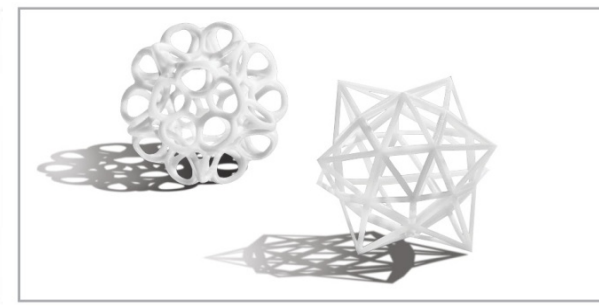
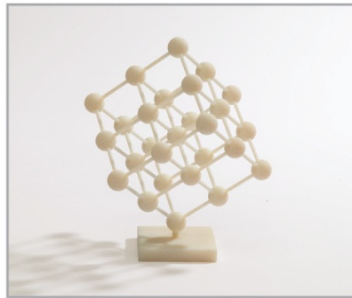


White Paper: In-House or Outsource? 6 Business Advantages of Owning a Desktop 3D Printer

April 2011
Objet Geometries Ltd.













In-house Desktop 3D Printing – Understanding the Business Benefits

The numerous benefits of 3D printing and rapid prototyping have been well-recognized for years. Whether its design validation, functional testing or faster launch of new products – top management seldom needs to be convinced of the benefits. Yet most businesses still outsource 3D modeling, with the most prevalent claim being financial – “our prototyping volume does not justify an expensive in-house 3D printer.”

What many companies do not realize is that the 3D printing industry has advanced dramatically; and the availability of a new breed of high-quality 3D desktop printers at affordable prices now discredits the “too costly” argument. What’s more, the lower upfront costs of desktop 3D printers represents just the tip of the tangible benefits: even with relatively low modeling volumes, having in-house 3D printing capabilities provides a range of operational and business benefits that translate into real bottom line advantages.

The following provides an overview of the benefits of in-house inkjet-based 3D printing over outsourced prototyping.

1. Accelerated Time to Market

Time savings					
Day 1	Day 2	Day 3-4	Day 5-8 (Including weekend)	Day 9	Day 10-11
Outsourcing					
 CAD design	 CAD-based design review	 Purchase order	 At service bureau	 Back from service bureau	 Design review with model Final product decision!
OBJET In-house 3D printer					
 CAD design (afternoon)	 Design review with model (morning)				
 Printed model (overnight)	 Final product decision!				

A common myth regarding turnaround time with outsourcing is that “it only takes 2-3 days to get models back.” This is rarely the case. In fact, outsourcing to create a 3D model usually takes around a week.

Most delays take place before a model order is placed, in large part because of the prohibitive cost of outsourced prototyping. For example, a typical response would be to

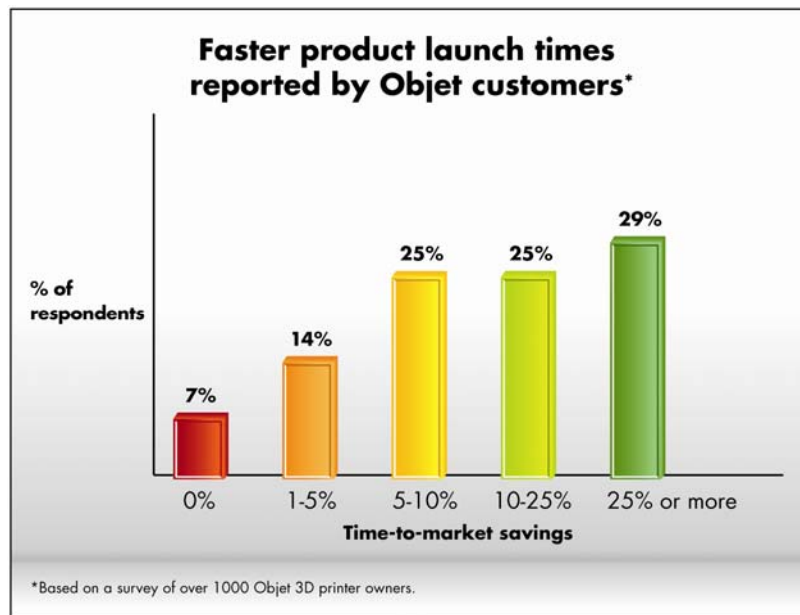


say “let’s not order a model until we have advanced far enough with the design that it’s worth spending the money”.

