Tech-Clarity

Tech-Clarity Insight:

Unlocking Engineering Value for Small and Medium Businesses with Product Design on the Cloud

Examining the ROI of Product Design on the Cloud

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Executive Overview

Today's global environment is so competitive, it has become very difficult for companies to stand out from the competition. To be profitable, companies must design better products, at less cost, in less time while offering customers something unique. This can be especially challenging for small and medium size businesses (SMBs) who face many of the same challenges large companies do, but with fewer resources to address them. With this in mind, they do not have any resources to spare. Yet, research published in Tech-Clarity's report, Reducing Non-Value Added Work in Engineering, **"***Engineers spend a third of their time on non-value added work. Even worse, 20% of their time is spent working with outdated information, which often leads to wasted effort and rework."* Figure 1 shows the breakdown of that non-valued added time.

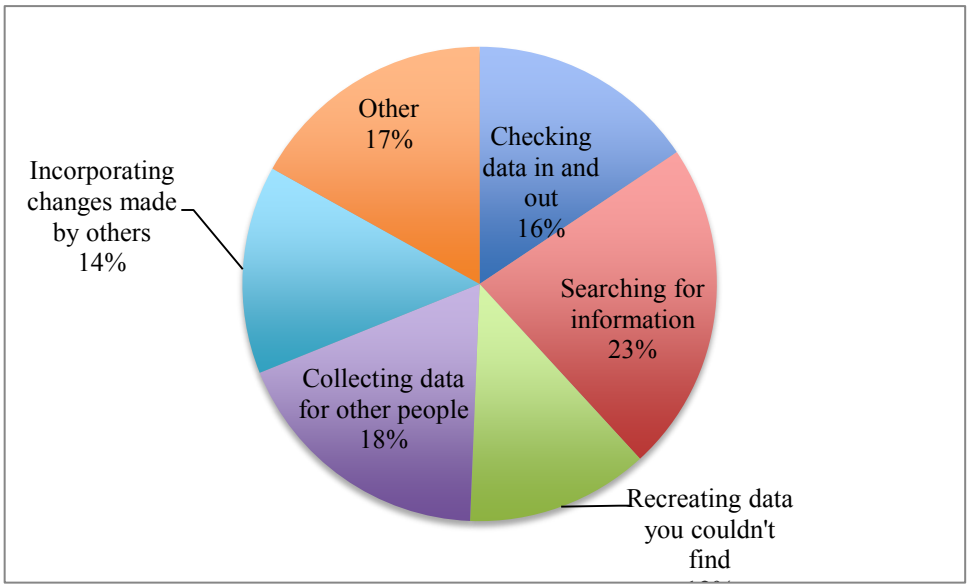

Figure 1: Breakdown of Non-Value Added Time

Turning to a design platform on the cloud can be a way to help. The adoption of cloud technology continues to grow as applications for both personal and business applications become readily available.

Engineers spend a third of their time on non-value added work. Even worse, 20% of their time is spent working with outdated information, which often leads to wasted effort and rework.

As stated in Tech-Clarity's Assessing the Cloud PLM Opportunity, "*Cloud computing is generally recognized as the next generation of information technology (IT) architecture. Large and small companies alike are using cloud solutions to simplify their IT*

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infrastructure. These companies are taking advantage of lower costs, faster time to value, and increased agility available from Internet-based applications. Many companies have already moved applications such as e-mail, customer relationship management (CRM), collaboration, and other systems into the cloud." As an example, companies such as Salesforce.com have proven success with a cloud-based, enterprise solution, even with highly sensitive customer data. ERP is another example that is finding success on the cloud. Based on research done for Tech-Clarity's report, Modernizing Manufacturing Systems with the Cloud, *"...cloud ERP results in a better, lower risk implementation than most companies could support in-house, offering web class performance and reliability*."

Large and small companies alike are using cloud solutions to simplify their IT infrastructure. These companies are taking advantage of lower costs, faster time to value, and increased agility available from Internet-based applications.

Given the success of other cloud applications, it makes sense that those benefits would also extend to a design environment on the cloud. Companies such as AKKA Technologies have found just that. AKKA Technologies is a French company that provides engineering and technology consulting services for the transportation and mobility, aerospace and defense, energy, life sciences, and hi-tech industries. Philippe Obry, Chief Innovation Officer at AKKA Technologies says, "*Designing products on the cloud has led to a 30-40% reduction in development time. The time savings come from combining the expertise of multiple team members on a single platform and giving them easy access to the design data*."

Designing products on the cloud has led to a 30-40% reduction in development time.
Philippe Obry, Chief Innovation Officer, AKKA Technologies

Such significant time savings can turn into a real competitive advantage. This report details the business value and return on investment that can be achieved when designing products on the cloud.

