



The How-to Guide for Adopting Model Based Definition (MBD)

**Michelle Boucher | Vice President |
Tech-Clarity**

The Importance of Engineering Investments



What strategies will your company use to improve profitability? Is engineering a part of it? If not, it should be.

To boost profitability, companies work hard to win over customers with great products. Unfortunately, creating great products isn't easy. Global competition makes it hard to stand out. To be successful, products must be innovative and high quality, yet priced competitively without negatively impacting margins. While balancing these often-conflicting requirements is already a challenge, companies must also race against the clock to beat the competition.

Engineering is key to accomplishing these goals, and having the right tools is essential for success. Plus, as the world evolves, the tool that was right 10 years ago may no longer be ideal. Today, engineers need tools that will manage rising product complexity, adapt to increasing customer expectations, and support new technologies as they become available. If you find your engineering tools are holding you back, it may be time for a change. When that time comes, what steps should you take to ensure the quickest return on your investment (ROI) for your new CAD tool?

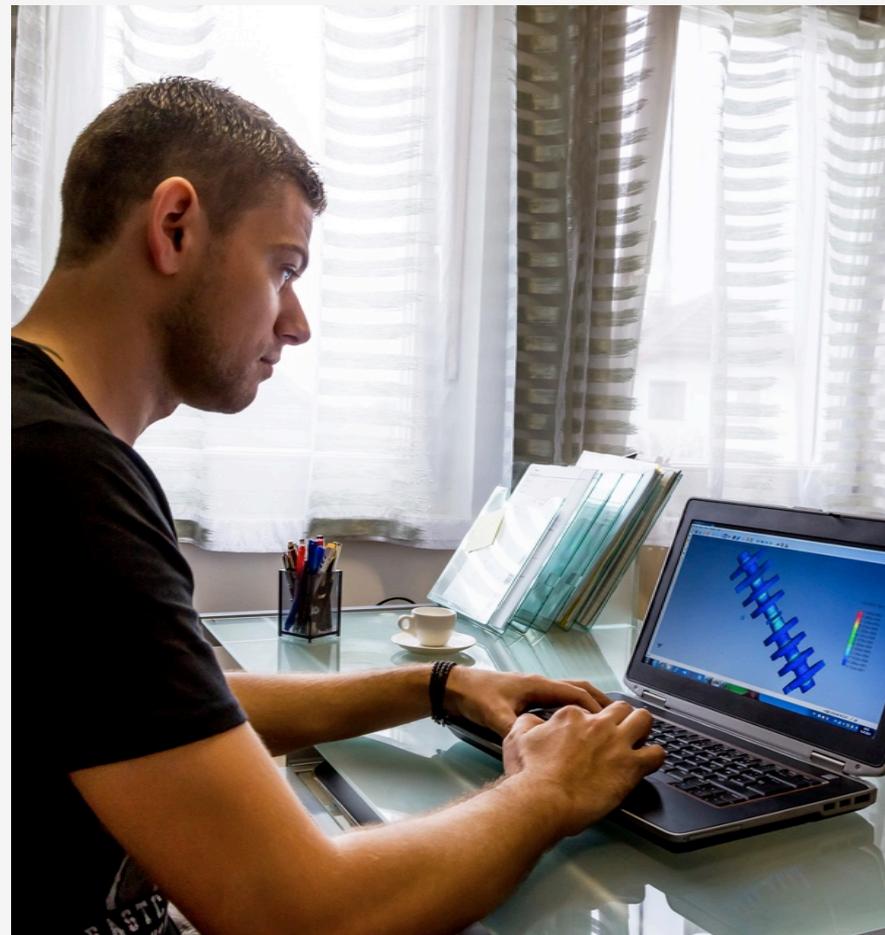
This e-book identifies best practices for migrating to a new CAD tool. It serves as a how-to guide to help companies achieve a positive ROI, as quickly as possible.

About the Research

Based on the results of a Tech-Clarity survey of over 230 manufacturers, this e-book shares best practices for adopting a new CAD tool. The research examined three different types of migrations:

- Transitioning from 2D CAD to 3D CAD
- Migrating from 3D CAD to a new 3D CAD
- Adopting model-based definition (MBD)

Each eBook in the series focuses on a single type of migration. **This eBook focuses on adopting MBD.**





Adopting Model-Based Definition (MBD)

Why Consider Model-Based Definition?

With fierce global competition, today's manufacturers have to work harder than ever to stay competitive. While time-to-market used to be the dominant pressure, Tech-Clarity's research shows that now cost and quality are equally pressing, with innovation and performance not far behind.

With so many different pressures, engineers have their work cut out for them. Constant time-to-market pressures make it hard to look for ways to cut cost while improving quality. They desperately need to improve efficiency so that they have the bandwidth to accomplish all of this.

Tech-Clarity discovered that 33 percent of design time is spent on drawings. Considering this mostly involves documenting what is already in the 3D model, that is a lot of time wasted on non-value-added efforts. Opportunities for improvement are significant. This is where model-based definition (MBD) comes in.

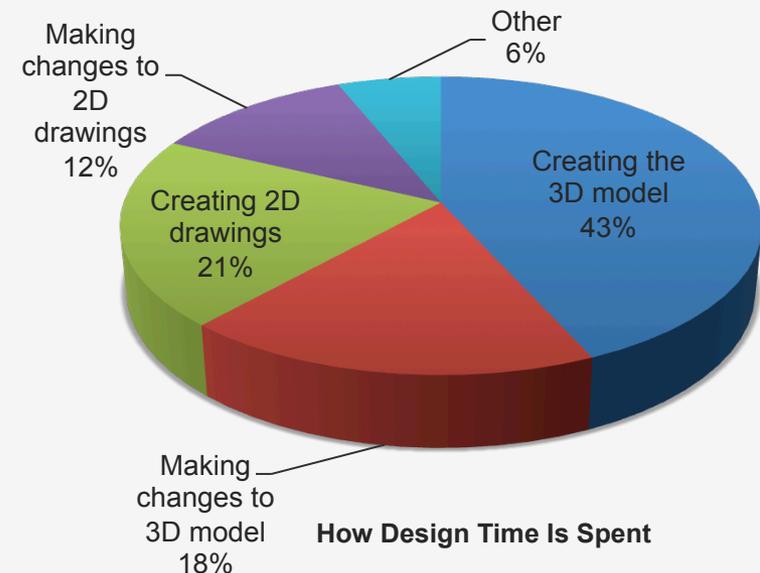
✓ 33% of design time is spent on drawings. Imagine if that time could be spent on better design.