So, when taking into account 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. In many cases, this process may be repeated two or three times before a product design is finalized for production, compounding the time to market delays. Delayed time to market is not the only cost. Even though some things can be done in parallel, it is estimated that a significant amount of time spent waiting for models to return from an outsource provider is wasted design time.

In comparison, an in-house 3D printer enables a prototype model to be produced within hours, rather than days. Not to mention additional time saved by printing during the night or over the weekend when no one is at the office. This can effectively save weeks off the development cycle – and dramatically accelerate time to market of new products and new features for existing products.

Additionally, because development continues even while a design is at the service bureau and after the model comes back, designers are often caught in a development time-lag. “Ignore this feature; it will not be like this in the final product...” is commonly heard at internal meetings and even at external marketing presentations. With the ability to quickly print 3D models – in just hours – decisions can be based on accurate prototypes and data, instead of imagination.



In a survey of over 1000 Objet 3D printer owners, almost *one-third* reported experiencing a 25% or more improvement in product launch times, with more than *half* of respondents reporting a product launch time improvement of at least 10% or more (see chart above).



With the Objet 3D Printer, Kingstar has reduced production errors, has significantly enhanced efficiency and delivered valuable time savings. Initially, Kingstar estimated time to market to improve by 10 -15%, and, according to Alan Kuo, “we believe that we will be saving more time in the future with Objet’s help.”

- Alan Kuo, Vice General Manager, [Kingstar](#)

Images courtesy of
Kingstar



2. Frequent Prototyping = More Competitive Advantage

New products and innovations are intrinsically linked to competitive advantage. For example, there is a positive correlation between new products and market share. As the life cycle of products decreases, companies must introduce new and better products ever-more quickly to remain competitive.

One of the greatest impediments to the introduction of new products in companies is the product development lifecycle, which is often long and cumbersome. Early-stage and frequent prototyping, made possible by an in-house 3D printing system, sets the ground for more effective product launches, enabling a company to introduce new innovations to market ahead of their competitors.

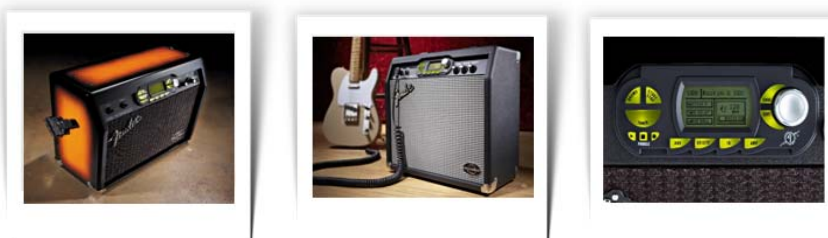
Consider: if a picture speaks a thousand words, then how many thousands does a life-like 3D replica speak? Designers can quickly visualize all their product ideas without being constrained by lengthy processes, budgetary decisions and approvals for outsourcing. Innovative design ideas can be effectively communicated with 3D models, ensuring that great ideas are not overlooked because team members and managers don’t understand the designer’s explanation.

And 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, can be instrumental in winning bids or gaining approval to proceed with jobs.

Having an in-house Objet 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](#)

Images courtesy of
Fender Instruments



“The part quality and finish are as good as the stereo-lithography 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.”

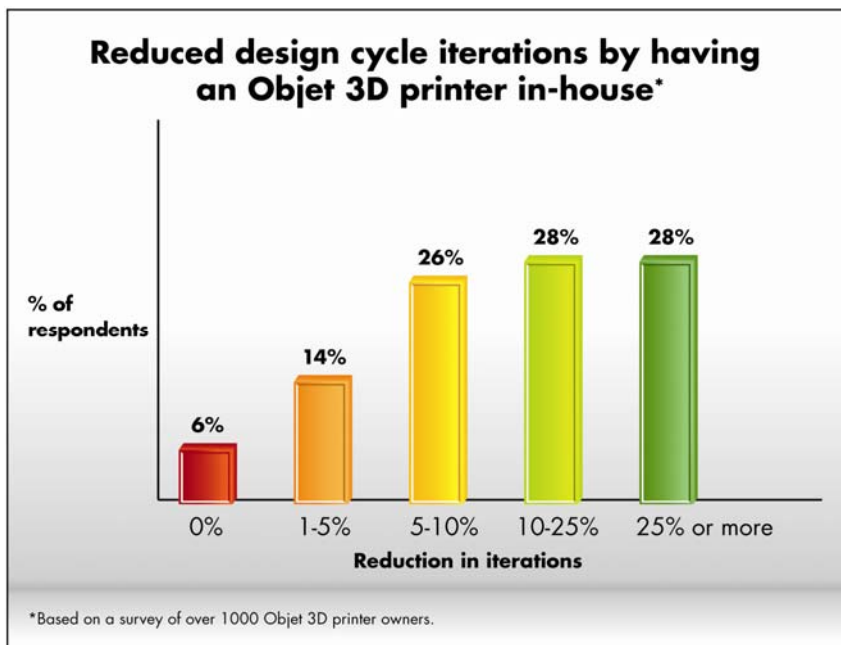
- Mike Zeigle, Manager, Prototype Development Group, [Trek Bicycles](#)

