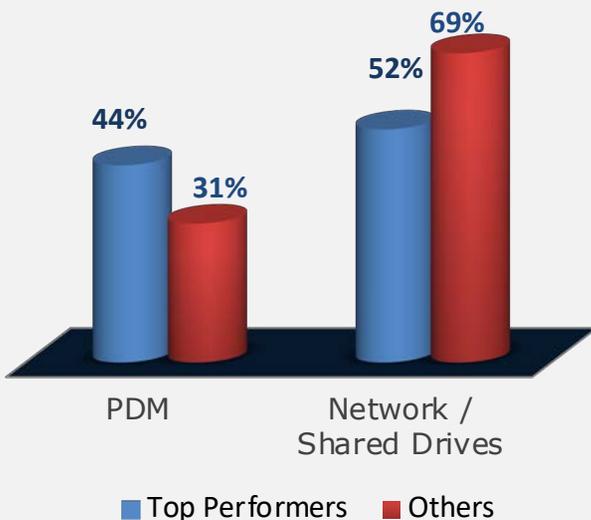
Top Performers Use Less Informal Tech

What's most noticeable, in some ways, is what they *don't* rely on. Top Performers are significantly *less* likely to rely on informal technologies like spreadsheets, network drives, and email for data management and extended

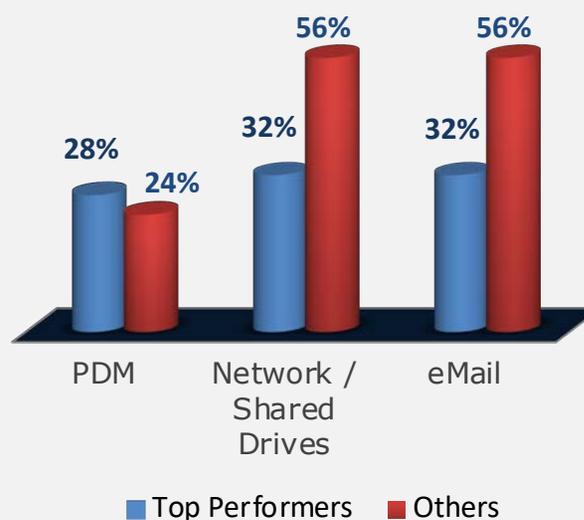
product data management capabilities.

These informal methods fail in all but the simplest situations. Substandard technology leads to inefficiency in finding the right information and errors like using outdated information. Top Performers use these technologies to some level, but are more likely to rely on a formal PDM system. This leads us to the conclusion that PDM reduces non-value-added time and helps manufacturers hit their product development targets.

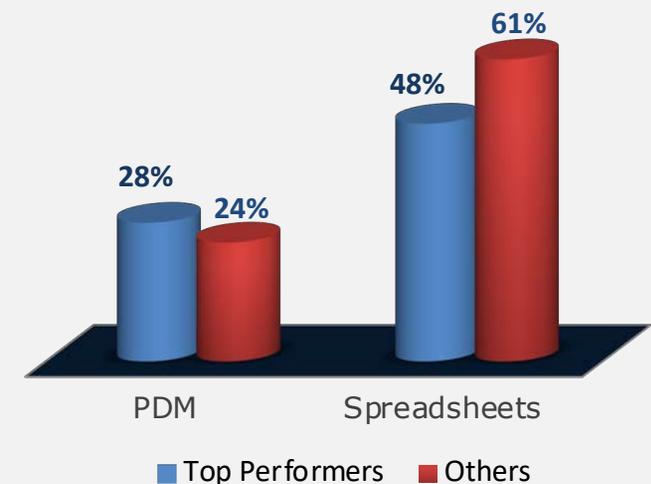
PRIMARY SYSTEM USED TO MANAGE DESIGN DATA