Tech-Clarity



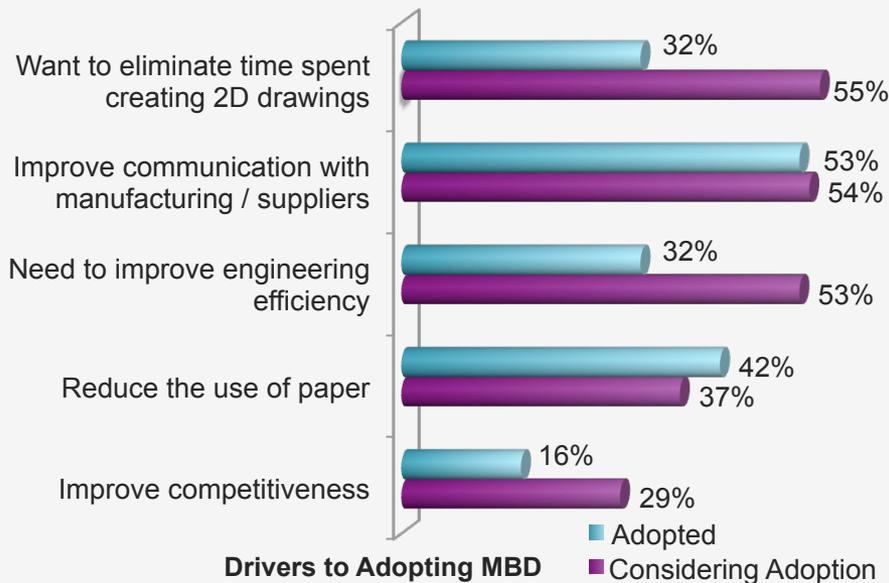
“Companies find they can no longer focus on a single area. To be competitive, they must consider a variety of factors such as performance, innovation, quality, and personalization.”

“Are You Switching CAD Tools? What You Should Know”
– Tech-Clarity



What Is Driving MBD Adoption?

Initially, companies were most likely to adopt MBD to improve communication with manufacturing and suppliers. Compared to a 2D drawing, a 3D model makes it easier to visualize the final product. Plus, there is far less room for misinterpretation for things like assembly procedures. Also, in an effort to adopt more environmentally friendly policies as well as reduce costs, many companies turned to MBD as a way to reduce paper.

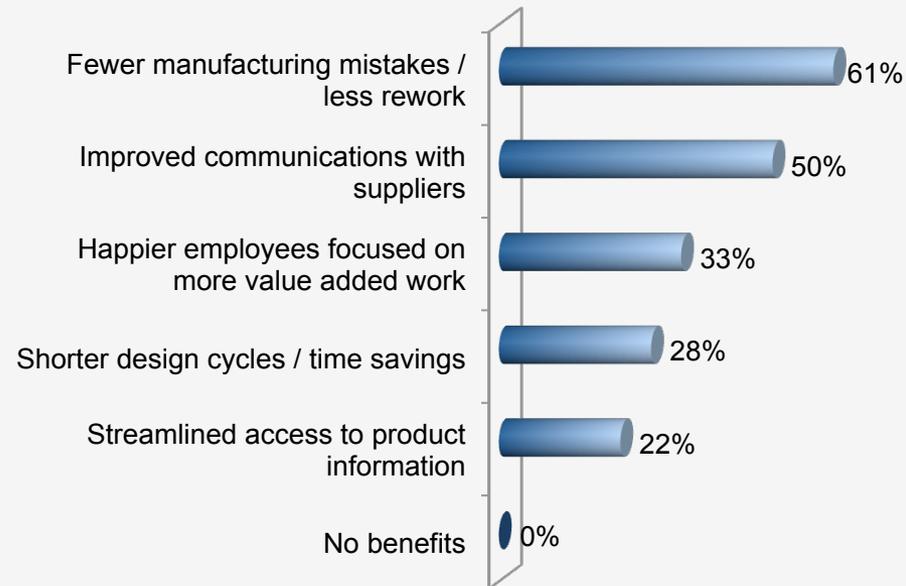


- ✓ **Model-Based Definition (MBD)** is when product and manufacturing information (PMI) is embedded into the 3D CAD model to support downstream processes such as manufacturing, analysis, and inspection.
- ✓ Embedded information can include geometric dimensions and tolerances (GD&T), 3D annotations (text), surface finish, and material specifications.
- ✓ A 3D model is then used rather than a 2D drawing.

These are still important drivers, but companies who are currently considering adopting MBD are looking at it more as a way to make better use of engineering time. By reducing all that time spent creating 2D drawings, engineers can focus more effort on value-added tasks that will improve the design and result in products that are more competitive.