3. Fewer Manufacturing Errors

Prototyping reduces manufacturing errors and saves costs by enabling design details to be fine-tuned before costly molds and die casts are made. This is true whether the prototypes are outsourced or created by an in-house 3D printer.

However, when prototyping is readily available and can be done inexpensively in multiple iterations, the potential for errors is significantly reduced. Designers can test out different ideas to find the optimal design; and small variations can be modeled and checked for functionality.

In a recent survey of over 1000 Objet 3D printer owners it was found that almost *one-third* of respondents were able to reduce iterations by 25% or more by having an Objet 3D printer in-house, with more than *half* of respondents reporting some reduction of over 10% thanks to their in-house Objet 3D printer (see chart above).



“With the improved prototyping process, we can do continuous model verification. Now we can refine the shape before ordering the die, which means there are fewer die errors – which are expensive and time consuming to fix.”

- Yoshiaki Nachi, Deputy Manager Product Development, [KVK Corporation](#)



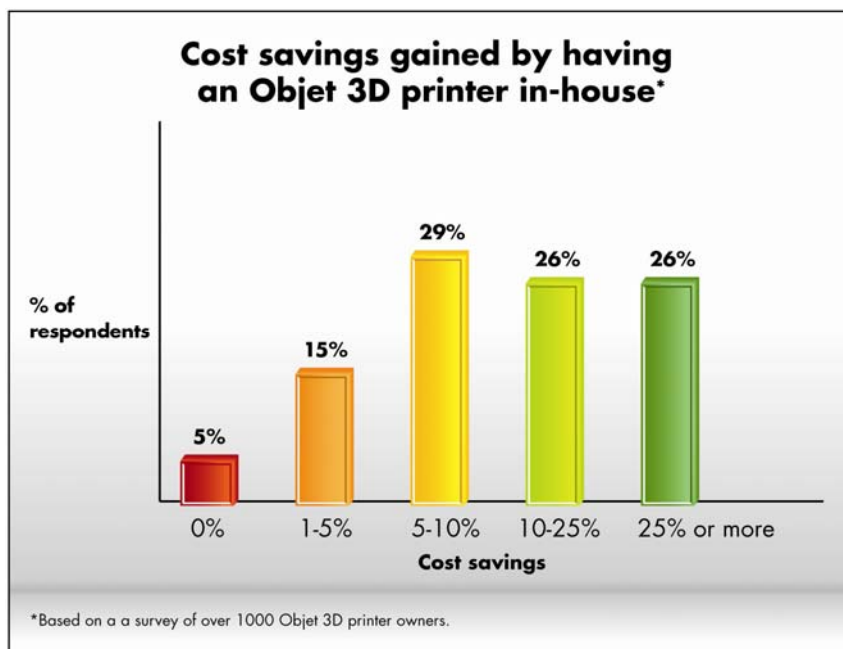
Image courtesy of KVK Corporation



4. Lower Costs

An outsourced prototype can cost anything from several hundred dollars for a simple design, up to thousands of dollars for a more complex model. Creating the same prototype on an in-house 3D Printer can convey a significant cost saving.

It's not unheard of for an outsourced part to cost as much as 3-5 times that of a part printed in-house. Even if printing only two models per month on average, using an onsite 3D printer can produce major cost savings over the costs of sending designs out. In addition to the lower out-of-pocket expenses, there are the savings resulting from 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.