PRIMARY SYSTEM TO MANAGE DESIGN COLLABORATION



PRIMARY SYSTEM TO MANAGE PRODUCT DEVELOPMENT TASKS AND PROJECTS



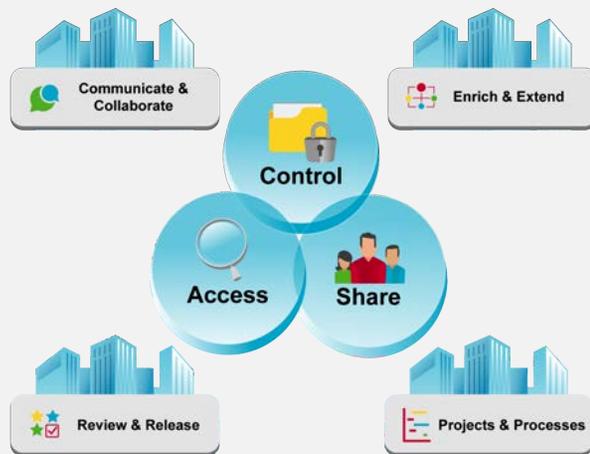
Top Performers Extend PDM

Top Performers Extend PDM Beyond Engineering

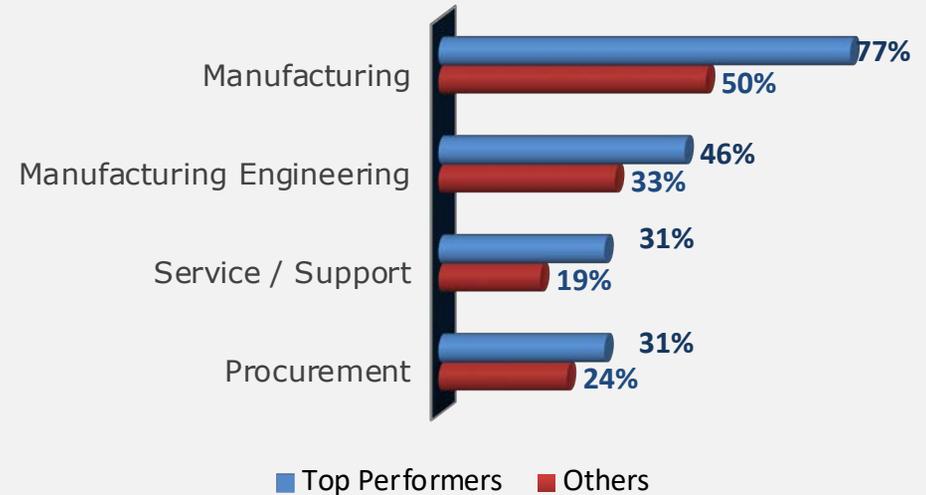
Prior research¹ shows product development performance is higher in companies with more people using PDM. Survey results for this report reinforce those findings. They are also more likely to have other downstream departments use PDM. For example, Top Performers are over 50% more likely to extend PDM directly to users in Manufacturing. Extending PDM to more people increases value through better collaboration.

Top Performers Manage Cross-Departmental NPD Processes in PDM

Beyond simply collaborating on product data, Top Performers are more likely to use PDM to support processes that cross departmental boundaries. Both Top Performers and Others use PDM to some level for revision control, sharing information with other engineers, and other Engineering-centric uses. What really sets Top Performers apart, though, is their use of PDM for cross-functional processes like change management and reviews / approvals.