The Positive Impact of MBD

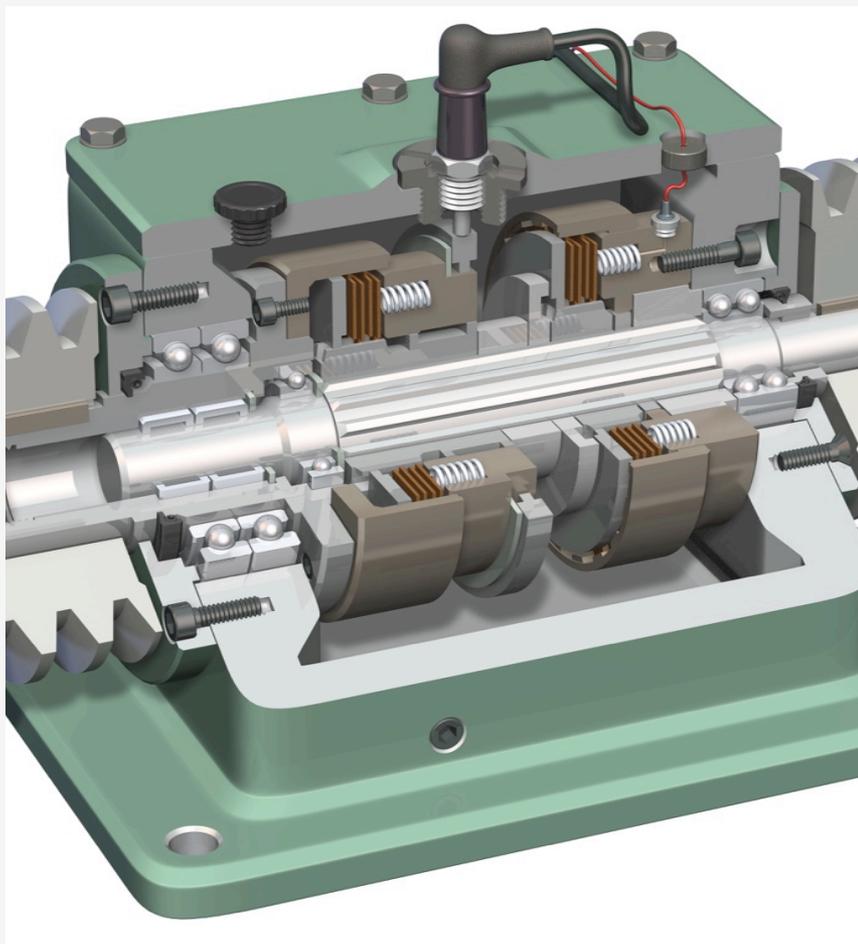
Those who have implemented MBD are very happy with it and report benefits. The most common benefit is better communication with manufacturing and suppliers. Another is improved employee satisfaction because employees spend less time on the less enjoyable, tedious tasks involved with drawings. Instead, they spend more time doing what they like: designing great products.



Benefits Experienced by Those Who Have Adopted MBD

- ✓ Of those who have implemented MBD, 89% are satisfied or extremely satisfied.
- ✓ None are dissatisfied.

What Users Say About Benefits



“After the initial changeover, you will like the benefits.”

~ Tool Designer, Contract Manufacturer



“Just do it.”

~ Owner, Industrial Equipment Manufacturer

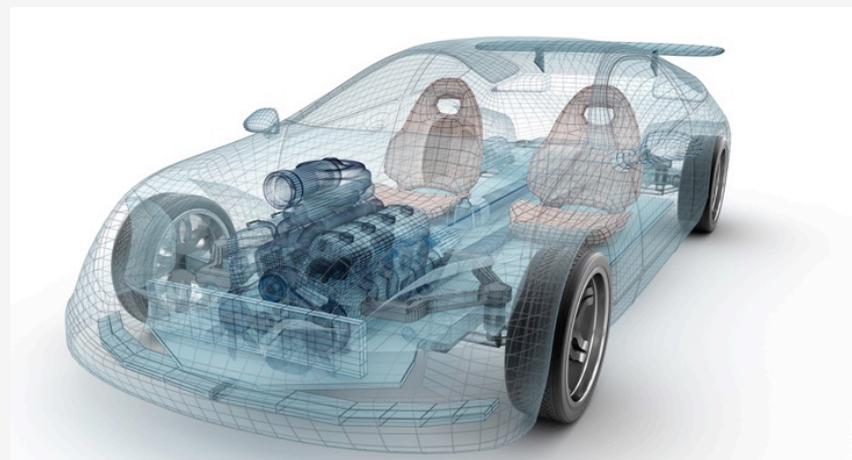
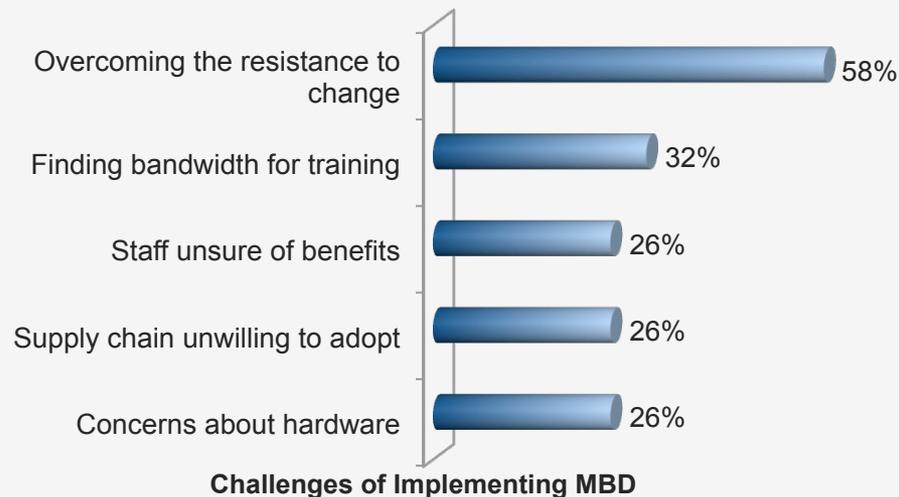
Challenges to Look Out For

While companies like MBD a lot once it is implemented, there are some challenges to overcome during the initial implementation. By planning for these, they will become less of an obstacle.

As with any big change to a well-ingrained process, overcoming the resistance to change is the biggest challenge. The remaining challenges are secondary and will mostly be addressed by taking steps to overcome the resistance to change.

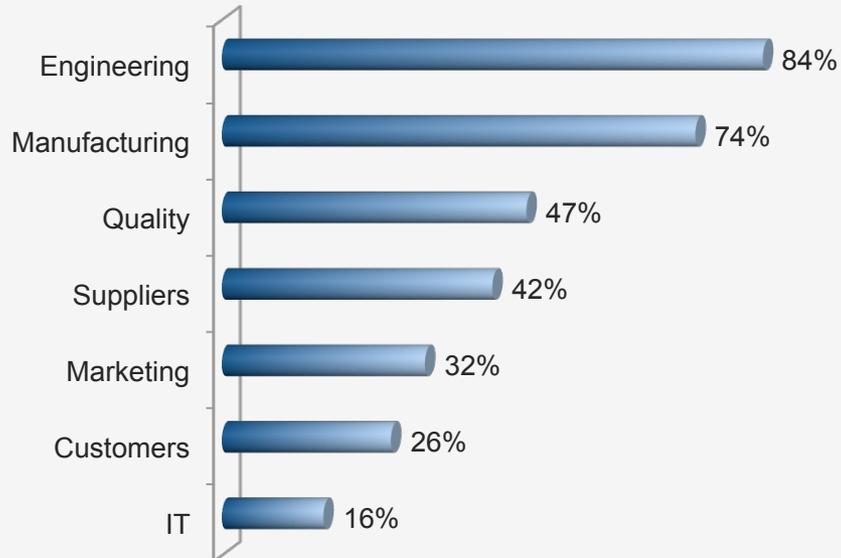
Training is needed to ensure both staff and suppliers understand the benefits. However, finding that time is hard. Fortunately, once MBD is successfully implemented, reduced costs associated with less rework and fewer manufacturing errors make it a good investment of time.

