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Outsourcing Product Design -- Increasing Revenues without Downtime
by Montie W. Roland

At 4:30 PM on Friday a wild-eyed guy walks into your office. He's not an intruder; instead, he's one of your salesmen with an idea for a new product. "If we had this product, we couldn't keep up with demand!" he tells you. At first you think it's probably just another crazy idea from the sales department. Then you think to yourself, "It's Friday, what could be the harm in listening? If it's not a good idea for a product, I'll just kick him out and start my weekend early." Pretty soon it's 5:30 and you realize this isn't just an idea, it's a significant opportunity. The problem is that you don't have time to do the design work yourself. "This is a small company and your time is better spent solving problems and putting out day-to-day fires. The engineering group (YOU) doesn't have time to follow up on it," you explain to the salesman.

This type of conflict occurs every day in small-to-medium size companies all across North Carolina. As an engineering manager, you must balance the needs of manufacturing and administration against the possibility of increasing company revenues through the design, manufacture and sale of new products. Often, putting out day-to-day fires consumes the bulk of your time. This is when outsourcing the design of your new product may make sense.

Let's take a moment to examine how the process of outsourcing product design works. Imagine that you give Montie Design a call in the morning to invite me to visit your facility. When I arrive you give me a short tour and show me the products that your company currently produces. Then we sit down in your office and discuss the steps that we might take to make this new product idea a reality.

The first step is to define the product. Someone in your company must believe that there is a strong need for this product; otherwise, we wouldn't be having this discussion. From the strong need emerges a vision for the product. This vision may range from a simple list of requirements to something far greater. For some products a simple list of requirements may suffice. In other cases the vision may include how the product looks, how it works, and how the user interacts with it.

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Once you've developed your vision, it is used to develop of a list of the specific requirements for your product. Each requirement must be considered and challenged. Some requirements are based on "questionable facts" that may -- or may not -- actually be true. One example is "no one will buy the proposed printer if it can't print through six layers of paper." This may have been true in the early days of computers, but as computing technology has become more pervasive things have quickly changed. Today we simply print additional copies when needed instead of using multiple layers of paper at once. Because a product that doesn't fit the market when it is released has little chance of success, it's critical to challenge every requirement before investing time and money in the design process.

In the case of technical products, the next step is often developing a functional concept. The functional concept, or proof-of-concept, proves that the theory actually works. Consider the example of the ink-jet printer: Before the engineers could design an inkjet printer, they had to create an engineering model of a print head. An ink-jet printer sprays tiny droplets of ink onto paper. Before the ink-jet printer could be developed, the engineering team had to build a proof-of-concept print head with enough functionality to confirm that the ink-jet printing process actually worked.

Industrial designers take the product requirements and translate them into a product concept. There are several steps involved in developing this concept. The first is to look at what pieces and what arrangement of pieces are necessary for the product to function. The industrial designer must also consider how the user interacts with the product. Often these two aspects of "function" drive the "form". Form describes how the product looks and feels. In order to ensure that the product is both useful and marketable, the designer must balance the absolute requirement of function with the need for an attractive and well-received form. This process is iterative and requires interaction between the industrial designer and the client. Input from engineering, manufacturing and marketing is critical, and the proposed designs should be reviewed frequently. Often several different product concepts are developed, with one main concept eventually being chosen from among them. The effort in developing several concepts is rarely wasted, as ideas from the other concepts are often incorporated into the one that is chosen.

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The product of this work may include hand sketches, computer renderings, computer animations or physical (rapid prototype, etc.) models.

As the product concept develops, it is important to continuously update the product requirements and begin to develop the product verification and test procedure. The product verification procedure asks questions which confirm whether or not the product meets the requirements. Many companies have product or brand managers who, along with marketing, are heavily involved in the product verification process. In this phase it is also important to begin considering how the product will be tested in order to ensure that you have a quality product which reliably meets the technical specifications. Waiting until after the product is designed can often result in unnecessary delays, such as waiting for test fixtures and test equipment to be fabricated. One often overlooked testing requirement is the need for UL, CE or TUV listings or labeling. Working with the listing agency throughout the design process is crucial to ensure that the product complies with those requirements.

Once you have developed a clear product concept, you move into the detailed design process. During the detailed design process the product concept is transformed from sketches or conceptual computer models into a more concrete product. At this point, CAD systems such as SolidWorks™, Pro/Engineer™, or AutoCAD™ are used to precisely define the assemblies and parts which make up the product. The engineer doing the detailed design works closely with the industrial designer to capture the essence, or design intent, of the product concept. The engineer works to create parts that can be efficiently manufactured, assembled, and tested.

Photo-realistic images generated by the computer (CAD) models are often of high enough quality that they can be used for magazine and print ads. If you so desire, they can be rendered with special surface textures, special lighting, or other special effects. This gives the marketing department a head start on placing ads in publications with long lead times, such as magazines. In competitive markets, the head start this gives your marketing team may translate into significant market share.

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One major advantage of using solid modeling tools, such as SolidWorks™ or Pro/Engineer™, is the ability to verify designs for function, fit or manufacturability before the prototype is even built.

Once the detailed design has sufficiently matured, it's time to build a prototype. This prototype may be very similar to the actual product or it may be a mock-up that uses rapid prototype parts. The key is to use as little documentation as possible when building the first prototype. This minimizes the delay and expense of creating drawings of individual parts that are likely to change. The shipping and point-of-sale packaging can also be designed at this point.

Once the prototype performs as expected, the product can go directly into production. Drawings and manufacturing instructions are part of the documentation package which can be used to manufacture the product in-house or outsource it to a contract manufacturer.

Many of these steps can be successfully outsourced. The goal is to bring your well-designed and well-targeted product into the marketplace as quickly as possible. The more often you work with the same vendor, the more seamless your team effort becomes.

A steady stream of well-designed products is one of the keys to success in today's market. Outsourcing part or all of your product design needs is a good way to get your next, well-designed product out to market faster.

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