DEPARTMENTS DIRECTLY USING PDM



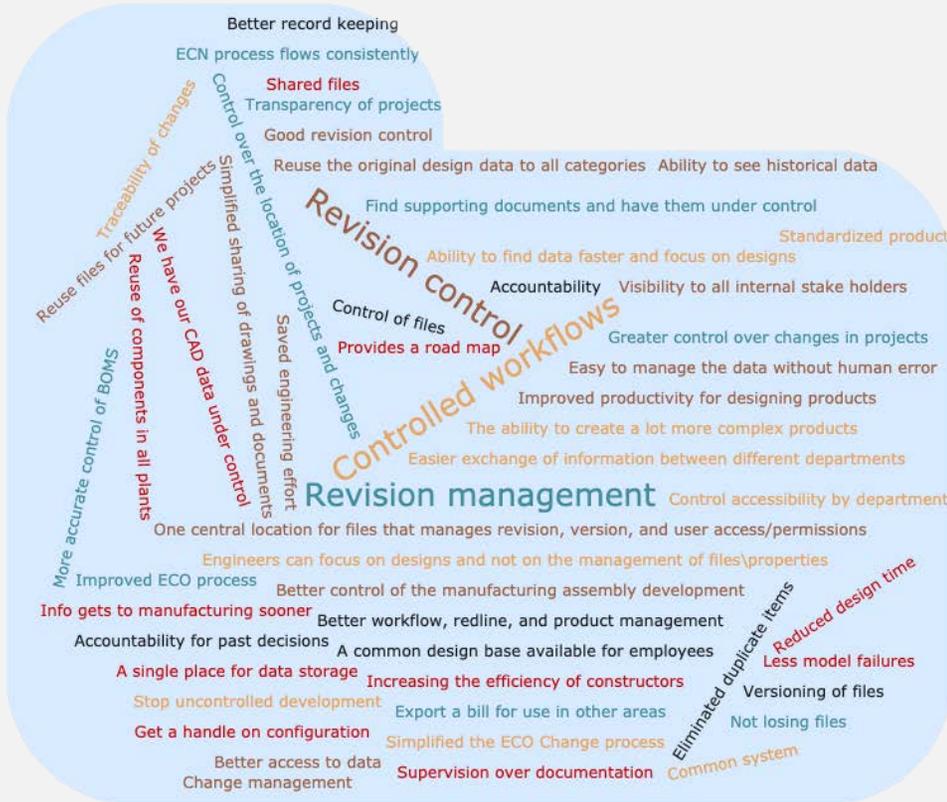
PROCESSES SUPPORTED BY PDM



Weighing the Cloud PDM Option to Improve ROI

PDM Offers Significant Value

Respondents report significant value from their PDM/PLM solutions (see word cloud, below). The value ranges from operational value such as controlling revisions and sharing data to more strategic benefits such as managing intellectual property and improving part reuse.



Cloud Lowers Barriers to Achieving PDM Benefits

One way to reduce barriers to adopting achieving these benefits is by leveraging the cloud. Cloud PDM solutions that go beyond basic file sharing applications are now available and provide capabilities on par with traditional solutions. The cloud, however, offers benefits including:

- Lower cost
- Reduced need for IT resources
- Less adoption risk

Because of these benefits, we're starting to hear "why not implement on the cloud?" replacing earlier misgivings. Choosing whether or not to use the cloud is an important decision, and it's not right for everyone, but today's more mature understanding of service level agreements, standards, and audits have increased acceptance of cloud PDM solutions. For most companies, it's worth consideration. And all companies, whether they're ready to adopt the cloud or not, should recognize the importance for their software provider to offer a cloud option to remain relevant as the market continues to transition to cloud as the primary deployment environment.



PDM Provides Extendable Value

PDM Provides Tangible Business Benefits

PDM provides significant value by helping companies control, access, and share product data. PDM helps companies reduce non-value-added data management time and better hit their product development targets. It's important to note that the benefits are not only available to the select Top Performers, but to all.

PDM Provides a Platform for Future Value

PDM implementations – and value – can expand over time. Only about one-third of respondents implemented PDM in a single implementation. Over one-half implemented in multiple or phased projects, while a small number adopted a continuous improvement approach.

PDM value increases as companies extend usage. Companies can extend PDM in multiple directions to gain

more value, including:

- More people / roles
- More departments
- More locations
- More processes
- More product details

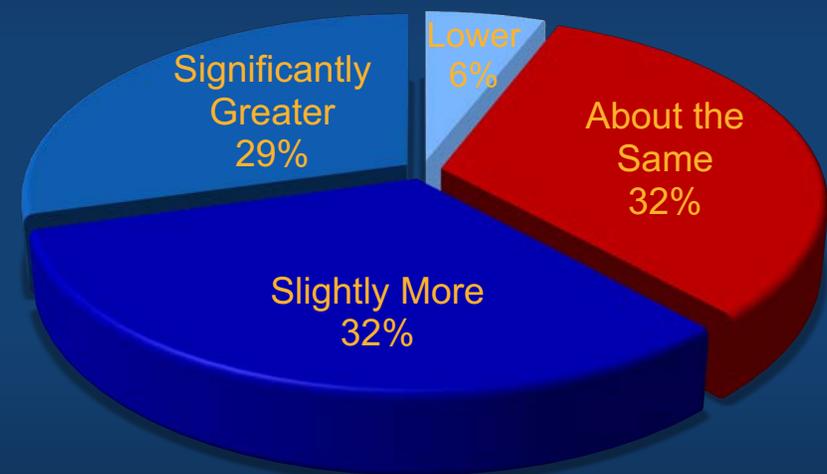
Each of these expansions can increase value.