Another concern is the hardware needed to access 3D models. While a full CAD workstation is pricey, many MBD solutions do not require high-end workstations. Even better, many can run on lower-cost tablets, minimizing the hardware investment.

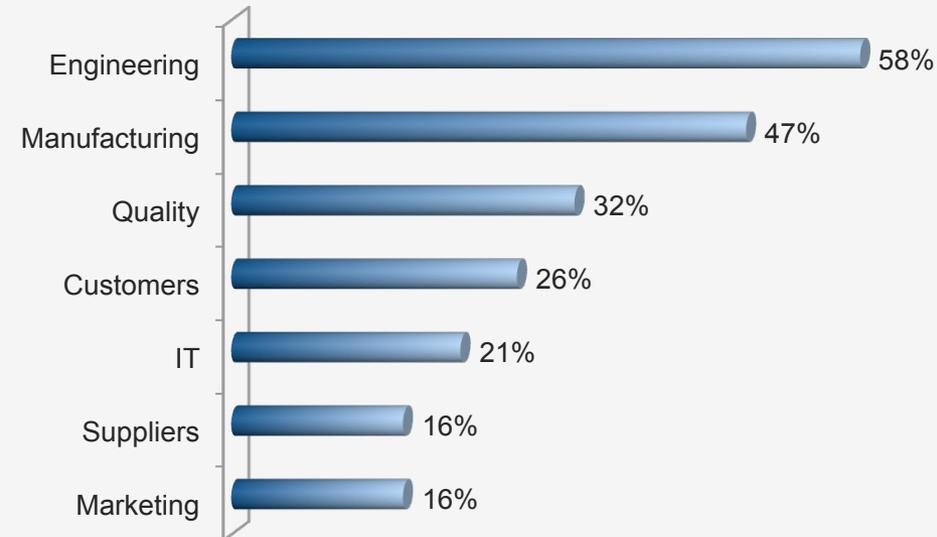


Who Should Use MBD?

MBD helps unlock all of the valuable information produced by engineering and makes it more accessible to the rest of the company. To realize the most value from MBD, companies should make it available to users across the enterprise. As you would expect, engineering and manufacturing are the most common users, but those who have adopted it report that they have successfully rolled it out to multiple other departments too.



Departments Using Models Created With MBD



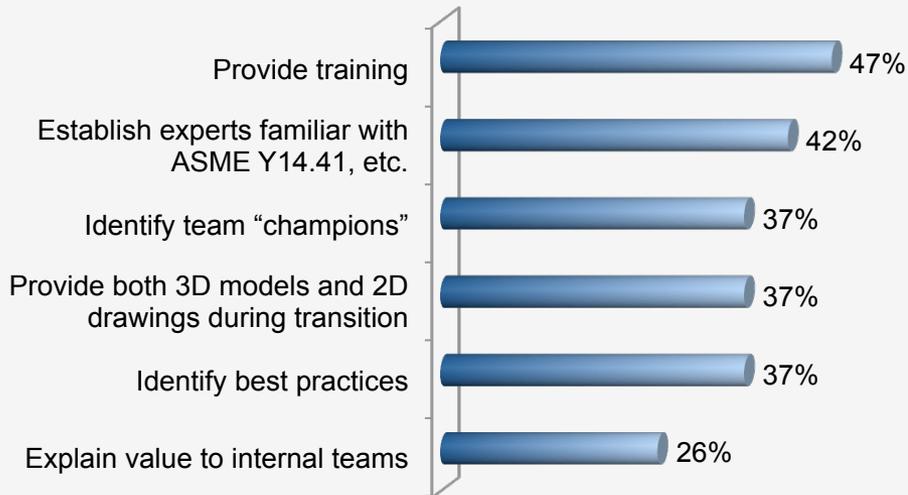
Departments Involved in Defining MBD Implantation Plan

To encourage adoption and meet needs across departments, a cross-functional team representing all potential users should develop the implementation plan.

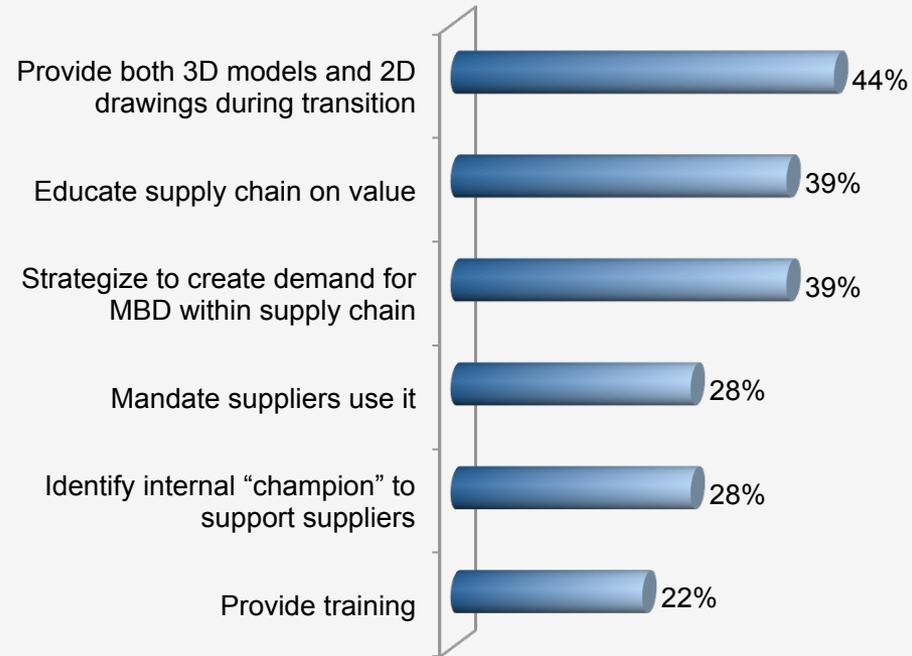
✓ Companies report it takes 8.4 months to implement MBD.