Lower IT Costs

One of the more immediate impacts of a cloud environment for design is the reduction of internal IT infrastructure. Comments Obry from AKKA Technologies, "*We want to focus on our core competencies without the distraction of worrying about managing IT tools or network infrastructures*." A cloud environment provides this.

One of the first benefits companies might notice is the speed of the initial implementation. This is something Shaderfarm, a hi-tech company in Japan that

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specializes in rendering technologies, noticed right away. Says Mika Ishikawa, Founder and President at Shaderfarm, "*When we first started using design software on the cloud, it took less than a day to get it running. It was nice because we didn't need to be knowledgeable about the server technology or databases. Our customers don't need to worry about the technology either*."

We want to focus on our core competencies without the distraction of worrying about managing IT tools or network infrastructures
Philippe Obry, Chief Innovation Officer, AKKA Technologies

In addition to a faster implementation, companies can also avoid investments in expensive infrastructure, including servers that can become obsolete after only a few years. "*The infrastructure to support a design environment is very expensive*," observes AKKA's Obry. "*Plus the time waiting to implement it takes away from productivity. With the cloud, you can externalize the infrastructure investment. This way you can immediately focus on your business and how you add value for your customers*." This reduced cost leads to greater profitability for the business.

With a cloud-based design environment, setting up new projects is especially easy. This can be particularly useful for project based companies or those that involve third parties in the development process. Adds Obry, "*With our cloud-based design environment, the agility of starting a new project is very nice. With just a few clicks, the right people have access and everyone can start working*."

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Designing products on the cloud does not necessarily limit other solutions that must integrate with design tools either. This was an important consideration for New York based SHoP Construction (SC), an engineering and construction services firm. "*We need to apply the right tool to the right problems and sometimes that involves using a variety of design and project management tools from multiple vendors*," comments Erik Churchill, Senior Project Manager at SHoP Construction. "*It is nice that we are still able to use this varied toolset with our cloud-based CAD solution*."

Let Innovation Drive Business Decisions

A cloud-based product design solution can also provide business agility. Decisions can be based on what's right for the business rather than working around limitations imposed by

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the infrastructure. Obry from AKKA Technologies explains that before moving to a cloud environment, the IT infrastructure was a constraint for innovation. "*Prior to starting a new project, we had to ask IT for the tools and infrastructure, then wait for them to get back to us*," says Obry. "*Waiting for those approvals and budget allocations ate up valuable time*." As an example, Obry describes a new project that needed a new server. "*First we had to evaluate the server, then obtain it, and finally install it. This whole process wasted 6 weeks. We cannot work this way and stay competitive*." He finds that the cloud offers more of a 'plug and play' solution. Comments Obry, "*When the business needs additional infrastructure for a new project, it's 3 days to get access and set up the server and 15 minutes to set up the new project with the needed tools*." Going from a 6 week delay to just a few days gives development teams that much more time to innovate, come up with better designs, and offer even more value to customers.

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Create Expense Flexibility

A cloud infrastructure also eliminates big upfront investments. By designing products on the cloud, you can pay for what you need, when you need it. Says Ishikawa of Shaderfarm, "*If we temporarily need a new modeling toolset, we can just purchase a three month license. It is quick and easy and gives us a very flexible platform*."
This flexibility can be especially helpful for project-based businesses. The traditional method for buying software means a large upfront investment, which is a capital expenditure. Since cloud software is pay as you go, the investment becomes an operating expense for the project. From a business perspective, this flexibility moves IT from a cost center to a contributor of business outcomes. There is also flexibility to adjust capacity as needed. As the project ramps up and more team members get involved with the project, more licenses can be acquired. Then when the project winds down, those licenses can be decreased.

If we temporarily need a new modeling toolset, we can just purchase a three-month license. It is quick and easy and gives us a very flexible platform.
Mika Ishikawa, Founder and President, Shaderfarm

Another benefit for those using cloud-based software: the vendor assumes more risk for their customers. With the traditional model, after purchasing the software, the customer has assumed the risk of making sure the software investment works for the business. In some cases, additional functionality may have been bundled with the initial purchase. It is then up to the customer to figure out how to take advantage of that additional

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functionality or it "sits on the shelf" unused. With the cloud model, the vendor assumes some of that risk since there is not a big upfront investment. The vendor is even more vested in making sure the customer realizes the full value of all purchased software so that the customer will want to continue the subscription.

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Enable Better Collaboration

Beyond IT benefits, product design on the cloud also offers many strategic benefits for design. As found in Tech-Clarity's research, Reducing Non-Value Added Work in Engineering, 32% of engineering time is wasted on non-value added work. Much of this time is related to searching for information, not finding it, or collecting it to share with others. Since a cloud environment shares models in real time, much of this non-value added work is eliminated so engineers and designers can complete their work in less time or use that valuable time for innovation and better designs.

