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In-House or Outsource?

Six Business Advantages Of Owning An In-House 3D Printer

stratasys

White Paper

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The benefits of 3D printing and rapid prototyping are numerous and well recognized. Whether it's design validation, functional testing or faster launch of new products, executives seldom need to be to be convinced of the benefits. Still, many businesses continue to outsource 3D printing because they believe ownership is cost prohibitive.

What many companies don't realize is that 3D printing has advanced dramatically; the availability of a new breed of high-quality 3D printers at affordable prices now discredits the argument that they are too costly. What's more, the lower upfront costs of 3D printers represents just the tip of the tangible benefits: Even with relatively few modeling builds, having in-house 3D printing capabilities provides a range of operational and business benefits that provide real bottom-line advantages. The six key advantages an in-house 3D printer offers discussed in this white paper are lower costs; accelerated time to market; competitive advantage; fewer manufacturing errors; greate confidentiality; and improved model accuracy and quality.

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1. Lower Costs

An outsourced prototype can cost from several hundred dollars for a simple design to thousands of dollars for a more complex model – as much as three to five times that of a part printed inhouse. Creating the same prototype on an in-house 3D printer brings a significant cost saving, even if your company prints only two models per month on average.

These savings are augmented by designers and developers not having to wait for prototypes to return, time to market savings, and savings on reduced manufacturing errors due to the ability to print many prototypes, discussed in categories below.

One Fused Deposition Modeling (FDM®) customer Akaishi, estimates it reduced costs by 73% with in-house prototyping versus the traditional outsourcing method.

> “Outsourcing to local service bureaus had a 10-day lead time and high expense for a single round of prototyping of an unverified design. We bought the Dimension® 3D Printer to bring prototyping back in-house. Now, we can verify the functionality as much as we want because the cost to make prototypes is low.”
>
> Mr. Makoto Muraoka
> **Akaishi**

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2. Accelerated Time To Market

Turnaround time with outsourcing rarely takes the perceived two to three days to get models back. In fact, it normally takes around a week or longer. Most delays take place before a model order is placed, in large part because of the prohibitive cost of outsourced prototyping. For example, a company might not order a model until the design is advanced enough that the company feels it's worth spending the money.

Including internal design review meetings, order placement, approval processes and other procedures, the total design delay time can be five or 10 times the actual turnaround time when outsourcing. And in many cases, this process may be repeated two or three times before a product design is finalized for production. Delayed time to market is not the only cost: Even though some things can be done in parallel, a significant amount of time is spent waiting for models to return from an outsource provider.

In comparison, an in-house 3D printer produces a prototype within hours, rather than days. Additional time can be saved by printing during the night or over the weekend. This can shave weeks off the development cycle and dramatically accelerate time to market for new products and new features for existing products.

Additionally, because development continues while a design is at the outsource provider and after the model comes back, designers are often caught in a development time lag with prototypes that are already obsolete. The ability to quickly print 3D models in just hours means decisions can be based on accurate prototypes and data.

In a survey of over 1,000 Stratasys 3D Printer owners, almost onethird reported experiencing a 25 percent or higher improvement in product launch times. More than half of respondents reported a product launch time improvement of at least 10 percent or more (see chart on page 3).

> “The Dimension [3D Printer] was easy to operate, the cost was right and the speed of build was great. We can digitally make these products, print them out and have a prototype in hand in a couple of days.”
>
> John Mason
> **Senior Product Developer, Cool Gear, Inc.**

Cool Gear, Inc. saved more than 12 weeks getting products like its food storage containers and water bottles to market by switching to in-house 3D printing.

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3. Frequent Prototyping Competitive Advantage

Many factors can slow down the introduction of new products during the product development lifecycle – everything from choice of tools to time spent waiting for prototypes to arrive from an outsource vendor. Sidestep this problem with an in-house 3D printing system: Early-stage and frequent prototyping leads to more effective product launches, enabling a company to introduce new innovations to market ahead of their competitors.

Consider: If a picture speaks a thousand words, how many thousands does a life-like 3D replica speak? Designers can quickly visualize all their product ideas by avoiding lengthy processes, budgetary decisions and approvals for outsourcing. Innovative design ideas can be effectively communicated with 3D models, ensuring that great ideas are not overlooked because team members and managers didn't understand the designer's explanation. The same visual power of an accurate 3D model can turn ideas into winners in front of customers. The ability to quickly print physical models that customers can see, touch and play with is instrumental in winning bids or gaining approval to proceed with jobs.

Frequent in-house prototyping allowed Fender Instruments to play around with design until it found the perfect solution.