Support Adoption

To overcome the resistance to change, put together a plan to encourage adoption, for both the internal team and suppliers. Internally, companies should focus most of their efforts on training and ensuring they have a go-to person for help. Also, to develop internal expertise, establish an expert on standards such as ASME Y14.41, ISO 16792, and JEITA. Promoting the value of MBD is still done with internal teams, but it is less of a focus here than with suppliers. This is likely because the value is more immediately obvious to engineers.



How Did You Support MBD Adoption Internally?



How Did You Support MBD Adoption with Suppliers?

With suppliers, it is much more of a "push" approach. To encourage adoption within the supply chain, companies focus on encouraging the transition and promoting the value of MBD. In some cases, companies may even have to mandate suppliers use it.

Advice for Adopting MBD



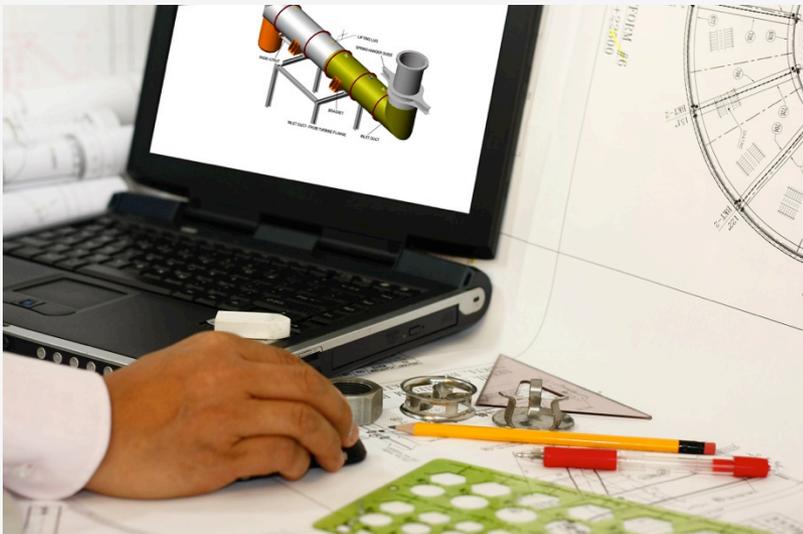
“A stage-by-stage approach is the most effective one.”

~ CAD Director, Medical Devices



“Don’t underestimate the need and time required to train/mentor those organizations downstream of the product design who consume MBD information (such as manufacturing, quality, supply chain).”

~ Director, Aerospace and Defense



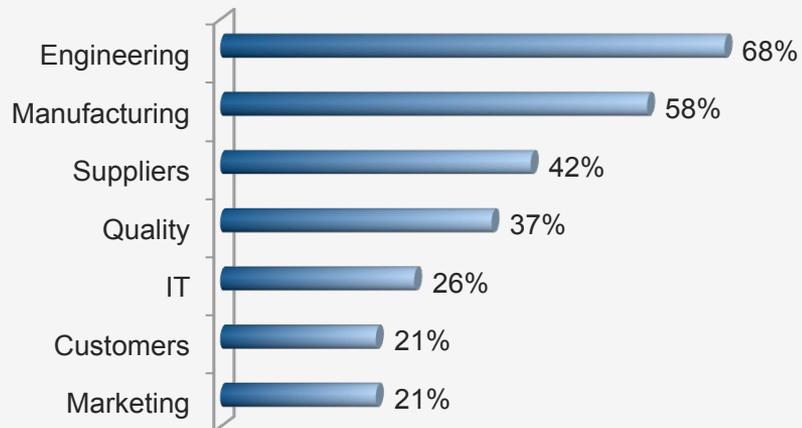
“Be willing and open to change.”

~ Design Engineer, Mold, Tool, and Die

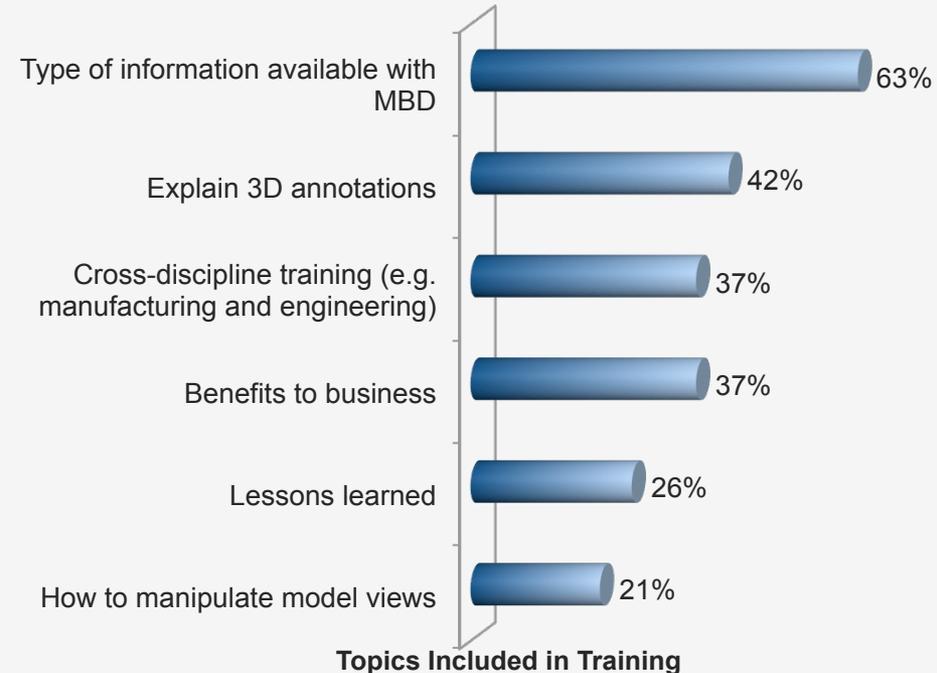
Establish Training

Provide training to a large cross-section of users in the enterprise, especially engineering, manufacturing, suppliers, and quality. This helps make sure that all departments who can benefit from MBD can use it.

