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Margin Master

Lean Design for Plumper Profits

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Significantly speeding design and then building a more profitable product sounds like an unattainable ideal, but consulting firm Munro & Associates of Troy, Mich. says companies that learn to think outside of the box using a process called "lean design" are in a much better position to build better (and more profitable) boxes. By catching problems early and incorporating improvements in the design phase prior to manufacture, an OEM can **cut design time and make more money**.

Designing in Savings

CEO Sandy Munro likens lean design to a car trip: someone can get in and immediately start driving, or make preparations first and study a map. "Most companies get in the car and say, 'Let's start driving,'" he says. "The ones that are really profitable **figure out how they're going to get there**" first.

According to Munro, a full 70% of the product cost and time-to-market savings a company can realize come during the critical product design phase. Yet most businesses don't recognize this and **try to correct things during manufacturing at much higher cost**. The travel equivalent would be driving to Paris from Berlin via Prague -- no matter how much you speed up, you can't make up the time saved with a straight-line route.

Done right, Munro says **lean design can do wonders for the bottom line**. Shipping a product six months late can lose as much as a third of the profits it would generate if shipped on time. If a product is 9% too expensive due to poor planning, it loses 22% of the potential profit. Munro's figures assume a 20% annual market growth rate, 12% annual price erosion and a five-year product lifecycle. The latter may sound unrealistic, but as he says, "Most of the PC guys claim they only have 18 months [from design to retirement of a design], but all they really do is just change things a little bit" from one model to the next.

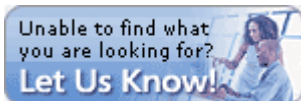
There's Green in Lean

Potential margin increases through lean design techniques

Level	Description	Potential Margin Increase (in % points)
1	Small changes to existing designs	3 - 5
2	Significant changes to existing designs	5 - 15
3	Application of lean design to new products	20 - 30

Source: Munro & Associates, 2005

Just as being late or over budget can pummel margins, being early or cutting costs boost profits.



Munro suggests that shipping product six months ahead of competitors can **increase margins by as much as 30%**. Similarly, reducing costs by just 9% as a result of smarter design planning can increase net profit after taxes by 22 to 25%. Lean design makes early delivery and cost savings possible.

A more thorough design process might be seen as extravagant and lean design usually requires 20% more up-front engineering time. But Munro says that most companies can increase their development costs by half and still lose only 3.5 percentage points in margins, so the potential gain far outweighs the expense. In the balance, he has seen **OEMs improve margins from 3 to 30 percentage points** using lean manufacturing techniques.

Making Designs Lean

Lean design offers clear benefits, but it isn't easy to implement. An OEM must first map the entire design and manufacturing process, approaching the process as though it knows nothing about current operations. That is actually closer to the truth than most companies realize. **"Most people do not know how a product is made, do not know how much it costs, and do not know exactly where they get the parts from,"** says Munro. In this exercise, management will learn surprising things about how purchasing and the production line actually work.

Afterwards the company can **assess product quality using statistical techniques** and the information on components and processes. Only then can management examine how it currently does business with an eye toward improvement. Are there unnecessary steps or parts? Are people assembling systems having to do things like bend rails to slide in boards? Are any components out of published specifications?

To streamline assembly, Munro suggests using the model of BOB (the Blindfolded, One-armed Builder). "If I can't put a product together with BOB, then the design is bad," he says. **Automation can mask inherently inefficient practices.** By planning as though everything were done manually, management breaks old assumptions and forces people to think more creatively.

The Margin Killers

Top process and design areas contributing to wasted profits

1. Excess production and early production
2. Delays
3. Movement and transport
4. Poor process design
5. Inventory
6. Inefficient performance of a process
7. Making defective items

Source: UGS Corp.


Using Outside Eyes

Munro stresses the **importance of fresh thinking from outside the company**. "You already know what the best practices are in the PC industry," he says. In fact, a view from the outside is necessary because of a psychological condition called a scotoma -- literally a blind spot. People become used to a given set of assumptions. When faced with a problem, they try to force solutions into their known context. Someone with different experiences and assumptions can often find a solution that is right in front of them.

Munro includes the people who actually assemble the PCs as valued "outsiders." Although they are from within the company, managers do not always consider their insight, which is forgoing an important resource. "A lot of **our best inventions come from the hourly people,**" says Munro. "Because they have to suffer the problems every day, they always have a solution."

After all the planning and problem-solving comes the most difficult phase of lean design: implementation. Most companies miss at least half of the potential benefits because **management shies away from implementing the changes.** "They're afraid because they don't understand that new technique or new technology," Munro says.

Many managers are also concerned about mistakes reflecting badly on them. This is another reason to engage experts from other industries -- the people who suggested a particular technique or approach are usually the ones with the experience. Over time, **they can transfer knowledge to the OEM's own staff**, which can then sustain the changes.

The amount of work and re-evaluation of what a company has taken for granted over years can be daunting. Munroe finds that most management teams "will never change until their company is flat out next to broke" because they want to believe that problems will magically improve. But for those OEMs willing to re-think design from the ground up, **they will find themselves getting to market faster -- and likely with higher profits.** It's the best type of design of all. 

Success Factors of Lean Design

1. Leadership with an intimate, detailed knowledge of the tools and hands-on experience on a project team
2. A detailed, strategic and all-inclusive action plan
3. Action plan is owned by everyone involved
4. Use of outside resources for new ideas, approaches and technologies
5. Multi-disciplinary design and implementation teams
6. Management commitment
7. Analytical decision making based on data and numbers

Source: Munro & Associates

For More Information

[Economical Experimentation via 'Lean Design'](#)

A discussion of lean design as a method of experimental product development.


[Lean Design: Winning the Battle of Profitability \(PDF document\)](#)

A Munro & Associates white paper on product development using lean design.

[Slash Manufacturing Costs through Lean Design](#)

A publisher and training company's overview of lean design.

About Munroe & Associates

Munro & Associates' (www.munroassoc.com ) patented Lean Design and Six-Sigma-based Quality Report Card (QRC) methods are part of the Munro Design Prophet Suite of services offered by the company. They go beyond other DFM/DFA consulting practices by showing clients how to maximize profit from design, whether the idea is just a sketch on a napkin or in full production. The methods are straightforward, team-oriented and focused on total-accounted cost. Additional offerings include the company's Lean Design and QRC software and competitive benchmarking and reverse engineering services.

About the Author

Erik Sherman is a journalist and photographer whose technology work has appeared in *Electronics Design Chain*, *Electronic Business*, *Electronics Movers and Shakers*, MIT's *Technology Review* and *Newsweek*.

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