> "Having an in-house Objet® 3D Printer means we can experiment more. It's given us a lot of freedom and creative latitude. If I have an idea for something new and edgy, I can design it and have a prototype in just a few hours. If it doesn't work out, I've only used an afternoon instead of a week."
>
> Shawn Greene
> **Senior Industrial Designer, Fender Instruments**

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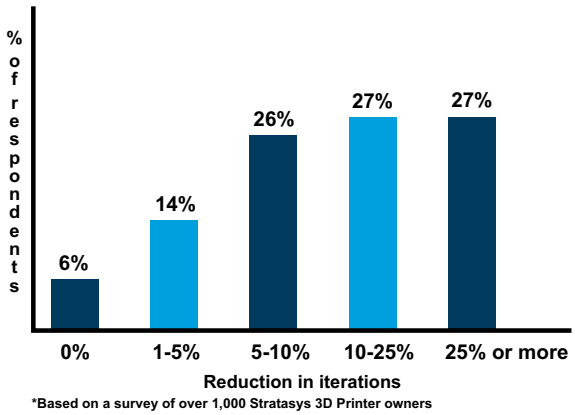
4. Fewer Manufacturing Errors

Prototyping reduces manufacturing costs by finetuning designs before molds and die casts are made. When prototyping is readily available and can be done inexpensively in multiple iterations, the potential for design errors is significantly reduced. Designers can test out different ideas to find the optimal design, using small variations on the model to check for functionality. In a recent survey of over 1,000 Stratasys 3D Printer owners, almost one-third of respondents were able to reduce iterations by 25 percent or more by having a 3D printer in-house. More than half of the respondents reported a reduction of up to 10 percent thanks to their in-house 3D printer (see chart on page 3).

Reduced design cycle iterations by having a Stratasys 3D Printer in-house*



*Based on a survey of over 1,000 Stratasys 3D Printer owners

> “Manufacturing dental models using our Objet 3D Printer has contributed increased speed, consistency and accuracy – and enabled a new cost-effective business model.”
>
> Markus Dohrn
> **general manager,**
> **DCD Dental Consulting**

DCD Dental Consulting Laboratories used its in-house 3D printer to create accurate dental models that produce perfect fits and excellent aesthetic results.

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5. Greater Confidentiality

In today's competitive market, a leaked design may spell disaster, making it imperative to ensure confidentiality.

Keeping rapid prototyping in-house with a 3D printer eliminates the need to transmit design files to any external network. It ensures that designs never leave the company premises, safeguarding intellectual property.

NASA uses Stratasys to create its 3D prototypes using FDM Technology™. FDM is the only 3D-printing method that supports production-grade thermoplastics, which are lightweight but durable enough for rugged end-use parts.

6. Improved Model Accuracy And Quality

Regardless of how a prototype is produced, the goal is to accurately simulate the real-life product. In every field, high-quality, precise models are vital for form, fit and function testing. Quality 3D printers provide functional and visual accuracy. They can print the smallest features and finest details, smooth surfaces, and even moving parts, in a single build. And, with a choice of model materials and varied post-processing options, it is possible to create models that closely resemble the end product. With today's affordable 3D printers, it's possible to create stunning models at a far lower cost in-house compared to outsourcing.

> "The part quality and finish are as good as the stereolithography parts we used to get from our service bureau. And we can have a part in just a few hours, versus several days and lots of paperwork when we had to outsource."
>
> Mike Zeigle
> **Manager, Prototype Development Group, Trek Bicycles**

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Summary

Having in-house, quality 3D printing capabilities offers significant benefits for the entire product development cycle. Model creation takes hours instead of weeks; costs a fraction of outsourcing; delivers comparable or better quality and accuracy; and enables frequent iterations, speeding up design changes and ensuring quality. 3D printing also promotes creativity and innovation and allows accurate design verification before embarking on costly pre-production.

Return on investment with an in-house 3D printer is typically fast, even when outsourced modeling is low-volume. The short-term economic return becomes long-term advantage through enhanced innovation, increased confidentiality, more productive design cycles, higher-quality designs and faster time to market.

All of the advantages of in-house 3D printing are possible with Stratasys 3D Printers.

> “Because the Dimension 3D Printer saves time over out-of-house printing, we can keep our minds fresh on the design. Each day, we can continually improve a design rather than having to refresh our minds after time away. We can stay with one product and not have to bounce around between projects while waiting for a model to come back.”
>
> Brandon Davey,
> **Senior Designer, NEMO Equipment**

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