Training content should include what's available in MBD and annotations. Also include training across disciplines. This helps to provide better insight into the needs of other departments so, for example, engineering has a better understanding of why certain information is needed in the model.



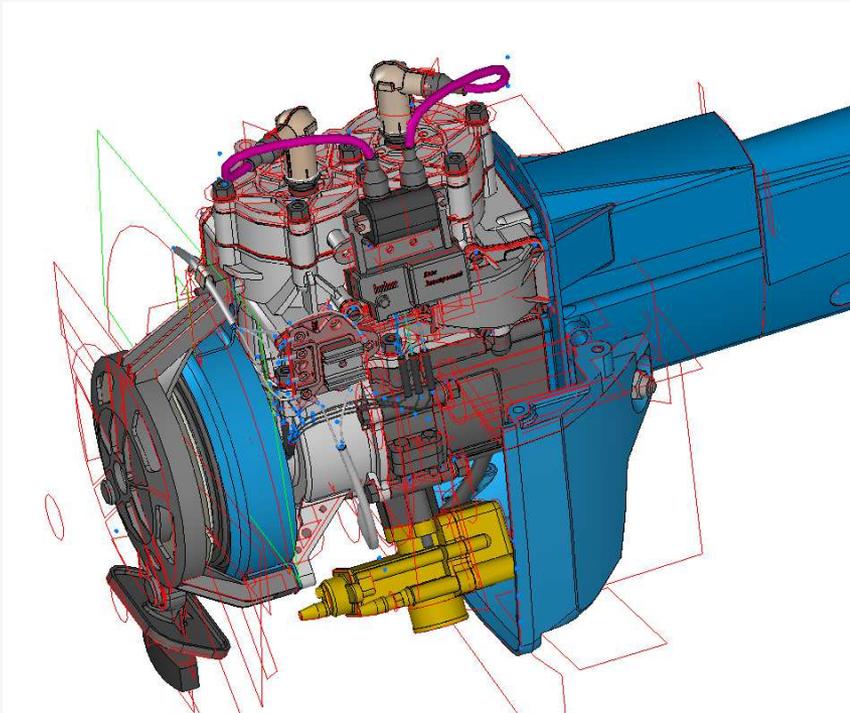
Who Received Training?



Topics Included in Training



Recommendations to Adopt MBD



For successful adoption of MBD, consider the following:

- ✓ Consider MBD as a strategy to improve engineering efficiency. It can enable engineers to spend more time on great design and less time on tedious drawing-related tasks.
- ✓ When adopting MBD, consider everyone who could benefit from access to the engineering model. All departments who could potentially use it should be involved in defining the implementation plan.
- ✓ With internal teams, encourage adoption by making sure they have access to resources to help them use it.
- ✓ Anticipate investing more effort to encourage suppliers to adopt it. Work with suppliers closely to make sure they understand the benefits.
- ✓ Everyone who will use MBD, including those who will consume it, should receive training.