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The research also found that 41% find it takes a couple of days or more for engineering change information to get to the entire team. Working with outdated information for two or more days risks wasting efforts on work that will later need to be redone once the updates are received. With the cloud, this problem can be avoided. The model is shared via the cloud so all team members can actively work on the model simultaneously and they will see changes as they happen. This changes the way engineers work together as they are now communicating by sharing rather than sending. In a sense, it brings the "sharing economy" to engineering. Further research from the engineering efficiency report found that Top Performers, defined as those who are better than their competitors at quickly and efficiently designing high quality, innovative products that meet cost targets, are nearly 2-times more likely to maintain up-to-date models (59% versus 31%). Because of this, Top Performers are less likely to waste time fixing models due to outdated information. "*From my perspective, the biggest value of designing products on the cloud is linking disparate partners into one sandbox so that is everyone is working with the same thing*," says SHoP Construction's Churchill. "*Email is too linear to be effective. The real time collaborative environment created by the cloud meets our needs very well*."

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From my perspective, the biggest value of designing products on the cloud is linking disparate partners into one sandbox so that is everyone is working with the same thing. Email is too linear to be effective.
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This connecting of people happens regardless of where individual team members are. Comments Ishikawa from Shaderfarm, "*Since we are global, we might have one person in Europe and another in Japan. Designing on the cloud gives us some interesting tools to efficiently work together*."

It also makes it easier to connect people with different expertise to overcome silos of knowledge as AKKA Technologies has found. Says Obry, "*By designing on the cloud, we are able to connect different specialists together. Empowering them to easily collaborate together leads to greater innovation*."

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Philippe Obry, Chief Innovation Officer, AKKA Technologies

Companies can also connect with their customers to be more in tune with what their customers need or are trying to do. Overall, this collaborative environment means each team member has real-time access to the design as it evolves. This should minimize the need to wait for information and should result in a more efficient design process.

Extend Access Beyond Engineers and Designers

In addition to improving collaboration within the design team, the cloud also helps to involve other people in the design. Just making the 3D model more readily available helps. SHoP Construction has found easier access to the 3D model has improved communication. Says Churchill, "*It is very easy to misinterpret complex geometry. Anytime you can get people looking at a 3D model, it is much easier to visualize the design, regardless of complexity, especially for those not doing the design work*." Churchill goes on to explain how the cloud has made it possible to give more people access to the model. "*With our cloud-based design solution, we can pull up the model in a client meeting. Even partners can get involved and provide input. We can look at 'where is that pipe bending' and in a collaborative 3D space, it is easy to catch potential problems and make sure our clients are happy before we build anything*." This improved collaboration leads to better decisions and better designs.

SHoP Construction has also found they can now get valuable input from less technical team members. "*We can even get people involved who have little modeling experience. They can see it in 3D so it is very easy to visualize the design and they can quickly find*

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what they need," says Churchill. "*It makes the communication of project information incredibly powerful. We had 20 people in India who didn't have modeling experience and they were able to get in and markup and share with the team. The communication between design and construction and how we communicate around the world is drastically better*."

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As an unexpected benefit, this collaborative design environment creates greater project visibility and others want to get involved. Churchill explains, "*One of the biggest surprises has been on the personnel side. You put the tool in front of a new team and see how quickly people want to be a part of it. It is like getting an invite to a new party*."

Improve Processes

By facilitating the free flow of information without the inhibitions of technology infrastructure, companies have an opportunity to rethink and optimize their processes. Companies often have to compensate for information bottlenecks in their process. With more streamlined access to information, companies can think through how the process should work, rather than working around technology limitations.

Previously, we would send a drawing to engineering and it would take 5 days to get it back and no one could track it. Now, the cloud is changing the way we think.
Erik Churchill, Senior Project Manager at SHoP Construction

SHoP Construction's Churchill explains their former process before using the cloud. "*Previously, we would send a drawing to engineering and it would take 5 days to get it back and no one could track it*." Implementing a cloud-based design environment has changed this. "*Now, the cloud is changing the way we think*," says Churchill. "*Moving everything to one environment, in one place, is helping us define better processes. We can link together information and strategically think through what our workflows should be. This is leading to greater efficiency*."

Overcome Security Concerns

While product design on the cloud offers many benefits both from an IT perspective and strategically, there may still be some concerns over security. "*Every client expresses some concerns over security*," says Churchill. "*We have been able to overcome these concerns by showing them white papers that explain the extent of the work that has been done to ensure data is secure and protected*." It can also be helpful just to test it out.

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"*When people have concerns over security, I let them see and test it*," says Ishikawa from Shaderfarm. "*When they find they are restricted from downloading anything, they are often reassured because they see there is more control over who has access to the design and when*."