Get Started and Grow Value

PDM offers an opportunity for companies to get started and grow. Our research, "The Facts About Managing Product Data," details that it doesn't have to take a lot of time and money to implement PDM. Further, it shows that starting small doesn't seem to hamper performance, an almost identical percentage of Top Performers start with limited scope as do Others.

Based on these findings, we recommend that companies start small, gain value, and then extend PDM scope and benefits over time.

RELATIVE VALUE OF ADDITIONAL PDM IMPLEMENTATION / IMPROVEMENT EFFORTS



About the Research

Data Gathering

Tech-Clarity gathered and analyzed 168 responses to a web-based survey on Tech Transfer. Survey responses were gathered by direct e-mail, social media, and online postings by Tech-Clarity and Autodesk.

Industries

The respondents represent companies that design and/or manufacture products or provide engineering services. Companies serve the industrial equipment / machinery market (46%) as well as Building Products and Fabrication (11%), Automotive / Transportation (11%), Electronics / High Tech (11%), Energy / Utilities (10%), Aerospace / Defense (8%), and others.*

Company Size

The respondents represent a mix of company sizes including 42% with 5 or less engineers, 27% with 6 to 20 engineers, 15% with 21 to 50 engineers, and the remainder with over 50 engineers.

Geographies

Responding companies report doing business in North America (60%), Western Europe (46%), Asia (24%), Eastern Europe (18%), Middle East (8%), Latin America (7%), Australia (5%), and others including Africa.*

Role

The respondents were comprised of 51% non-manager, staff, individual contributor, engineer

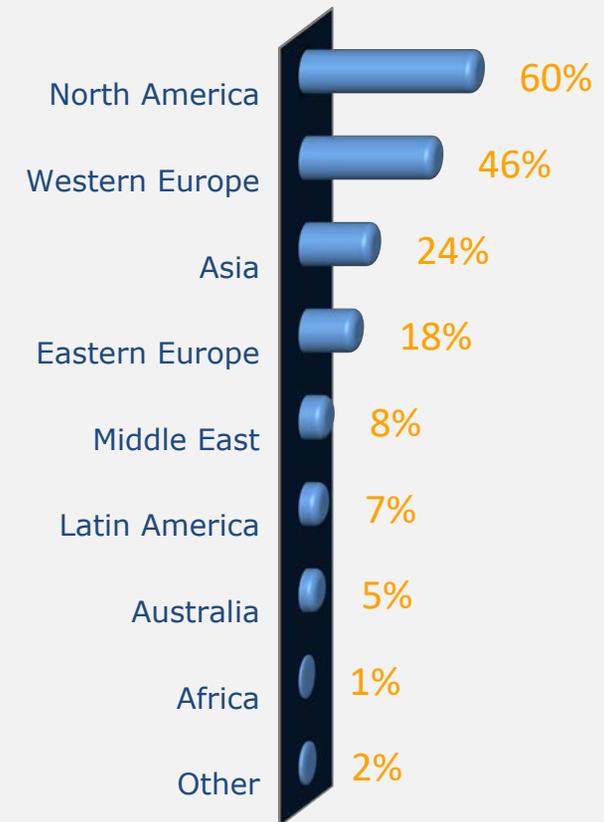
level, 28% Manager level, 5% directors or VP Level, and 10% executive, "C-level" employees, and others.

Organizational Function

Of the respondents, 47% serve product design / engineering functions, 26% have roles in industrial / manufacturing engineering, 7% in Manufacturing, 5% in project / program management, and others.

* Note that the values may total greater than 100% because companies reported doing business in multiple industries and geographies.

The respondents represented a mix industries, company sizes, and geographies.



Acknowledgments



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About the Author

Jim is a recognized expert in enterprise software for manufacturers with over 25 years of experience in application software, management consulting, and research. He has extensive knowledge on how industrial companies use product innovation, product development, engineering, and other enterprise solutions to improve business performance.

Jim is actively researching the value of improving product innovation and operational performance through digitalization.

Tech-Clarity is an independent research firm dedicated to making the business value of technology clear. Our mission is to analyze how companies can improve the way they research, innovate, develop, design, engineer, produce, and support products through the intelligent use of best practices, software, and IT services.



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References

- 1) Brown, Jim, "The Facts about Managing Product Data," Tech-Clarity 2015.

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