-50.22

-50.11

21.94

67.11

37.99

1

-30.22

63.11

-25.50

2009

2008

2007

91.99

77.51

41.89

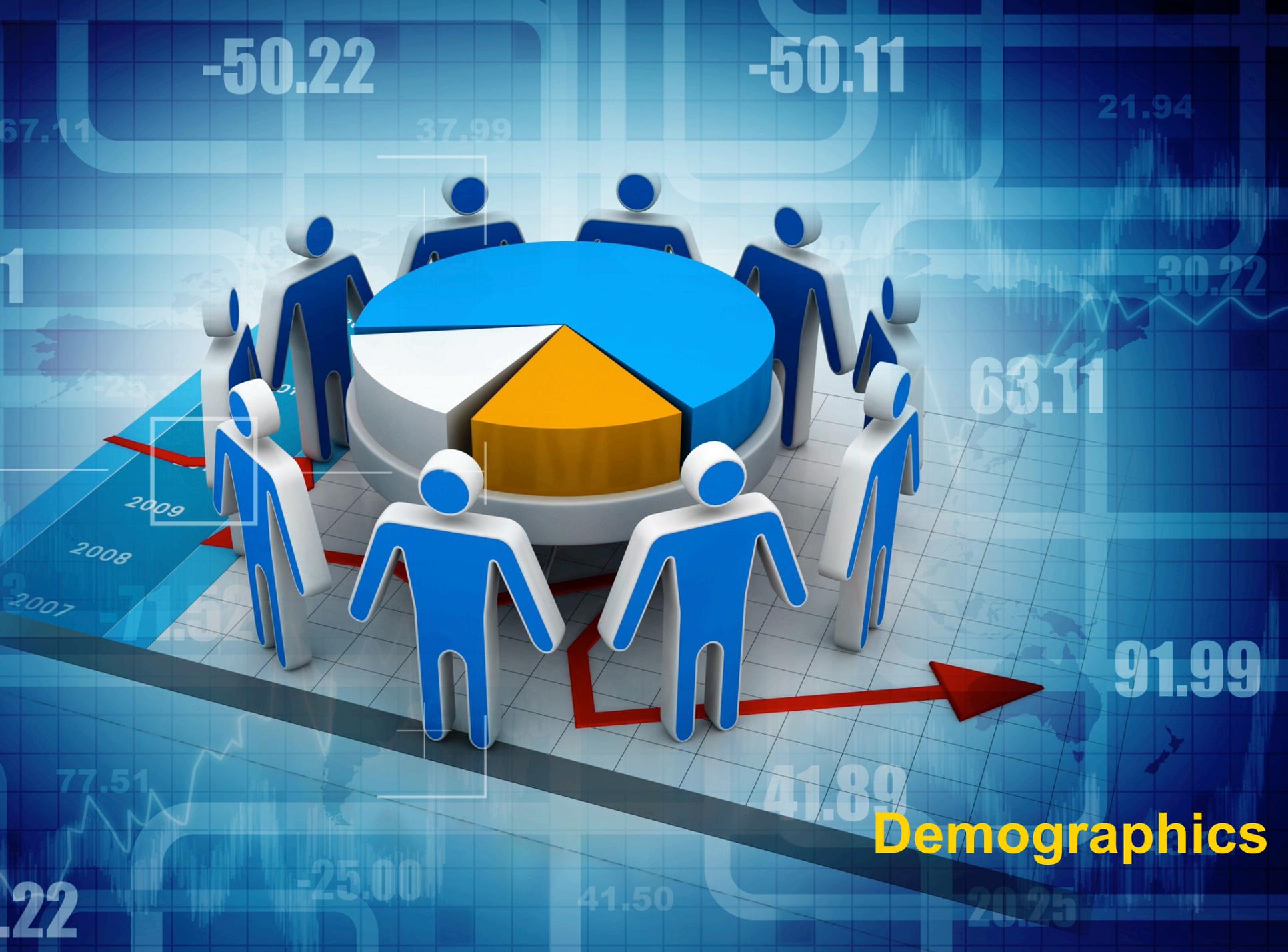
.22

-25.00

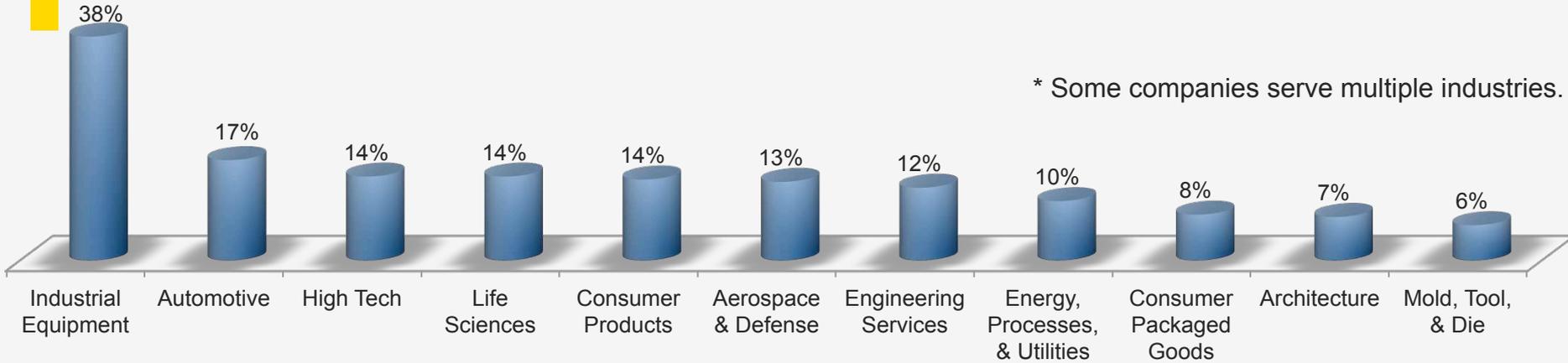
41.50

20.25

Demographics

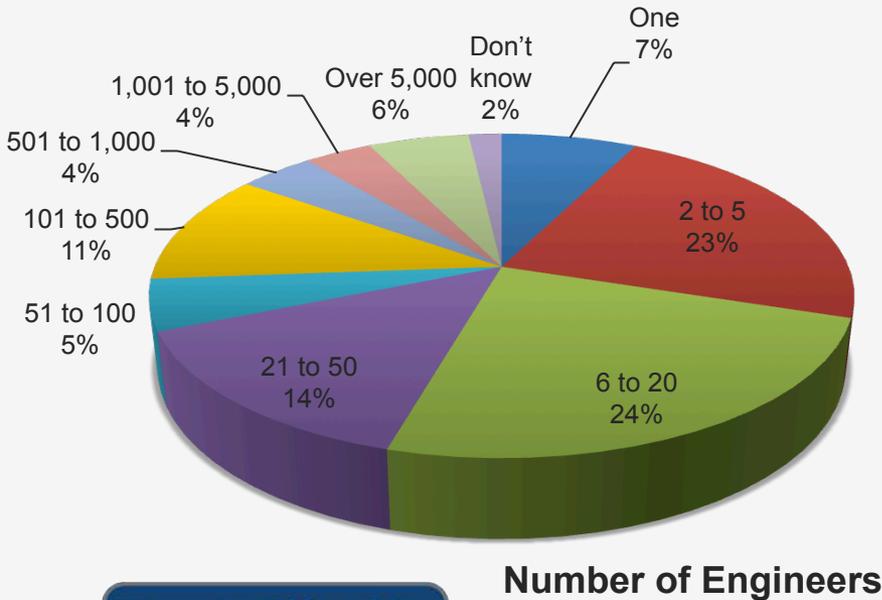


Industry and Size

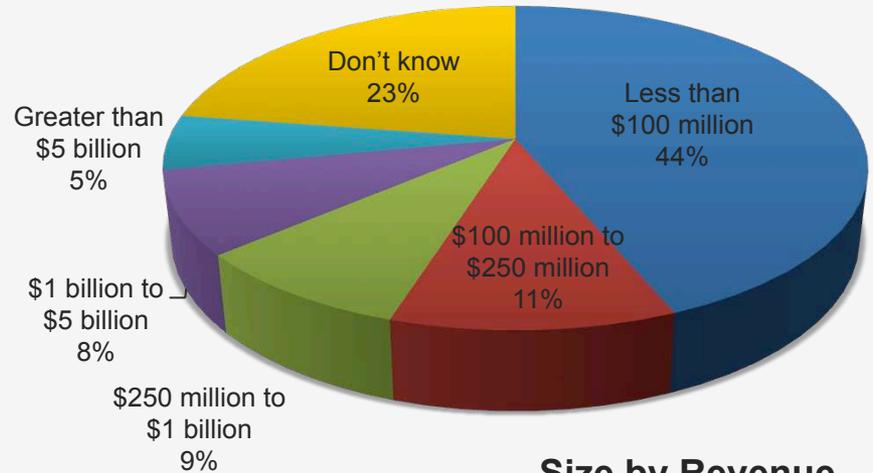


* Some companies serve multiple industries.

