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Issue in Focus: CAD Standardization Strategies

***Considerations for Multi-CAD
versus Standardization***



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Introducing the Issue

There are benefits to having a standard CAD package, as reported in the recently published research paper *Tech-Clarity Insight: Consolidating CAD*. These business benefits range from tactical cost savings to strategic advantages such as corporate flexibility. As that paper mentioned, however, *“Not all businesses have the opportunity to unify their CAD solutions due to customer and supplier constraints, but there are multiple advantages for those that can.”*

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This paper is intended to help companies develop a “CAD Standardization Strategy” based on a thorough understanding of the business drivers, constraints, and tradeoffs impacting their decision. This strategy can help determine the appropriate level of standardization to best meet the needs of the business. The paper offers a suggested list of business drivers to be used as a starting point for an industry and company tailored CAD strategy.

Considering the Business Drivers

Engineering software strategy must not exist in a vacuum; it must support the business strategy. Manufacturers should understand the strategic goals of the company and then examine which business drivers impact the CAD strategy. The business considerations that heavily influence the CAD Standardization Strategy include both internal influences as well as supply chain considerations. These factors include impacts on direct cost, internal efficiency, supply chain efficiency, customer requirements, and corporate flexibility (Figure 1). These items can serve as a starting point for a manufacturer’s unique requirements based on their industry, their supply chain, their business objectives, and their company.

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Factor	Impact
Cost	A consolidated CAD strategy should reduce cost. The “Consolidating CAD” report puts forward a framework for understanding the elements of cost that a leaner IT infrastructure can deliver, starting with savings in CAD licenses and other IT-related costs but also considering impacts on personnel costs such as support organizations.

<p>Internal Efficiency</p>	<p>A single CAD solution should make design more efficient, at least over time. Companies with a common solution can invest in best practices that tie directly to the CAD software, simplifying processes. While not every engineer might appreciate the improvement in efficiency – particularly those that need to change the tool they are using – there are advantages at the aggregate level. This may be offset, however, if there are engineers with unmet needs for their particular role. Not all CAD packages are the same, with each having particular areas of strength and different specialized tools for experts. While standardization might make some more efficient, if the tool does not have the right tools for specialists then there will be tradeoffs between the efficiency of working in the same tool and the added need to translate to/from the standard tool or work in a multi-CAD environment. There are also different modeling techniques that benefit different scenarios, such as the use of parametric modeling for design automation or the use of direct modeling for more free-form changes, although these two approaches are merging in the leading CAD packages.</p>
<p>Supply Chain Efficiency</p>	<p>Many supply chains have informally standardized on a set of tools. Depending on the industry, suppliers may be more likely to favor one tool or another. Pulling models together and editing them as an assembly should be more efficient if the suppliers are using the same tool as the company, although modern CAD and PLM solutions are designed to support multi-CAD environments and can create assemblies from models originating from different CAD systems.</p>
<p>Customer Requirements</p>	<p>Perhaps the most important decision criteria are based on customer preferences (or demands). In some industries, program participation might dictate accepting standards for the CAD tool, the design standards, the version of the tool, and even the PLM environment used. In these cases, the most straight forward choice would be to use that same tool internally. Alternatives do exist, including delivering in a neutral format (if acceptable) or translating designs from your tool of choice to the target solution.</p>
<p>Corporate Flexibility</p>	<p>One of the more strategic benefits is corporate flexibility. A standard toolset and common processes help make engineering resources more transportable and interchangeable across the business. If engineering demands are overworked in one part of the business then resources from a less utilized area of the business can be applied. This benefits the corporation, but also the</p>

	engineers who might be laid off if there is not enough work for them in their area of the business. Of course a common design tool is only one element, if the businesses are drastically different, engineering resources might not have the required skills for the products, technologies, or industries involved.
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Figure 1: Business Considerations Influencing a CAD Consolidation Strategy

Each company may have additional considerations, but the considerations identified above are common across most manufacturers. The key is to fully understand the business strategy to ensure that all of the important influencers of the CAD Consolidation Strategy are identified and understood.

Making Tradeoffs

Unfortunately, few companies’ requirements analysis will result in all factors supporting the same approach. Many of the factors influence each other and others potentially conflict. Therefore, it is important to weigh the importance of each business driver and make a decision that benefits the organization as a whole. Once the factors are understood, business leadership will have to make tradeoffs. Some common tradeoffs include:

- Savings from consolidation versus the cost of change
- Internal efficiency versus supply chain efficiency
- Internal and supply chain efficiency versus customer requirements

It is important to weigh the importance of each business driver and make a decision that benefits the organization as a whole.

There are internal drivers as well, such as product development efficiency. A single tool in an integrated PLM environment provides deeper support for product development functions that leverage design data. Each factor should be considered, with positives and negatives identified for either a consolidation or a multi-CAD approach (Figure 2).

