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Moving Innovation Closer to the Customer (Order)

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There is profit in innovation. Innovative products clearly attract more attention and interest in the market. If innovation focuses on the right things, the products can also capture the hearts—and pocket books—of customers. However, innovation means different things to different people, and innovation without purpose does not provide corporate value. How can companies enhance innovation and target it to provide the greatest profit for their investment? How can innovation provide most benefit in the product lifecycle and in the supply chain? Can innovation be moved closer to the customer in order to meet their needs, and if so, how far towards the customer's point of order can innovation still be included?

Providing Products that People Want to Buy

Nothing is worse than designing a product that does what it supposed to do, but nobody wants to buy it. Innovation should be focused on delivering customer value or it is wasted effort. Unfortunately, designers often don't have access to all of the information required to design the right product. New products fail for many reasons, with one reason being misalignment between the product capabilities and customer needs. For example, sometimes product requests outline the wrong product concept at the outset of the project, the right product is requested without all of the right features, or the right product is requested but delivered at the wrong price. This misalignment means that the inspiration and energy devoted to innovation is misdirected.

Designing Customer Needs In

In order to build the right product—the product that the customer feels compelled to buy—engineers must have a more complete picture of the customers' needs. Without customer knowledge, designers can focus on the wrong things. Incrementally reducing the cost of a luxury yacht, for example, is probably not as important as improving aesthetics or performance. On the other hand, an innovation that reduces the material cost of a fastener by fifteen percent while maintaining the same mechanical properties may be highly attractive. A design engineer that does not understand what the customer values can spend countless hours optimizing a product characteristic that the customer does not appreciate in terms of competitive differentiation or added sales price.

Customer needs, not watered down generalizations, must become a direct part of the design effort. These needs may come from feedback on existing products, quality programs, supplier input, market studies or direct interaction with customers. Whatever the source of the information, it must be directly tied into the design process. PLM solutions can play a significant role in making the requirements an active part of the design process, by providing broader visibility at the point of design and providing collaboration tools to help validate customer needs outside of the company's four walls.

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Designing Customers Needs In at Order Time

Another, more dynamic approach to focusing products on customer needs is to build or assemble products to customer specifications. As more companies move towards a "to order" manufacturing model, companies have the opportunity to incorporate innovation later in the product lifecycle. A pure "job shop" environment will focus on customer requirements because each order may be unique. Other forms of "to order" manufacturing can also provide value. For example, imagine letting the customer choose from unlimited color, size and material options for a product. Would the customer be willing to pay extra for the benefit of meeting their needs exactly? If they weren't willing to pay a premium, would they at least prefer the tailored product to a standard product offered at relatively the same price? In many cases, the answer is "Yes!" By allowing the customer to indicate their needs at the point of order, customer demands are more readily addressed.

Not all products are suitable for "to order" production at the most extreme level. Nevertheless, moving decisions on product characteristics closer to the customer's point of demand provides opportunities. As design and collaboration tools continue to reduce the effort and lead-time required to customize a product, these opportunities are becoming more readily achievable. Many products, unfortunately, are not designed with customization in mind. In these cases, the effort and cost of customization may be prohibitive. Supply chain realities may also limit "to order" capabilities. At a minimum, however, tracking customization or "to order" requests can serve as a window into customer behavior that allows designers to look for trends and values to design into standard products.

Designing for Customization

The ideal scenario for "to order" products is to design a flexible product platform that can easily be manufactured to customer specifications. Designing this flexibility into a product requires forethought and additional effort, and should be considered an investment in capturing more orders and doing so with higher profit margins. At a minimum, it should be considered an investment in avoiding commoditization. Today's CAD tools provide a solid foundation for customization. Parametric capabilities and modern design and analysis capabilities open up opportunities that previously didn't exist in terms of rapid design changes. Collaborative PLM tools can also play a valuable role by providing a foundation to communicate those changes effectively across the supply chain. The table below provides more information on the value that PLM tools and process can offer to a "to order" strategy.

Manufacturing Strategy	Characteristics	CAD & PLM Needs / Capabilities
Make to Order (MTO) or Make to Stock (MTS)	Standard products designs	Rapidly design standard products Ability to proliferate designs for product variations Provide access to past designs and IP Validate product designs across supply chain
Assemble to Order (ATO)	Features and options Configured product orders Uses standard components	Easily combine components into new assemblies Rapidly validate feature / option combinations Ability to accurately and rapidly estimate cost Communicate drawings and specs to customer and supply chain
Make to Order (MTO) / Light ETO (ETO)	Ordered specifications Configurable components Variable dimensions	Easily retrieve and modify existing designs Communicate and enforce design rules and constraints Quickly select appropriate components for order Easily combine components into new assemblies Rapidly modify and validate components Quickly validate manufacturability Ability to accurately and rapidly estimate cost Communicate drawings and specs to customer and supply chain
Engineer to Order (ETO)	Significant order engineering Orders highly specified Engineered product orders	Easily retrieve and modify existing designs Communicate and enforce design rules and constraints Quickly select appropriate components for spec Easily combine components into new assemblies Rapidly modify and validate components Provide access to past designs and IP Quickly validate manufacturability Ability to accurately and rapidly estimate cost Communicate drawings and specs to customer and supply chain
Job Shop	Significant order engineering Each order may be unique	Rapidly design and validate new components Easily combine components into new assemblies Provide access to past designs and IP Quickly validate manufacturability Quickly validate manufacturability Ability to accurately and rapidly estimate cost Communicate drawings and specs to customer and supply chain

Table 1: Innovating to Customer Needs by Strategy
Source: Tech-Clarity

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Designing products so that customer specifications are relatively easy to incorporate requires a different design approach, an approach that focuses on designing in possibilities and potential capabilities as opposed to premature assumptions and artificial constraints. By delaying the selection of characteristics, manufacturers leave open a larger range of possible designs to the imagination of the customer.

Delivering on the Customization Promise

"To order" products have to be readily ordered, designed to specification and manufactured if they are going to gain market acceptance. If the supply chain, including the manufacturing facility and any impacted suppliers, are not able to respond to customized orders then the value of meeting customer needs gets lost in the drag from excess cost and expanding lead-times. Companies must not only engineer their products for customization, but also their supply—and design—chains. For multi-tier supply chains, this means that all suppliers and the final manufacturer must be able to readily share design and customer specifications. The design and manufacturing processes need to flow from order, through design, to manufacturing cleanly. Clearly these issues expand outside of the Engineering Department and into the broader business. Engineering cannot implement this strategy in a vacuum. However, providing a strong PLM backbone and tight design integration can set the stage for a compelling "to order" business offering. In order to reap the full benefits of these strategies, these PLM systems should offer significant automation in the "to order" process to avoid the potential hazards of long lead-times, higher costs and inconsistent quality that can result from an ineffective "to order" strategy.

Summary

Product designers have the opportunity to make a significant impact on profitability by increasing the level of customer-focused product innovation. By focusing on customer needs, products have a much higher opportunity for success. If the manufacturer can delay the incorporation of customer needs until the product is ordered, they can drastically enhance their ability to design the right product for the customer. With strong PLM tools and processes in place, engineers can play a key role in enabling this business model. Without the right tools, however, "to order" product strategies will likely succumb to unacceptably high prices and prohibitively long lead-times.

About the Author

Jim Brown is the president of Tech-Clarity, a research and consulting firm dedicated to making the value of technology clear to business, where he is a frequent author and speaker on applying software technology to achieve tangible business benefits. Jim also serves as the PLM Analyst for Technology Evaluation Centers and The PLM Evaluation Center.

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