Industry*

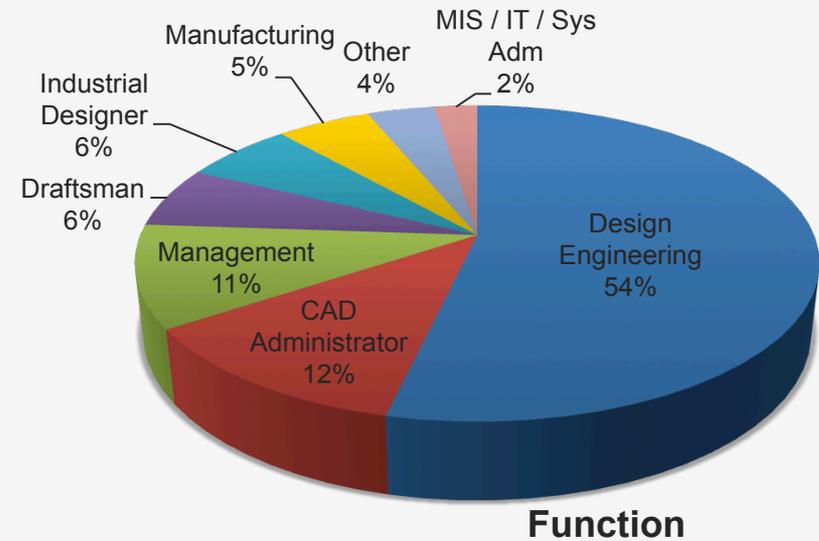
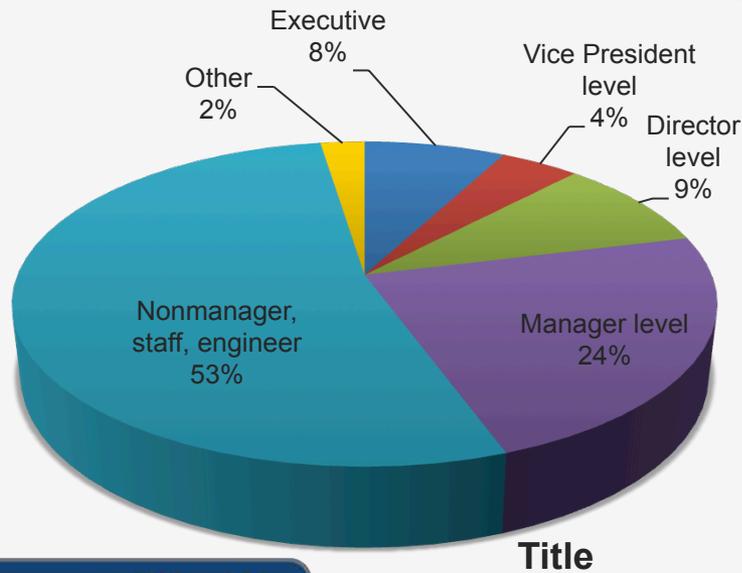
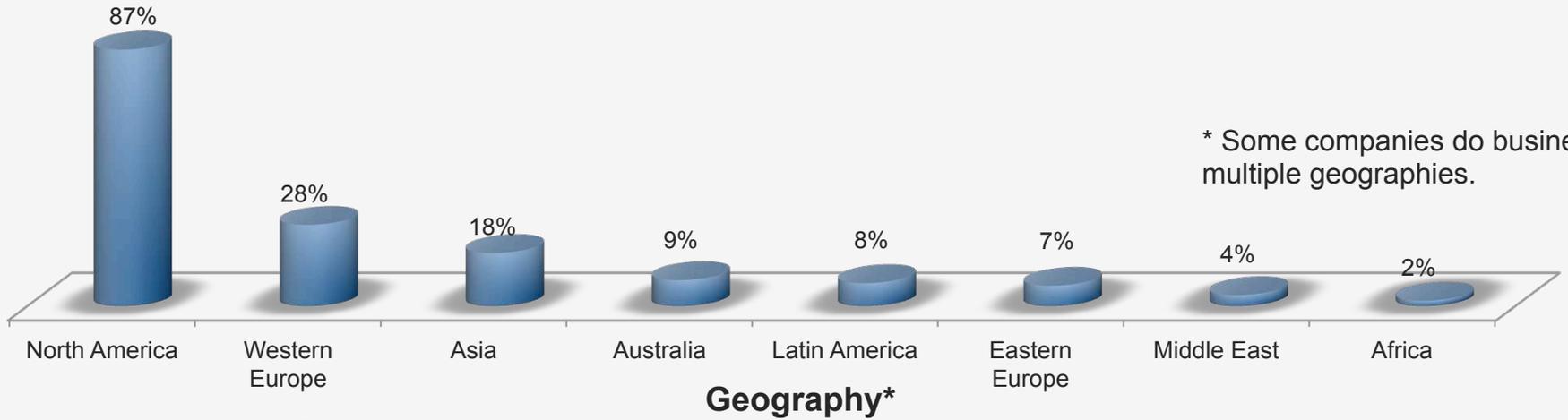


Number of Engineers



Size by Revenue

Geography and Role





www.tech-clarity.com



clarityonplm.com



[@michboucher](https://twitter.com/michboucher)



TechClarity.inc

The How-to Guide for Adopting Model Based Definition (MBD)

This e-book is licensed by Dassault
Systèmes SolidWorks Corporation.

About the Author

Michelle Boucher is the Vice President of Research for Engineering Software for research firm Tech-Clarity, an independent research and consulting firm that specializes in analyzing the business value of software technology and services. Michelle has spent over 20 years in various roles in engineering, marketing, management, and as an analyst.

Michelle has broad experience with topics such as product design, simulation, systems engineering, mechatronics, embedded systems, PCB design, improving product performance, process improvement, and mass customization. She graduated magna cum laude with an MBA from Babson College and earned a BS in mechanical engineering, with distinction, from Worcester Polytechnic Institute.

Michelle is an experienced researcher and author. She has benchmarked over 7,000 product development professionals and published over 90 reports on product development best practices. She focuses on helping companies manage the complexity of today's products, markets, design environments, and value chains to achieve higher profitability.

Tech-Clarity

© Tech-Clarity 2017