We have been able to overcome security concerns by showing clients white papers that explain the extent of the work that has been done to ensure data is secure and protected.
Erik Churchill, Senior Project Manager at SHoP Construction

While there may be concerns about the security of a cloud infrastructure, many companies are surprised to find that by using the cloud, their data is actually even more secure than it would be using their existing internal infrastructure. As stated in Tech-Clarity's report, Assessing the Cloud PLM Opportunity, "*Cloud providers base their business success on providing security and uptime. They can afford top-notch experts (some of whose salaries might rival the executives in a small manufacturing firm) because they are leveraging these resources across multiple companies*." This means that in some cases a cloud provider may keep data better protected than a company can protect it itself.

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Small and medium size businesses (SMBs) who think their smaller size keeps them safer from attacks would be mistaken. A study done by the National Cyber Security Alliance and Symantec found that 77% of SMBs think they're safe from hackers, viruses and malware. However, 83% of SMBs do not have anything formal in place to protect against cyber threats. Unfortunately for SMBs, the study found that 44% of all attacks are aimed at SMBs so they are not spared the need for high levels of security.

It is very difficult for a smaller company to dedicate all the required resources to keep their data secure. On the other hand, these resources have already been dedicated to a cloud solution. A vendor with a cloud solution can offer protections such as security cameras, background checks, and dedicated teams to attempt hacks to expose potential vulnerabilities. These additional steps can be cost prohibitive for a small company, but have already been taken care of when using a cloud solution.

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A vendor providing a cloud solution can also dedicate resources to stay regularly informed of the latest top security threats such as those identified by the Open Web Application Security Project (OWASP), a worldwide organization focused on improving software security. The vendor can offer further protections through redundant disks, disaster recovery, and backup and restore procedures should anything happen to the data. All of these additional precautions mean a vendor providing a cloud solution may be better positioned to protect data than a company can on its own.

Conclusion

It can be very difficult for companies to differentiate their products. Enabling product development teams to innovate is key to improving product profitability. However, giving engineers the time needed to innovate can often be a challenge. "*Overall, product design on the cloud enables companies to work more efficiently*," says Shaderfarm's Ishikawa. "*Small companies like ours can tap into resources that previously were only available to bigger companies. Not only does it allow us to do business globally, but we also have the flexibility to run our business the way we want to do*." With this improved efficiency and better collaboration across the team, companies can be better positioned to be more innovative.

Small companies like ours can tap into resources that previously were only available to bigger companies.
Mika Ishikawa, Founder and President, Shaderfarm

In addition to enabling more efficiency and greater creativity, the benefits of a cloud-based design platform can even create a competitive advantage. The environment allows customers access to such rich information throughout the design process, customers are offered a unique experience and higher level of service they appreciate. This can often provide just the differentiation a company needs to set itself above the competition. "*We put it right into our proposal that everyone will be able to work in the same environment*," says Churchill from SHoP Construction. "*The level of detail we can share with our customers combined with this environment certainly sets us apart and our customers want to do business with us*."

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Erik Churchill, Senior Project Manager at SHoP Construction

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Recommendations

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

- Understand the IT costs associated with managing the infrastructure for the design environment
- Consider the IT advantages of a cloud solution
- Identify limitations in your ability to meet customer needs due to lack of flexibility within your IT environment
- Understand how your CAD licenses meet your capacity needs
- Think through how investments in design solutions are recognized by the company and if there may be advantages to restructuring them
- Understand how engineers spend their time and improve processes to facilitate collaboration and minimize time wasted on non-value added work
- Share design details with a wider audience, including customers and those outside of engineering and design to maximize input, catch potential problems, and ensure customer needs are met
- Identify processes that are less than optimal due to limitations of the IT infrastructure
- Evaluate opportunities that improve your customer's experience when working with you and set you apart from your competition
- Increase awareness around the security vulnerabilities without your own IT infrastructure

About the Author

Michelle Boucher is the Vice President of Research for Engineering Software for research firm Tech-Clarity. Michelle has spent over 20 years in various roles in engineering, marketing, management, and as an analyst. She 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 began her career holding various roles as a mechanical engineer at Pratt & Whitney and KONA (now Synventive Molding Solutions). She then spent over 10 years at PTC, a leading MCAD and PLM solution provider. While at PTC, she developed a deep understanding of end user needs through roles in technical support, management, and product marketing. She worked in technical marketing at Moldflow Corporation (acquired by Autodesk), the market leader in injection molding simulation. Here she was

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instrumental in developing product positioning and go-to-market messages. Michelle then joined Aberdeen Group and covered product innovation, product development, and engineering processes, eventually running the Product Innovation and Engineering practice.

Michelle is an experienced researcher and author. She has benchmarked over 7000 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.

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