Returning once more to our Objet customer survey; almost *one-third* of respondents reported at least a *25% cost saving* by having an Objet 3D printer in house – with *more than half* reporting a cost saving of at least 10% or more (see chart above).

5. Greater Confidentiality

Another advantage of in-house 3D printing is in terms of the safety of intellectual property. In today's competitive market, a leaked design may be a lost opportunity, making it imperative that companies ensure absolute confidentiality for their designs. Whenever detailed designs are sent beyond the company network and outside the company's physical premises, a potential risk is involved.

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, and intellectual property is better safeguarded.



6. Improved Model Accuracy & 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 fit, form and function testing,

Quality inkjet-based desktop 3D printers that jet ultra-thin layers provide functional and visual [accuracy](#)** that match and even outperform other prototyping technologies. They can print the smallest features and finest details, smooth surfaces, and even moving parts, in a single build process. And, with a choice of model materials and varied post-processing options, it's possible to create models with a look and feel that closely resemble the end product.

With today's affordable inkjet-based desktop 3D printers it's possible to achieve all the accuracy and quality needed for advanced 3D prototyping, at a far lower cost, and with less inconvenience than outsourcing.

"We'd considered moving to in-house rapid prototyping over the years - we're always looking for new ways to help our customers accelerate time-to-revenue for new devices. Unfortunately, every 3D printer we evaluated either didn't meet our resolution standards, or was too expensive, or both. Until we found the Objet Alaris30" (today known as the Objet24/30)

Images courtesy of
Orchid Design



- Brian McLaughlin, Business Development Manager, [Orchid Design](#)

"The high quality of the Objet Alaris30 (today known as the Objet24/30), combined with its affordable price, were an exact fit to our needs and budget."

- Mr. Luo, Head of Technical Center, [Jiangxi Sanchuan Water Meter Co](#)

Summary

Having an in-house, quality inkjet-based 3D printing capability offers significant benefits for the entire product development cycle. Model creation that takes hours instead of weeks, and at a fraction of the cost of outsourcing, while delivering comparable or better quality and accuracy, enables early-stage and frequent modeling of design iterations. This promotes creativity and innovation and allows accurate design verification before embarking on costly pre-production.

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

All the advantages of in-house 3D printing are available with the new Objet family of desktop 3D printers. The Objet24 and Objet30 provide top-quality in-house printing capabilities at an affordable price tag, starting at just \$19,900*.



For more information watch the [Objet 3D desktop printers workflow movie](#), and read more at http://objet.com/3D-Printer/Objet_Desktop_Family/.

For more information on return on investment on how having an Objet desktop 3D printer can positively impact your bottom line, please contact info@objet.com.

About Objet Geometries

Objet Geometries Ltd., the innovation leader in 3D printing for rapid prototyping and additive manufacturing, provides 3-dimensional printing systems that enable manufacturers and industrial designers to reduce cost of product development and dramatically shorten time-to-market of new products.

Objet's ultra-thin-layer, high-resolution 3-dimensional printing systems and materials utilize PolyJet polymer jetting technology, to print ultra-thin 16-micron layers. The market-proven Objet Eden line of 3D Printing Systems, and the Objet24 and Objet30, desktop printers are based on Objet's patented office-friendly PolyJet Technology. The Objet Connex multi-material family is based on Objet's PolyJet Matrix Technology, which jets multiple model materials simultaneously and creates composite Digital Materials on the fly. All Objet systems use Objet's FullCure® materials to create accurate, clean, smooth, and highly detailed 3D parts.

Objet systems are in use by customers worldwide, including Fortune 100 companies, in multiple industries such as Dental, Medical, Medical Devices, Education, Consumer Electronics, Automotive, toys, consumer goods, and footwear industries.

Founded in 1998, Objet serves its growing global customer base through offices in USA, Mexico, Europe, Japan, China and Hong Kong, and a global network of distribution partners. Objet owns more than 50 patents and patent pending inventions. For more information, visit us at www.objet.com, and for more about 3D printing industry-related news, business issues and trends, read the [Objet blog](#).

Additional [Objet case studies](#).

*Price for US. International pricing may vary. Price excludes VAT, options, installation, shipping, taxes and duties.

**The recent [T.A. Grimm & Associates, Inc. 3D Printer benchmark study](#) found that the Objet Alaris30 (today branded Objet24/30) offers the best quality with the highest total accumulated marks for durability, surface finish, dimensional accuracy, and feature details.

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