Factor	Consolidation	Multi-CAD
Cost	<ul style="list-style-type: none"> • Typically costs less • May require cost of CAD translation to meet specific customer needs 	<ul style="list-style-type: none"> • Higher cost
General Engineering	<ul style="list-style-type: none"> • Standardized processes drive efficiency 	<ul style="list-style-type: none"> • Translations of models takes time

Efficiency	<ul style="list-style-type: none"> Engineers working in a new tool will be less efficient (at least in the short run) 	<ul style="list-style-type: none"> Model translations might require manual correction Multi-CAD enabled engineering tools support multi-CAD assemblies
Engineering Specialists Efficiency	<ul style="list-style-type: none"> One tool may not meet the needs of all specialists, diminishing their efficiency May require translations, which add time and expense 	<ul style="list-style-type: none"> Specialized tools offer better support for certain engineering functions
Supply Chain Efficiency	<ul style="list-style-type: none"> Increases efficiency if supply chain has standardized 	<ul style="list-style-type: none"> Multi-CAD may be required in industries with fragmented supply chains
Product Development Efficiency	<ul style="list-style-type: none"> A common tool allows for more integration to streamline compliance, documentation, manufacturing process management, and other PLM processes 	<ul style="list-style-type: none"> Leading PLM solutions are built to support Multi-CAD environments, supporting visualization and design in context, but provide stronger support for the primary CAD tools from the PLM vendor
Customer Requirements	<ul style="list-style-type: none"> Standardizing on same tool as customers adds efficiency in collaboration and delivery of designs 	<ul style="list-style-type: none"> Engineers may not work in their tool of choice, decreasing efficiency Collaboration can be accomplished with multi-CAD enabled PLM solutions
Corporate Flexibility	<ul style="list-style-type: none"> Difficulty in sharing resources across divisions 	<ul style="list-style-type: none"> Easier to share resources across divisions
Ability to Change	<ul style="list-style-type: none"> Changing to a common tool may meet with resistance from users with deep expertise in the tool being retired 	<ul style="list-style-type: none"> Even after changing to a common tool, legacy designs may need to be maintained using the old tool while new designs are shifted to the common tool

Figure 2: Considerations for CAD Consolidation Strategies

The previous table can help companies understand the relative positive and negative impacts that consolidation or a multi-CAD strategy will have on the potentially competing factors driving their success. Again, this table should serve as a starting point as each company may have unique requirements based on industry, supply chain, and company uniqueness.

Developing a Strategy

Considering the business strategy first, manufacturers must determine which factors are the most important to success and profitability. To do this, manufacturers must thoughtfully answer some important questions:

- Is direct IT cost more important than engineering efficiency?
- Is corporate flexibility strategic? Is it realistic?
- What is the feasibility of making a change? Are there any constraining factors that can't be (or shouldn't be) overcome?
- Are cost savings achievable or are they only savings on paper?
- How long will it take to make a positive ROI?
- What level of risk are you willing to take with engineering resources that might not be willing to make a change?

Once the factors are identified and tradeoffs made, it is time to plan for the change. Will the change be made all at once, or over time? How will the benefits be realized? How will they be measured? How can business leadership communicate and support the change? The answers to these questions serve as the basis for a plan that will align the CAD Consolidation Strategy with the business strategy.

Conclusion

Deciding whether or not to adopt a CAD Consolidation Strategy is not a straight-forward decision. The strategy and considerations for each company will be unique, and no two strategies may look alike. Developing an optimal strategy requires understanding internal, supply chain, and customer business drivers. The plan will require tradeoffs, and an honest assessment to determine how benefits will be realized. For most companies, standardization will have an impact on engineers and potentially others in the organization that should be considered. Most importantly it is crucial to understand the business drives and other considerations before adopting and implementing a plan.

Developing an optimal strategy requires understanding internal, supply chain, and customer business drivers.

Recommendations

Based on industry experience and research for this report, Tech-Clarity offers the following recommendations:

- Understand the potential benefits of a CAD Consolidation Strategy
- Use the considerations in Figure 2 as a starting point, and develop an industry and company specific collection of drivers
- Develop a strategy, balancing the objectives of the business with the demands of the supply chain
- Implement the strategy to recognize available strategic benefits and cost savings
- Phase the approach as necessary, developing a program consisting of reasonably sized projects with short-term ROI
- Visibly communicate and support the business drivers and the strategy by business leaders

About the Author

Jim Brown is the President of Tech-Clarity, an independent research and consulting firm that specializes in analyzing the true business value of software technology and services. Jim has over 20 years of experience in software for the manufacturing industries, with a broad background including roles in industry, management consulting, the software industry, and research. His experience spans enterprise applications including PLM, ERP, quality management, service, manufacturing, and others. Jim is passionate about improving product innovation, product development, and engineering performance through the use of software technology and social computing techniques.

Jim is an experienced researcher, author, and public speaker and enjoys the opportunity to speak at conferences or anywhere that he can engage with people that are passionate about improving business performance through software technology.

Jim can be reached at jim.brown@tech-clarity.com, or you can find him on Twitter at @jim_techclarity or read his blog at www.tech-clarity.com/clarifyonplm.